OECD Economic Surveys
ISRAEL

MARCH 2018

OECD

OECD Economic Surveys: Israel 2018

OECD
BETTER POLICIES FOR BETTER LIVES

This document, as well as any data and map included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Please cite this publication as:
OECD (2018), *OECD Economic Surveys: Israel 2018*, OECD Publishing, Paris.
http://dx.doi.org/10.1787/eco_surveys-isr-2018-en

ISBN 978-92-64-29171-3 (print)
ISBN 978-92-64-29172-0 (PDF)
ISBN 978-92-64-29173-7 (epub)

Series: OECD Economic Surveys
ISSN 0376-6438 (print)
ISSN 1609-7513 (online)

OECD Economic Surveys: Israel
ISSN 2225-1839 (print)
ISSN 2225-1847 (online)

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Photo credits: Cover © Dmitry Pistrov/Shutterstock.com.

Corrigenda to OECD publications may be found on line at: *www.oecd.org/about/publishing/corrigenda.htm*.

© OECD 2018

You can copy, download or print OECD content for your own use, and you can include excerpts from OECD publications, databases and multimedia products in your own documents, presentations, blogs, websites and teaching materials, provided that suitable acknowledgment of the source and copyright owner is given. All requests for public or commercial use and translation rights should be submitted to *rights@oecd.org*. Requests for permission to photocopy portions of this material for public or commercial use shall be addressed directly to the Copyright Clearance Center (CCC) at *info@copyright.com* or the Centre français d'exploitation du droit de copie (CFC) at *contact@cfcopies.com*.

Table of contents

Basic statistics of Israel, 2016 8
Executive summary 9

Assessment and recommendations 13
Maintaining solid increases in living standards and well-being in the longer term will be challenging 17
Improving social cohesion would promote sustainable growth 37
Bibliography 61

Annex A.1. **The simulated impact of increasing employment rates on poverty in typical families of the main Israeli communities** 67

Annex A.2. **Progress in structural reform** 73

Thematic chapters

Chapter 1. **Improving the education system to enhance equity** 79
Large dispersion in skills contributes to inequalities 80
Making the education system more inclusive 83
Improving tertiary education to enhance social mobility 98
Improving the effectiveness of life-long learning 106
Recommendations to improve the education and training system to boost productivity and equity 110
Bibliography 111

Chapter 2. **Improving infrastructure to boost productivity and well-being** 115
The capacity and quality of current infrastructure need to be enhanced 116
Building more infrastructure and improving its efficiency will require reforms in several areas 129
Recommendations for promoting suitable and well-functioning infrastructure 150
Bibliography 152
Annex A.2.1. The Management of Infrastructure for water supply in Israel 157

Boxes

1. Disparities in Israeli society 16
2. The high-tech sector: share and development in the Israeli economy 18
3. The economic impact of the natural gas discoveries 21
1.1. A more equal skills distribution will help to reduce wage inequalities 82

1.2. Economic Development Plan for the Arab Sector – Education 87
1.3. Funding of tertiary education in Israel 99

Tables

1. Macroeconomic indicators and projections 20
2. Possible extreme shocks affecting the Israel economy 21
3. Past recommendations on improving the stability and efficiency of the financial system 25
4. Past recommendations on fiscal policy 29
5. Past recommendations on tax policy 30
6. Illustrative fiscal cost and financing of additional spending in the structural reform scenario 32
7. Past recommendations on housing policy 35
8. Past recommendations on labour market policies 40
9. Past recommendations on social policies 41
10. Past recommendations on education 47
11. Past recommendations on improving product market regulation and lowering trade protection 51
12. Past recommendations on infrastructure 57
13. Past recommendations on environmental policies 59
A.1.1. Gross earnings in 2015 69
2.1. Fiscal consolidation during 1998-2007 122
2.2. Number of airport service providers in selected OECD countries 146

Figures

1. Israel's economy is performing strongly 14
2. Well-being outcomes are mixed 15
3. Inequality and poverty remain high 15
4. Education outcomes are poor for disadvantaged groups, whose share is growing 17
5. Exports of goods by market and commodity are fairly diversified 19
6. Competitiveness has been hit by exchange rate appreciation 19
7. Evolution of macro-financial vulnerabilities 22
8. Capital ratio and non-performing loans 22
9. Inflation developments according to the CPI 23
10. The labour market continues to tighten 23
11. Packages sent to Israel from abroad are rising rapidly 24
12. Inflation expectations are low in the short term but within the target range thereafter 24
13. Market interest rates have stabilised, but mortgage rates have risen somewhat . . 26
14. Banks' exposure to the housing sector is high, but housing credit has slowed . . . 26
15. The gap in GDP per capita with the OECD average could shrink further with ambitious reforms 27
16. Factors contributing to the gross debt-to-GDP decline between 1998 and 2016 . . 28
17. Primary civilian expenditure 29
18. Public debt sustainability would benefit from the enactment of further reforms . . 32
19. House prices are elevated and still rising 33

20. Household spending on housing has increased, but total household debt is low . . . 34
21. Housing supply has strengthened . . . 35
22. Investing in real estate picked up sharply after 2007 . . . 36
23. Participation rates have improved markedly, particularly for disadvantaged groups . . . 37
24. There is a high share of low-paid jobs in the labour market . . . 38
25. Spending on ALMPs, especially training programmes, is low . . . 39
26. The gender wage gap is pronounced . . . 40
27. Poverty rate before and after taxes and transfers . . . 41
28. The share of working poor is high and increasing . . . 42
29. Higher employment of Haredim and Israeli-Arabs may not be enough to lift them out of poverty . . . 43
30. Child poverty is high, while effort to overcome it is low . . . 44
31. High inequalities are related to differences in skills . . . 45
32. Education financing remains low, especially at secondary level . . . 46
33. Poorer students, Haredi and Israeli-Arab students are less likely to enrol in tertiary education . . . 49
34. Israel's business environment remains less favourable than in other OECD countries . . . 50
35. The productivity penalty of small firm size is fairly high in Israel . . . 50
36. Israel could do more to facilitate trade . . . 52
37. There is room to further reduce barriers to trade in services . . . 52
38. Tax procedures for businesses are onerous . . . 53
39. Regulatory management processes can be enhanced . . . 54
40. Public investment in Israel doesn't match its population density, which is rising rapidly . . . 55
41. Inadequate public transport and infrastructure, especially in Arab areas, hinders well-being . . . 56
42. Lack of competition weakens efficiency in airport management . . . 58
43. Environmental indicators . . . 60
A.1.1. Families with one breadwinner are less likely to escape poverty . . . 70
A.1.2. Large families even with two breadwinners would not necessary escape poverty . . . 71
A.1.3. Higher employment of Haredim and Israeli-Arabs may not be enough to lift them out of poverty . . . 72
1.1. Adults in Israel have weak numeracy skills with significant variability . . . 80
1.2. Israel has many low-paid workers, and the effect of skills on wages is particularly strong . . . 82
1.3. The impact of skill inequality on wage inequality . . . 83
1.4. The shares of Israeli-Arab and Haredi pupils are increasing . . . 84
1.5. Israel lags considerably in students' school outcomes, particularly in case of Arab students . . . 84
1.6. Education financing remains low, especially at secondary level . . . 86
1.7. Shortages of teachers are prevalent in Israel . . . 88
1.8. Quality of teachers is weak, particularly in disadvantaged schools . . . 89
1.9. Salaries are relatively low for young and starting teachers . . . 89

1.10. Arab students have worse PISA outcomes and lower educational attainment . . . 91
1.11. Young Haredi adults' skills are weak. 92
1.12. The share of students in VET is slightly below the OECD average 94
1.13. Vocational tracks differ significantly. 95
1.14. Participation in work-based vocational training is weak 96
1.15. Share of tertiary graduates is high in Israel 98
1.16. Number of students enrolled in tertiary education 99
1.17. Annual expenditures per student in tertiary education. 99
1.18. Poorer students, Haredi and Israeli-Arab students are less likely to enrol in tertiary education 101
1.19. Haredim and Israeli-Arabs are most likely to drop out from tertiary studies 102
1.20. Tuition fees charged by public institutions and share of students with financial subsidies 103
1.21. Mismatched workers are higher in Israel. 104
1.22. Workers who are mismatched suffer a large wage penalty in Israel 105
1.23. Differences in skills between younger and older age cohorts are substantial . . 107
1.24. Spending on ALMPs, especially training programmes, is low 108
1.25. There is a high share of workers with low levels of skills 109
2.1. Snapshot of Israel's transport infrastructure. 117
2.2. Electricity production from renewables and air pollution 118
2.3. Telecommunications indicators. 119
2.4. Intensity of freshwater use. 119
2.5. Medical beds 120
2.6. Indicators of regional variation in well-being 120
2.7. Stock of capital and investment in public transport. 121
2.8. Public investment 122
2.9. Investment in transport infrastructure and population pressure 123
2.10. Commercial and industrial area in relation to residential area in Israeli cities . . . 124
2.11. Areas for public amenities 125
2.12. Product market regulation in the network industries 126
2.13. Socio-economic index – Arab vs Jewish municipalities 127
2.14. Total hospital inpatient spending 132
2.15. Deaths from infectious and parasitic diseases 132
2.16. Infrastructure governance indicators, 2016 137
2.17. Change over time in transport investment plans for 2015 138
2.18. Fixed broadband connection 142
2.19. Telecom companies margins 142
2.20. Internet package prices per download speed 143
2.21. Hydrogeological situation of the main natural water sources 145
2.22. Air transport connectivity index, 2015 146
2.23. Airport management indicators 147
A.2.1. Intensity of freshwater use. 157
A.2.2. Water prices 159
A.2.3. Water by source and consumption 161

This Survey *is published on the responsibility of the Economic and Development Review Committee (EDRC) of the OECD, which is charged with the examination of the economic situation of member countries.*

The economic situation and policies of Israel were reviewed by the Committee on 18 December 2017. The draft report was then revised in the light of the discussions and given final approval as the agreed report of the whole Committee on 19 January 2018.

The Secretariat's draft report was prepared for the Committee by Mr. Claude Giorno and Mr Gabriel Machlica under the supervision of Mr. Peter Jarrett. The Survey *also benefitted from excellent consultancy work by Mr Jacques Adda. Research assistance was provided by Ms. Isabelle Luong. Editorial assistance was provided by Ms. Claude-Annie Manga-Collard.*

The previous Survey of Israel *was issued in January 2016.*

Information about the latest, as well as previous Surveys, *and more information about how* Surveys *are prepared is available at* www.oecd.org/eco/surveys.

Follow OECD Publications on:

http://twitter.com/OECD_Pubs

http://www.facebook.com/OECDPublications

http://www.linkedin.com/groups/OECD-Publications-4645871

http://www.youtube.com/oecdilibrary

http://www.oecd.org/oecddirect/

This book has...

StatLinks

A service that delivers Excel® files from the printed page!

Look for the *StatLinks* at the bottom of the tables or graphs in this book. To download the matching Excel® spreadsheet, just type the link into your Internet browser, starting with the *http://dx.doi.org* prefix, or click on the link from the e-book edition.

BASIC STATISTICS OF ISRAEL, 2016

(Numbers in parentheses refer to the OECD average)*

LAND, PEOPLE AND ELECTORAL CYCLE

Population (million)	8.2		Population density per km^2	371.2	(35.4)
Under 15 (%)	27.9	(18.0)	Life expectancy (years)	83.0	(81.0)
Over 65 (%)	11.5	(16.5)	Men	81.3	(78.4)
Foreign-born (%, 2015)	22.5		Women	81.5	(80.6)
Latest 5-year average growth (%)	1.6	(0.6)	Latest general election	March 2015	

ECONOMY

Gross domestic product (GDP)			Value added shares (%)		
In current prices (billion USD)	317.9		Primary sector	1.3	(2.4)
In current prices (billion NIS)	1 220.3		Industry including construction	20.8	(26.7)
Latest 5-year average real growth (%)	3.3	(1.9)	Services	77.9	(70.9)
Per capita (000 USD PPP)	37.8	(42.1)			

GENERAL GOVERNMENT

Per cent of GDP

Expenditure	39.5	(41.5)	Gross financial debt	62.3	(100.3)
Revenue	37.4	(38.6)	Net financial debt	58.7	(65.3)

EXTERNAL ACCOUNTS

Exchange rate (NIS per USD)	3.839		Main exports (% of total merchandise exports)	
PPP exchange rate (USA = 1)	3.779		Manufactured goods	31.8
In per cent of GDP			Machinery and transport equipment	27.5
Exports of goods and services	30.3	(53.7)	Chemicals and related products, n.e.s.	23.7
Imports of goods and services	28.2	(49.3)	Main imports (% of total merchandise imports)	
Current account balance	3.5	(0.2)	Machinery and transport equipment	37.5
Net international investment position	34.3		Manufactured goods	21.0
			Chemicals and related products, n.e.s.	11.2

LABOUR MARKET, SKILLS AND INNOVATION

Employment rate for 15-64 year-olds (%)	68.6	(66.9)	Unemployment rate, Labour Force Survey (age 15 and over) (%)	4.8	(6.3)
Men	72.0	(74.7)	Youth (age 15-24, %)	8.6	(13.0)
Women	65.2	(59.3)	Long-term unemployed (1 year and over, %)	0.5	(2.0)
Participation rate for 15-64 year-olds (%)	72.1	(71.7)	Tertiary educational attainment 25-64 year-olds (%)	49.9	(35.7)
Average hours worked per year	1 889	(1 763)	Gross domestic expenditure on R&D (% of GDP, 2015)	4.3	(2.4)

ENVIRONMENT

Total primary energy supply per capita (toe, 2015)	2.9	(4.1)	CO_2 emissions from fuel combustion per capita (tonnes, 2014)	8.1	(9.3)
Renewables (%, 2015)	5.3	(9.6)	Water abstractions per capita (1 000 m^3, 2014)	0.2	
Exposure to air pollution (more than 10 µg/m^3 of $PM_{2.5}$, % of population, 2015)	99.5	(75.2)	Municipal waste per capita (tonnes, 2015)	0.6	(0.5)

SOCIETY

Income inequality (Gini coefficient[a])	0.346	(0.311)	Education outcomes (PISA score, 2015)		
Relative poverty rate (%[a])	17.7	(11.3)	Reading	479	(493)
Median disposable household income (000 USD PPP[a])	19.1	(23.0)	Mathematics	470	(490)
Public and private spending (% of GDP)			Science	467	(493)
Health care	7.3	(9.0)	Share of women in parliament (%)	26.7	(28.7)
Pensions (2015[b])	5.4	(9.1)	Net official development assistance (% of GNI)	0.11	(0.39)
Education (primary, secondary, post sec. non tertiary, 2014)	4.3	(3.7)			

Better life index: *www.oecdbetterlifeindex.org*

* Where the OECD aggregate is not provided in the source database, a simple OECD average of latest available data is calculated where data exist for at least 29 member countries.

a) 2014 data for the OECD.

b) 2013 data for the OECD.

Source: Calculations based on data extracted from the databases of the following organisations: OECD, International Energy Agency, World Bank, International Monetary Fund and Inter-Parliamentary Union.

© OECD 2018

Executive summary

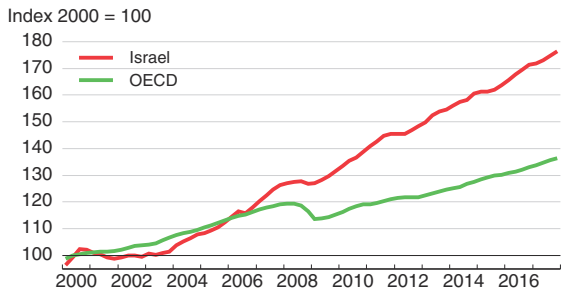
- *The economy is strong*
- *Income inequality has fallen, but economic disparities and a lack of social cohesion persist*
- *Reforming education, infrastructure and product markets will enhance inclusiveness and productivity*

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

The economy is strong

Israel's economy is performing strongly

Real GDP developments



Source: OECD, Economic Outlook Database.

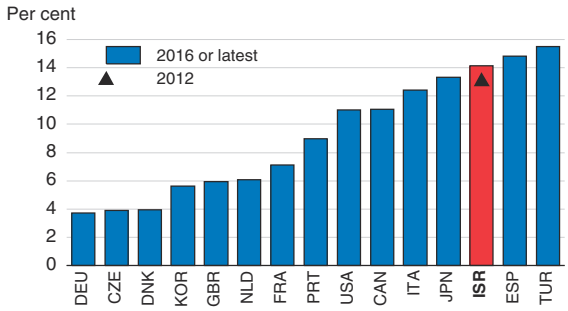
StatLink http://dx.doi.org/10.1787/888933672743

Israel's economy continues to register remarkable macroeconomic and fiscal performance. Growth is strong and unemployment low and falling. With low interest rates and price stability, financial policy is prudent, and public debt is comparatively low and declining. The external position is solid, thanks to a dynamic high-tech sector. The average standard of living is improving, mainly due to higher employment rates. Continued accommodative macro policies and planned investments in the offshore gas fields in the coming years will spur further growth. Against this backdrop, Israelis remain on average more satisfied with their lives than residents of most other OECD countries.

Income inequality has fallen, but economic disparities and a lack of social cohesion persist

The share of working poor is high and increasing

Share of workers in poverty



Source: OECD (2017), *Income Distribution Database.*

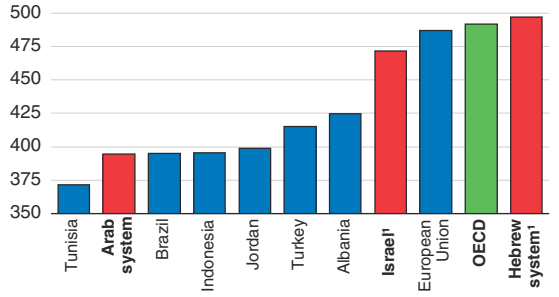
StatLink http://dx.doi.org/10.1787/888933673256

Rapid employment growth has also boosted the income of the poor, benefiting the disadvantaged groups. However, the share of working poor has risen because many workers, notably Israeli-Arabs and Haredim, are in low-paid jobs due to their weak skill sets. Workers from these communities are often trapped in low-quality jobs, implying persistent inequality and weak aggregate productivity. Moreover, low social transfers imply that the often large families in these communities face deprivation that contributes to child poverty. High house prices also weigh on the social situation and well-being. Without further policy action, these trends are likely to worsen, as Israeli-Arabs and Haredim will constitute half the population by 2059.

Reforming education, infrastructure and product markets will enhance inclusiveness and productivity

Education outcomes are poor for disadvantaged groups

Average overall PISA score, 2015



1. Haredi boys did not participate in the PISA test, as they do not study the required material. Results are thus overestimated.

Source: OECD, PISA Database; Shoresh (2017), Shoresh Handbook 2017: Education and its impact in Israel.

StatLink http://dx.doi.org/10.1787/888933672724

To foster stronger social cohesion, a broad set of complementary reforms in product markets, infrastructure and education are critical. Further strengthening product market competition will boost productivity in sheltered sectors. Israel has a large infrastructure deficit, especially in public transport, which causes considerable road congestion and poor air quality, impedes access to the labour market and accentuates spatial segregation of disadvantaged groups living in peripheral zones. Better infrastructure in disadvantaged areas, especially Arab cities, would improve job prospects and well-being. Above all, reforms and more public investment in education would improve the skills of Haredim and Israeli-Arabs, especially women, allowing them to find well-paid jobs in high value-added sectors.

MAIN FINDINGS	KEY RECOMMENDATIONS
Macroeconomic and financial policies, public-sector reforms and the housing market	
The fiscal situation is healthy, with declining public debt. But, despite recent increases, weak public spending on education and infrastructure limits the government's capacity to reduce significant socio-economic disparities and support growth. Extra spending needs to be financed. Tax collection could be improved, and there are a number of inefficient tax exemptions.	• Raise the spending-growth ceiling to make room for higher expenditure on education, infrastructure and poverty reduction, while maintaining the downward trajectory of public indebtedness. • Abolish inefficient tax preferences on fresh fruits and vegetables, medium-term saving in so-called "advanced training funds" (*Kranot Histalmult*) and services in Eilat. Raise more revenue by taxing carbon in the form of fossil fuels. • Hold military spending constant in real terms in line with the existing multi-year defence plan. • Further exploit available databases to improve tax collection.
Despite strong growth, prices have declined in the last three years. However, wage growth is picking up as the slack in the labour market disappears.	• Maintain a supportive monetary policy, but be prepared to move ahead with gradual increases in official rates when inflation becomes entrenched in its target range.
Risks of a house-price correction are still high.	• Maintain strong macro-prudential policies, and monitor housing-market developments very closely.
Real estate supply has been too rigid to adjust to strong housing demand partly due to low interest rates, causing high and rising housing prices. Local taxes on residential properties are too low for financing and maintaining the infrastructure needed for new housing development in poor municipalities.	• Better coordinate large and cheaper residential developments in peripheral areas with public transport to where jobs are located. • Ensure that adequate resources are provided for municipalities to finance local infrastructure services needed in new residential areas.
Fostering inclusiveness through better training and better jobs for disadvantaged groups	
Labour force participation rates for Israeli-Arabs and Haredim remain low.	• Evaluate systematically the effectiveness of existing active labour market policies, raising funding for effective programmes, above all for training.
The share of working poor is rising and high by international comparison. Child poverty is widespread. In-work benefits are low and insufficient for families even with two breadwinners in low-paid jobs.	• Further expand the role of in-work benefits by providing higher transfers to large families where both parents are in low-paid work. • Increase support for poor families conditional on their children taking up additional formal education.
Student outcomes differ significantly between educational streams, which contributes to high social and economic segregation. Inter-generational persistence of poverty is significant.	• Increase funding for disadvantaged schools. • Further expand Hebrew courses in the Arab stream. • Expand childcare and education for children under 3, and put it under the responsibility of the Ministry of Education. • Make funding to the Haredi stream conditional on an increase in core subjects in the curriculum and strengthened monitoring and testing.
Vocational education and training is underdeveloped, and many tertiary educated graduates are employed in jobs not matching their field of studies, which harms their wages and employment prospects.	• Expand work-based learning in some vocational programmes. • Introduce graduate tracking, and publish high-quality data and analysis about their labour market outcomes.
Improving infrastructure and product markets	
Partly due to past public underinvestment, Israel has a large infrastructure deficit, especially in public transport, which causes considerable road congestion and poor air quality. Infrastructure shortages also exist in other sectors, including renewable electricity generation and hospitals. The management and implementation of large infrastructure projects is often deficient, and the planning process is lengthy and weak. Arab towns often lack adequate infrastructure facilities because of a dearth of available public land, urban-planning problems and illegal construction.	• Raise budgetary resources for infrastructure. Use public-private partnership agreements, especially in public transport, following a careful and clear allocation of their risks. • Promote road tolls and electricity smart meters to foster user funding of infrastructure. • Shift car taxes substantially from ownership to vehicle use to reduce pollution. • Introduce systematic publication of cost-benefit analyses of projects with mandatory justification of policy-makers' choices. • Decentralise and promote transparency of urban planning in Arab cities.
Despite some progress, competition in Israeli markets remains weak and the economy is less open to foreign trade than most other OECD countries. Price levels are still comparatively high, notably for food. The business environment also suffers from excessive bureaucracy.	• Promote a more efficient use of infrastructure by enhancing its regulation. Introduce, in particular, competition in airport management. • Replace agricultural quotas and tariffs with direct transfers to farmers. • Use high-quality regulatory impact assessments based on a whole-of-government approach to cut the regulatory burden.

© OECD 2018

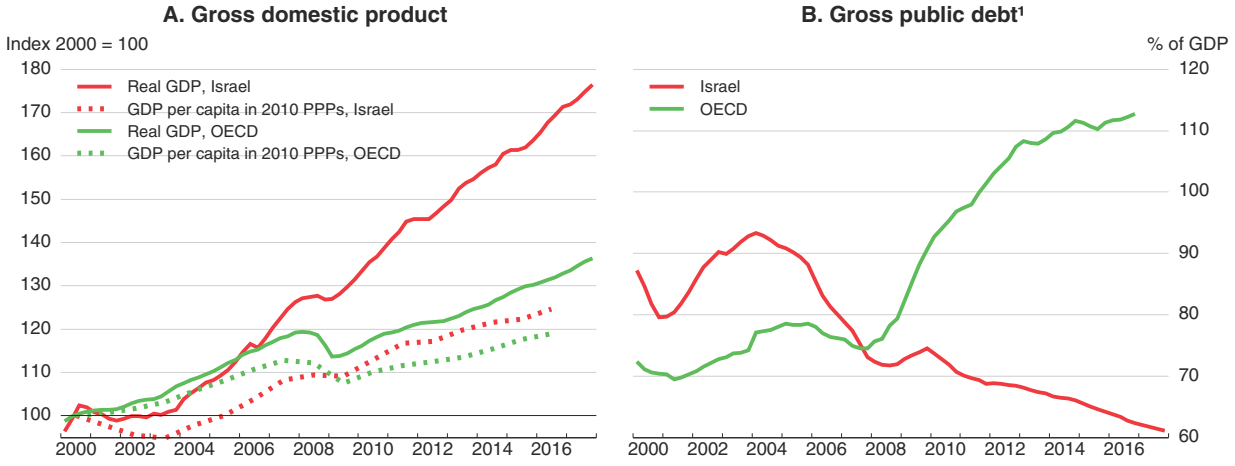
Assessment and recommendations

- *Maintaining solid increases in living standards and well-being in the longer term will be challenging*
- *Improving social cohesion would promote sustainable growth*

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in theWest Bank under the terms of international law.

Israel's economy continues to perform well both in terms of macroeconomic and fiscal outcomes (Figure 1). Growth has averaged 3.3% since 2000, higher than in many OECD countries, although this was partly driven by strong population growth, which accounted for half of this impressive increase. The external surplus is comfortable, and the public debt-to-GDP ratio, already well below the OECD average, is still falling. This success is largely attributable to a long history of effective macroeconomic policy settings and bold structural reforms, including the successful absorption of the wave of immigrants from the Former Soviet Union, the promotion of venture capital financing for the nascent high-tech sector and the liberalisation of higher education, all dating back to the 1990s, as well as improvements in work incentives in the early 2000s. These good results are expected to continue, thanks to the persistently dynamic high-tech sector and the forthcoming development of new gas fields. Against this backdrop, Israelis remain on average more satisfied with their lives than residents of most other OECD countries, even though well-being results are mixed in several respects, including the environment (Figure 2, Panel A). They enjoy remarkable health and labour market outcomes, with historically low overall and long-term unemployment rates. Employment growth has been the main factor reducing the gap in average living standards with the most advanced countries these last 15 years, although this driver has weakened in the past few years (Panel B).

Figure 1. **Israel's economy is performing strongly**



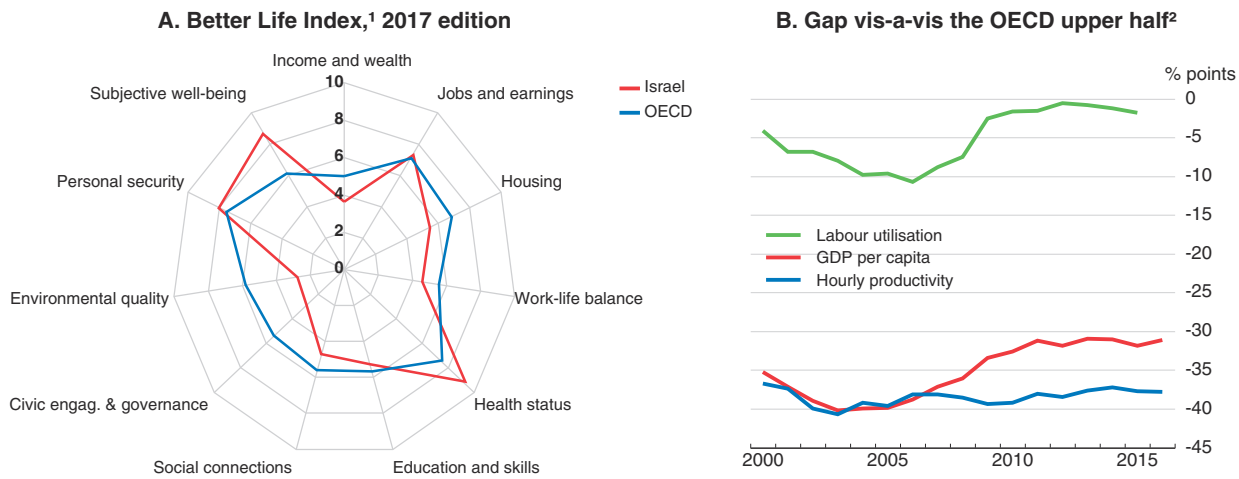
1. Estimate for 2017.

Source: OECD, *Economic Outlook Database*; OECD (2018), *Economic Policy Reforms: Going for Growth* (forthcoming).

StatLink http://dx.doi.org/10.1787/888933672743

Israeli society is, however, marked by a lack of social cohesion and significant disparities, which penalise parts of the population and threaten the longer-term sustainability of these good results. Inequalities have declined slightly since 2007, thanks to higher employment rates among Israeli-Arabs and the Haredim (MoF, 2017a), but poverty remains widespread,

Figure 2. **Well-being outcomes are mixed**



1. Each index dimension is measured by one to four indicators from the OECD Better Life Index (BLI) set. Normalised indicators are averaged with equal weights. Indicators are normalised to range between 10 (best) and 0 according to the following formula: (indicator value - minimum value) / (maximum value - minimum value) x 10. The OECD aggregate is weighted by population. Please note that the OECD does not officially rank countries in terms of their BLI performance.
2. Population-weighted average for the top 17 OECD countries.

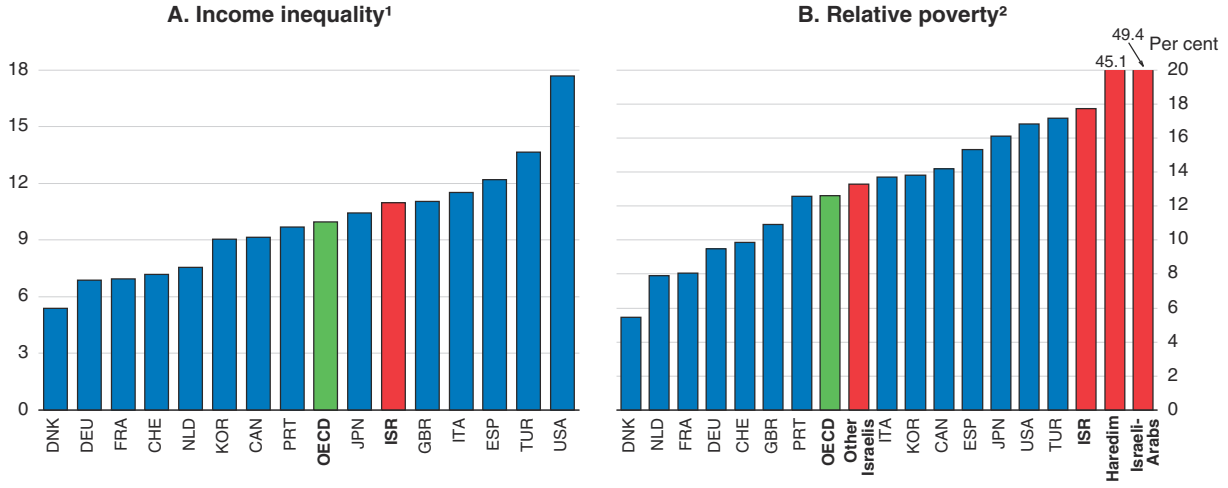
Source: OECD (2018), *Economic Policy Reforms: Going for Growth* (forthcoming); OECD (2017), *OECD Better Life Index*, *www.oecdbetterlifeindex.org*.

StatLink *http://dx.doi.org/10.1787/888933672762*

particularly among these disadvantaged groups, for whom the rate reaches around 50% (Figure 3). Better social and labour-market integration of these groups, which will represent half the population by mid-century, is crucial. Haredi and Israeli-Arabs' average skills and remuneration levels are low, their families large and social transfers limited (Box 1). In addition, overall productivity growth remains slow, and the cost of living is currently

Figure 3. **Inequality and poverty remain high**

2016 or latest year available



1. Defined as the S90/S10 disposable income share ratio, i.e. the share of all disposable income received by the top decile divided by the share of the bottom decile.
2. Poverty rate relative to threshold of 50% of median disposable income.

Source: OECD (2017), *Income Distribution Database*, *www.oecd.org/els/soc/income-distribution-database.htm*; National Insurance Institute (2017), *Poverty and Social Gaps Report, 2016*, Table 7.

StatLink *http://dx.doi.org/10.1787/888933672781*

Box 1. **Disparities in Israeli society**

Israeli society is marked by significant disparities between different communities. Most Haredim and Israeli-Arabs live separately from the rest of the population. They have different school systems, live mostly in different cities and do not serve in the army. This contributes to different outcomes in the labour market, education and earnings. Given their tendency to have very large families, the Haredi demographic share is projected to nearly triple in the coming decades to almost 30%. This will have serious economic implications, since Haredi men have a cultural preference to engage in full-time religious studies rather than participate in the labour market and avoid core subjects in their school careers. Furthermore, Haredi women can work only part-time because of their family responsibilities. The majority of Israeli-Arab women also do not participate in the labour market due to cultural preferences. The result is that most Haredi and Arab families have only one breadwinner, resulting in significant problems of poverty, notably among children.

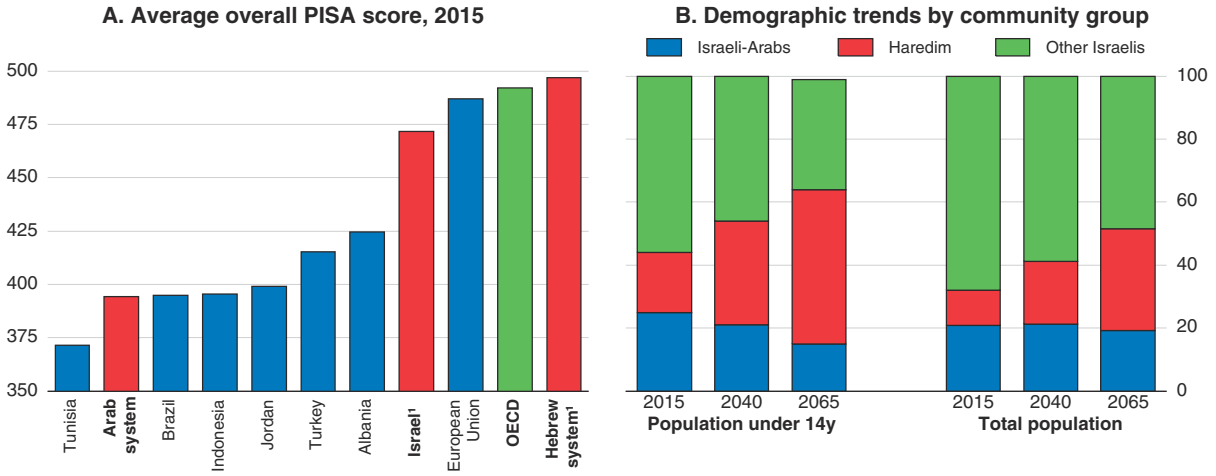
	Israeli-Arabs	Haredim	Others
Share of the population – 2016 (%)	21	11	68
Share of the population – 2059 (%)	20	29	51
Fertility rate – 2016	3.1	6.7	2.5
Number of children per household – 2016	4	6.5	2
Median hourly wage as a % of the national median hourly wage – 2015	70	87	109
Median wage as a % of the national median wage – 2015	74	68	111
Participation rate – 2016 (%)	58	66	81
PISA mean mathematics scores – 2015	391	-	495
Relative poverty rates – 2015 (%)	53.3	48.7	13.5

Source: National Insurance Institute (2016), *Poverty and Social Gaps Report, 2015*; OECD, *PISA Database*; Central Bureau of Statistics.

somewhat higher than the OECD average despite GDP per capita being more than 15% lower (OECD, 2017a). High house prices make home ownership difficult for the middle class and young households, and living space per person is modest, given large average family size. Moreover, public transport deficiencies are detrimental to work-life balance and cause urban congestion and poor air quality.

To a large extent, these difficulties reflect persistent weaknesses in three key areas: product markets, education and infrastructure (Flug, 2017a and b). As highlighted in the 2016 *Survey*, product market regulations are far from best practice. The lack of competition and high non-tariff barriers in many sectors, notably electricity and the entire food chain, push up prices and contribute to duality in productivity between open and sheltered sectors, resulting in wage and income disparities. Much room exists to improve the business environment and lower regulatory burdens and bureaucracy. Haredi and Israeli-Arabs lack the skills needed for well-paid jobs. These deficiencies limit the effectiveness of their employment gains for lowering poverty and perpetuate the strong disparities in formal education between these groups and the rest of the population (Figure 4, Panel A). Contrary to other groups, for the Haredim this situation largely reflects an explicit choice of studying religious rather than secular subjects and of separating themselves from the rest of the society. Moreover, even Haredi men who do work often do not consider their jobs to be a career path but merely a means of relieving tight income constraints. Already 44% of people under 14 are currently from Arab or Haredi families, and the Haredi share is

Figure 4. **Education outcomes are poor for disadvantaged groups, whose share is growing**



1. Haredi boys did not participate in the PISA test, as they do not study the required material. Results are thus overestimated.
Source: OECD, *PISA Database*; Shoresh (2017), *Shoresh Handbook 2017: Education and its impact in Israel*; CBS, *www.cbs.gov.il/reader/newhodaot/tables_template_eng.html?hodaa=201701138*.

StatLink http://dx.doi.org/10.1787/888933672800

growing rapidly (Panel B). The country's large infrastructure deficit also contributes to economic and social imbalances. Inadequate public transport accentuates the housing shortage by lowering the attractiveness of more affordable neighbourhoods and reduces access and employment opportunities for disadvantaged groups from peripheral zones. It is also the cause of considerable road congestion and worsens air quality.

With this background, the main messages of this *Survey* are:

- The current favourable economic situation provides an opportunity to prepare for the challenges of the future by tackling Israel's structural weaknesses to ensure the continued increase in living standards and in the quality of life for all Israelis, including in terms of housing.
- Enhanced training and education of Israeli-Arabs and Haredim, better infrastructure and further product market reforms have complementary roles to play in making growth stronger, more inclusive and more sustainable by boosting productivity.
- Increasing the supply and quality of human capital and infrastructure requires both structural reforms and additional financial resources, which can be funded while maintaining prudent fiscal policy.

Maintaining solid increases in living standards and well-being in the longer term will be challenging

The Israeli economy continues to expand

Growth has slowed somewhat but remained robust at 3.3% in 2017. Domestic demand, supported by accommodative fiscal and monetary policies, has been the driver of activity, which was also boosted by a probably unsustainable increase in stockbuilding. Strong employment gains, low inflation and minimum wage increases are fuelling consumer spending. At the same time unemployment has declined to around 4%, i.e. at or close to full employment, and labour shortages are spreading to all sectors in the economy, while, in previous years, they were above all prevalent in the high-tech sectors and for high-skilled workers (Box 2). On the other hand,

Box 2. **The high-tech sector: share and development in the Israeli economy**

The high-tech sector in Israel combines the industrial sectors in the electronics, pharmaceuticals and aircraft sectors alongside services – software and research and development. Along with veteran companies in the industry (such as Intel, Teva and Check Point), start-ups have been added in recent decades, financed by venture capital funds as well as research and development centres of multinational companies.This sector has grown rapidly and has contributed significantly to the development of the economy since the mid-90s (CBS, 2017a). Employment in the high-tech industry increased from 7% of total employment in 1995 to 9% in 2014, or 12% of employment in the business sector, which is more than double the OECD-country median. This sector, whose share in GDP increased from 6.5% to 11.4% during this period, experienced stronger growth in services than goods. High-tech services accounted for two-thirds of the value added produced in the high-tech sector in 2014. These developments have also benefited aggregate exports, half of which are high-tech goods and services.

High-tech development has been based on the remarkable performance of the country in the field of innovation (OECD, 2016a). It has been supported by high R&D spending (at 4.1% of GDP in 2014, R&D expenditure is the second highest in the OECD); universities providing high-quality human capital in science and technology fields; good collaboration between academia and industry; a well-developed venture capital industry (Israel has the largest share of early-stage and seed venture capital funding in GDP among OECD countries); and favourable taxation for high-tech firms. In addition to these factors, the challenges Israel faces were also an impetus for innovation and creativity (Flug 2017b). Highly dynamic entrepreneurship in ICT, in particular in the cyber security industry, has emerged partially as a response to security threats. The development of new technologies to respond to water scarcity challenges has also made Israel a world leader in water-related innovation.

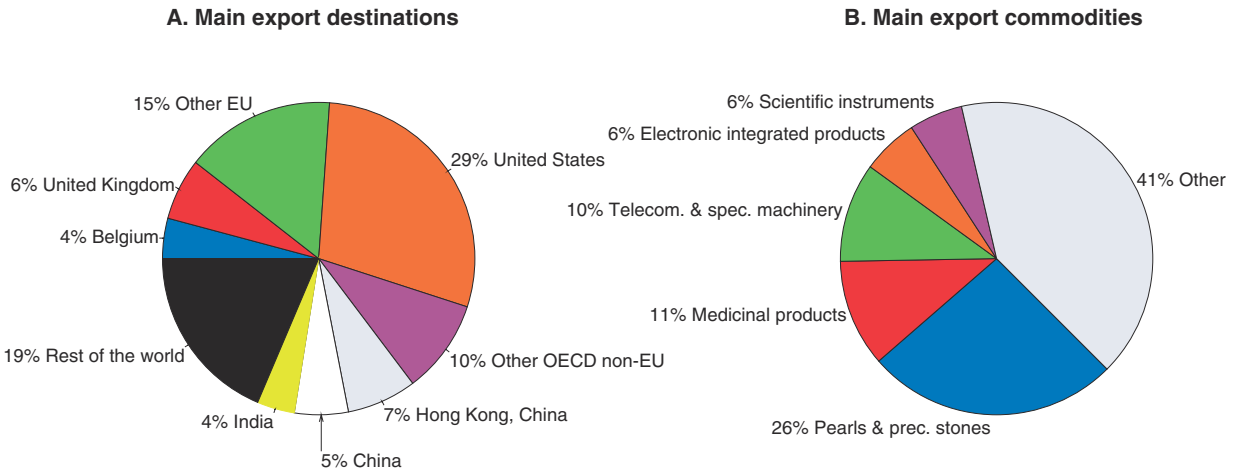
However, the vigour of the high-tech sector has weakened, and it has no longer been the engine of growth since 2010. Since then, high-tech industry expansion has been about half that of the rest of the economy. Production in this sector, which exceeded 13% of GDP in 2009, fell by 1.7 percentage points and its share in exports stopped increasing. The most significant challenge facing the sector is the lack of supply of skilled labour (MoF, 2016). Its employment share in the economy, although still higher than that of other countries, has declined by more than 1 percentage point since 2009. Moreover, investment in R&D and the dynamism of innovation are benefiting only a limited number of sectors and are not spreading to the entire economy. The result is that SMEs and entrepreneurs operating in traditional sectors are largely detached from the high-tech economy, their productivity is low compared with SMEs in other OECD countries, and only 15% of Israeli SMEs are involved in exporting.

goods exports have been relatively weak due to still moderate world trade growth and worsening price competitiveness from shekel appreciation. However, led by the high-tech sector, services exports have been much more buoyant and now represent 42% of the total (against less than 30% in 1995), and the external surplus remains sizeable because of the large export share of low-price-elasticity high-tech products (Figure 5). Despite the substantial real exchange rate increase since 2005, market share losses have been limited compared to other advanced economies (Figure 6). This overall robust performance has further improved Israel's financial stability, as reflected in its recent sovereign rating upgrade (Barkat, 2017a).

Growth is expected to be around 3½ per cent in 2018 and 2019 (Table 1). The still very low interest rates, expansionary fiscal measures, including corporate tax cuts and higher

Figure 5. **Exports of goods by market and commodity are fairly diversified**

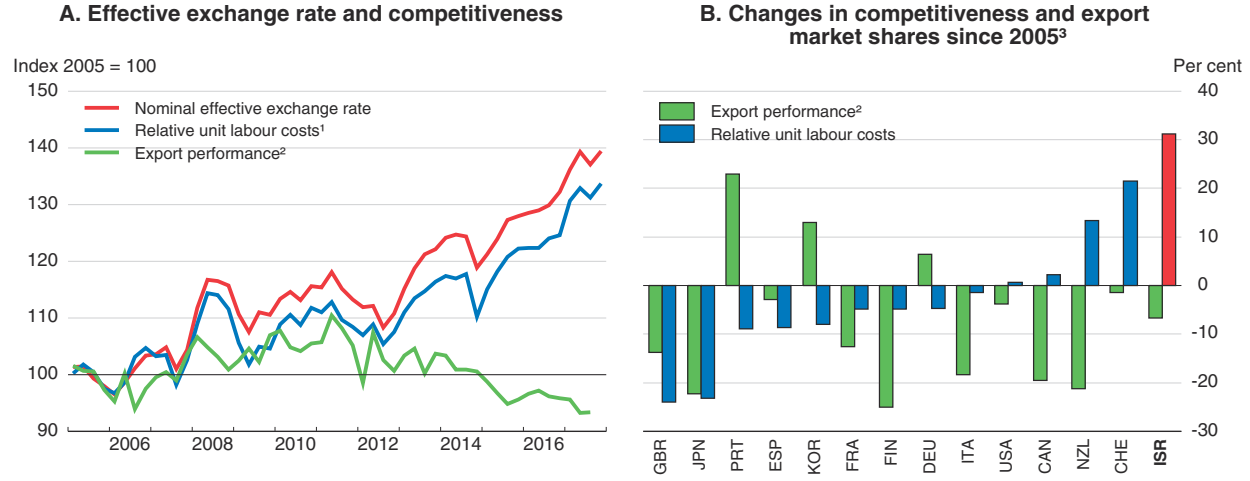
Share of total exports, 2016



Source: OECD, *International Trade Commodity Statistics Database.*

StatLink http://dx.doi.org/10.1787/888933672819

Figure 6. **Competitiveness has been hit by exchange rate appreciation**



1. Measured the Israeli's unit labour costs in dollar terms relative to the weighted average of these costs for its competitors in export and domestic markets. An increase of the index indicates a deterioration of the competitive position.
2. Of goods and services.
3. Change between 2005 and 2017 Q3.

Source: OECD, *Economic Outlook Database.*

StatLink http://dx.doi.org/10.1787/888933672838

social spending and investment, coupled with the launch of the Leviathan and Karish gas fields, will support activity (Box 3). An improved external environment should underpin exports and keep the economy at full employment. Against this backdrop, solid wage increases and stronger import price growth are expected to push inflation back up to around 1.5% by end-2018.

Growth would, however, be lower if the shekel were to appreciate further or if the geopolitical situation or the external climate were to deteriorate. Conversely, the economy could be stronger, and even overheat, if demand, supported by a better-than-expected

Table 1. **Macroeconomic indicators and projections**

	2014	2015	2016	2017	2018	2019
	Current prices NIS billion	Percentage changes, volume (2010 prices)				
GDP	1 103.5	2.6	4.0	3.3	3.5	3.4
Private consumption	614.3	4.1	6.1	3.3	3.6	3.4
Government consumption	250.6	3.1	3.9	2.9	3.0	2.0
Gross fixed capital formation	219.3	-0.8	11.9	2.5	4.1	8.4
Of which: Housing	74.3	1.5	8.1	1.3	-0.4	4.0
Non-residential and government	145.0	-1.9	13.9	3.1	6.3	10.4
Final domestic demand	1 084.2	2.9	6.7	3.0	3.6	4.1
Stockbuilding[1]	3.7	0.6	-0.7	0.5	0.5	0.0
Total domestic demand	1 087.9	3.5	6.0	3.5	4.1	4.1
Exports of goods and services	355.5	-2.4	2.5	3.2	4.7	3.9
Imports of goods and services	339.9	0.0	9.4	4.0	6.3	6.4
Net exports[1]	15.6	-0.9	-2.0	-0.2	-0.7	-0.7
Other indicators (% change, unless otherwise specified):						
Potential GDP	-	3.3	3.3	3.3	3.2	3.3
Output gap[2]	-	0.3	0.9	0.9	1.1	1.2
Employment	-	2.6	2.7	2.2	2.0	1.9
Unemployment rate[3]	-	5.3	4.8	4.2	4.2	4.2
GDP deflator	-	2.7	1.0	0.1	0.9	1.9
Consumer price index	-	-0.6	-0.5	0.2	1.0	1.7
Core consumer prices	-	0.4	0.0	0.0	1.1	1.7
Average wage per employee	-	3.0	3.2	2.9	3.7	4.0
Unit labour cost	-	2.5	1.4	2.7	2.1	2.6
Current account balance[4]	-	4.9	3.5	2.7	2.0	1.3
General government fiscal balance[4]	-	-2.1	-2.1	-2.0	-2.9	-2.9
Underlying government fiscal balance[2]	-	-2.4	-2.6	-2.4	-3.5	-3.5
Underlying government primary fiscal balance[2]	-	0.5	0.0	0.1	-0.9	-0.9
General government gross debt[4]	-	64.1	62.3	61.1	61.6	61.6
General government net debt[4]	-	60.3	58.7	57.5	58.0	58.0
Three-month money market rate, average	-	0.1	0.1	0.1	0.2	1.0
Ten-year government bond yield, average	-	2.1	1.9	1.9	2.1	2.8

1. Contributions to changes in real GDP, actual amount in the first column.
2. As a percentage of potential GDP.
3. As a percentage of the labour force.
4. As a percentage of GDP.

Source: OECD (2017), *Economic Outlook No.102*, November, updated.

global environment, is more robust and the central bank is slow to withdraw stimulus or the government follows through with mooted tax cuts. Capacity and labour-market pressures could intensify without affecting price inflation much if supply factors continue to push it down, as in recent years (see below). The economy may also face several other shocks whose impact would be difficult to assess (Table 2).

Still, the Israeli economy is enjoying its 15th consecutive year of growth and remains resilient. The country's macro-financial vulnerabilities appear low, despite the deterioration in price competitiveness since 2007 (Figure 7). The financial situation remains solid, thanks to profitable and well-capitalised banks, with few non-performing loans (Figure 8) and high liquidity (BoI, 2017a; IMF, 2017). However, risks associated with the large financial-sector exposure to the real estate market, where prices have more than doubled since 2007, have intensified.

Box 3. **The economic impact of the natural gas discoveries**

Israel's natural gas sector has recently taken off, with major offshore reserves discovered in its exclusive economic area in 2009-10. These reserves, which include the two big fields of Tamar (305 billion m^3) and Leviathan (580 billion m^3) and other smaller fields, are enough to supply the country for probably more than 50 years. Tamar is currently the only deposit exploited. It meets over 95% of the country's current demand of 8 billion m^3, and its development and production as from 2013 is estimated to have increased GDP by 1.1% mainly due to the over 60% decline in energy imports. Moreover, replacing imported coal and oil by gas in power generation has cut pollution, and related royalty revenues, even though still modest less than 0.1% of GDP, have been positive for the budget.

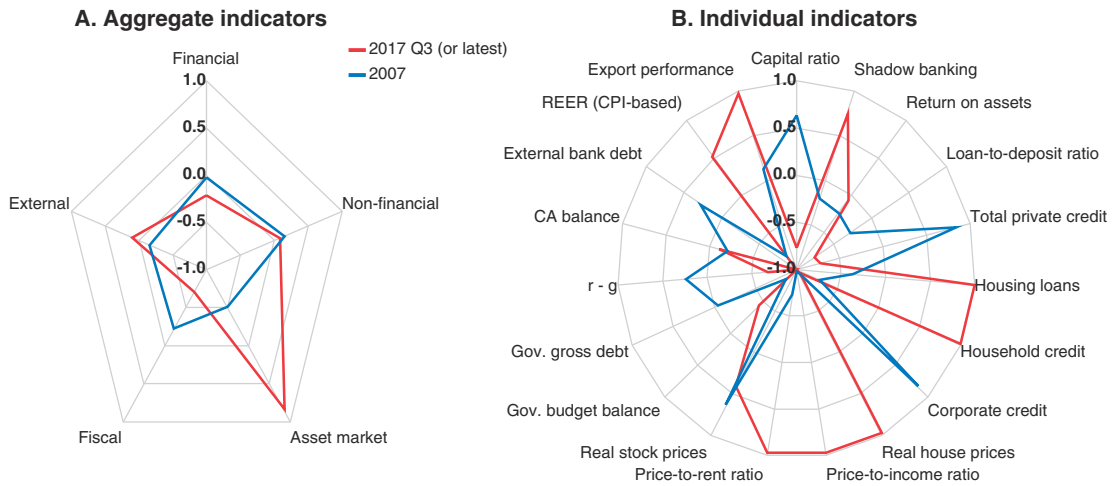
Because of limited domestic gas demand, Leviathan's operation, due to start in late 2019, will have a small initial positive impact (0.3%) on GDP, while its longer-term effect will depend on export opportunities. Contracts have already been signed with Jordan and in February 2018 with Egypt, and discussions are ongoing with Turkey and EU countries. In addition to royalties and corporate taxes, the gas industry will be liable for a special levy of 20-50% on profits over normal returns on investment, whose proceeds will be placed in a forthcoming dedicated sovereign fund to share with future generations. It could represent 10% of GDP in 2040 and will be invested in foreign currencies to reduce the risks of Dutch disease. This risk is currently being handled by a central bank foreign-currency purchase mechanism.

Table 2. **Possible extreme shocks affecting the Israel economy**

Shock	Possible impact
Increase in global protectionism	A new wave of isolationist economic policies and protectionism would lower global trade and exports. The effects on countries without a large domestic market, such as Israel, would be particularly harmful.
Renewed geopolitical tensions	Heightened geopolitical instability in the region or an intensification of the boycott campaign against Israel would weaken both domestic and external demand, with negative budgetary repercussions, which would be reinforced by a likely rise in military spending.
Financial markets and a housing market crisis	If house prices were to fall sharply, reversing some of the appreciation of the last decade, private consumption would suffer because of a wealth effect. That would lead to adverse effects on the labour market, which would harm borrowers' ability to service their mortgage debts and potentially entail a further house price decline. This vicious circle would weaken the banking system with its substantial housing-market exposure.

Figure 7. **Evolution of macro-financial vulnerabilities**

Index scale of -1 to 1 from lowest to greatest potential vulnerability, where 0 refers to long-term average, calculated for the period since 2000[1]



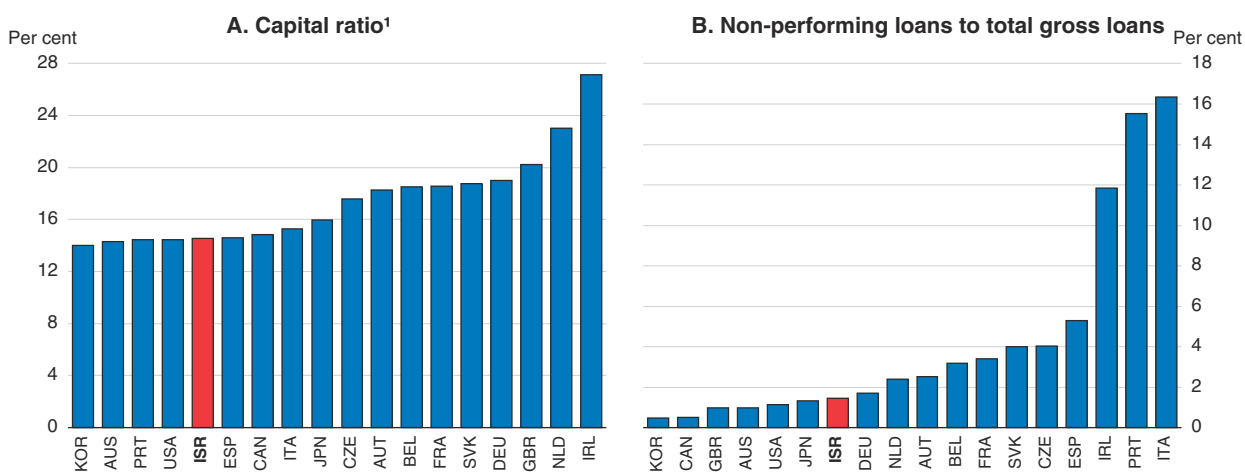
1. Each aggregate macro-financial vulnerability dimension is calculated by aggregating (simple average) normalised individual indicators from the OECD Resilience database. Financial dimension includes: capital ratio (regulatory capital), shadow banking (% of GDP), return on assets and loan-to-deposit ratio. Non-financial dimension includes: total private credit, housing loans, household credit and corporate credit. Asset market dimension includes: real house prices, price-to-income ratio, price-to-rent ratio and real stock prices. Fiscal dimension includes: government budget balance (% of GDP), government gross debt (% of GDP), real bond yield minus potential growth rate (r-g). External dimension includes: current account balance (% of GDP), external debt (% of GDP), real effective exchange rate (REER) and export performance.

Source: Calculations based on OECD (2017), *OECD Resilience Database*, December.

StatLink http://dx.doi.org/10.1787/888933672857

Figure 8. **Capital ratio and non-performing loans**

Q3 2017 or latest data available



1. Regulatory capital to risk-weighted assets.

Source: IMF, *Financial Soundness Indicators Database*.

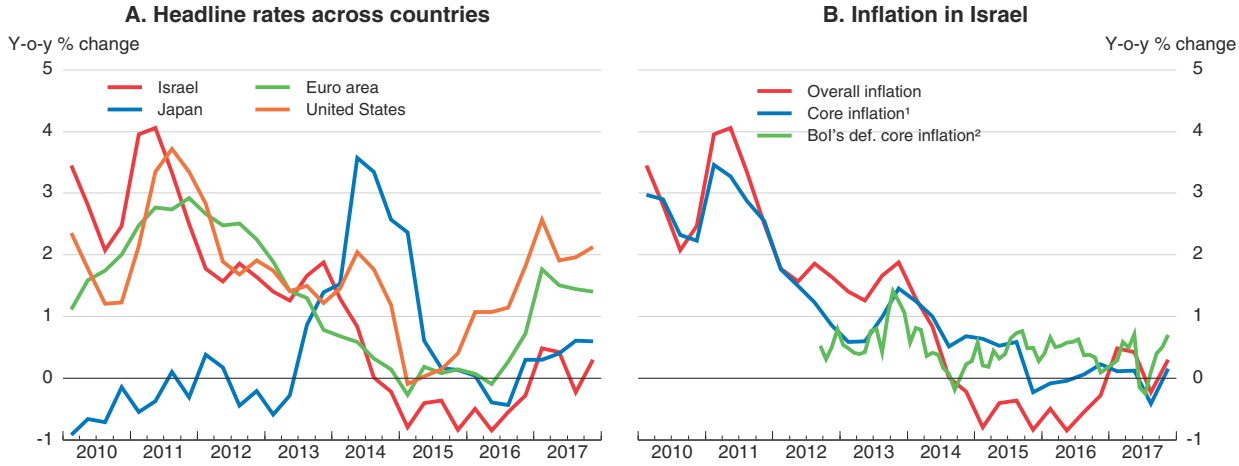
StatLink http://dx.doi.org/10.1787/888933672876

Pursuing appropriate monetary-policy settings

Monetary policymakers are facing unusual challenges in maintaining price stability. At 0.1% year-on-year, inflation is well below the 1-3% target range; prices declined for three straight years before turning up in the first half of 2017 (Figure 9), despite flourishing economic activity,

recent employment and minimum-wage hikes and a job-vacancy rate at its highest level on record (Figure 10). Wages have picked up over the past two years, as firms have managed to maintain their margins thanks to significant improvements in the terms of trade since 2014. Nevertheless, zero inflation is rather hard to fully explain, but the most important additional mechanisms are the lower import prices from shekel appreciation and lower commodity prices, as well as favourable temporary product-market supply shocks: government reforms (see below) and measures to lower the cost of living through public tariff cuts, VAT reductions, and stronger competition from the expansion of e-commerce (Figure 11), encouraged by higher exemption thresholds from customs duties and VAT on these purchases. Furthermore, deflation has tended to be self-perpetuating through expectations mechanisms (BoI, 2017b).

Figure 9. **Inflation developments according to the CPI**

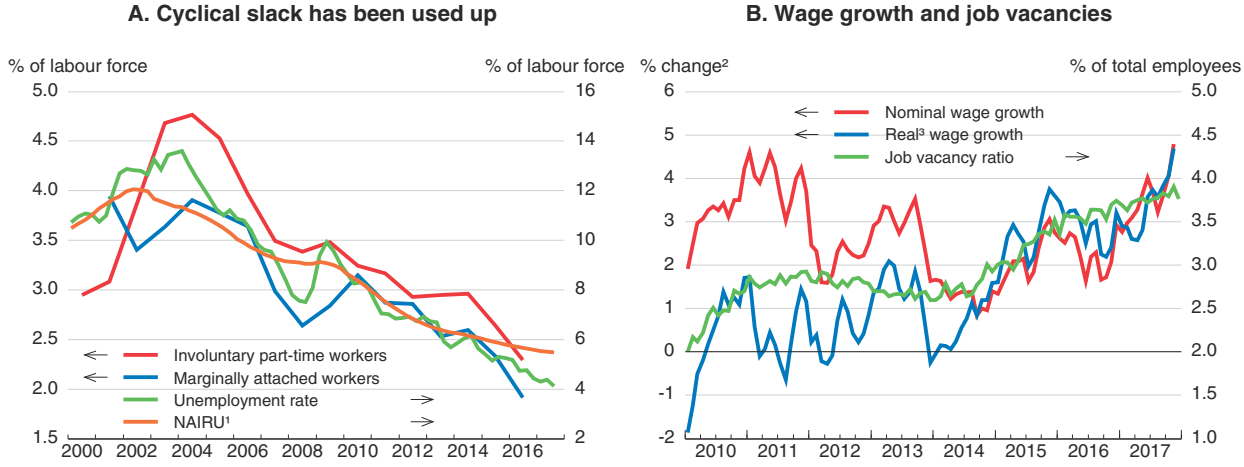


1. CPI excluding energy and food products.
2. CPI excluding energy, vegetables and fruit, and administrative charges.

Source: OECD, *Economic Outlook Database;* Bank of Israel.

StatLink http://dx.doi.org/10.1787/888933672895

Figure 10. **The labour market continues to tighten**

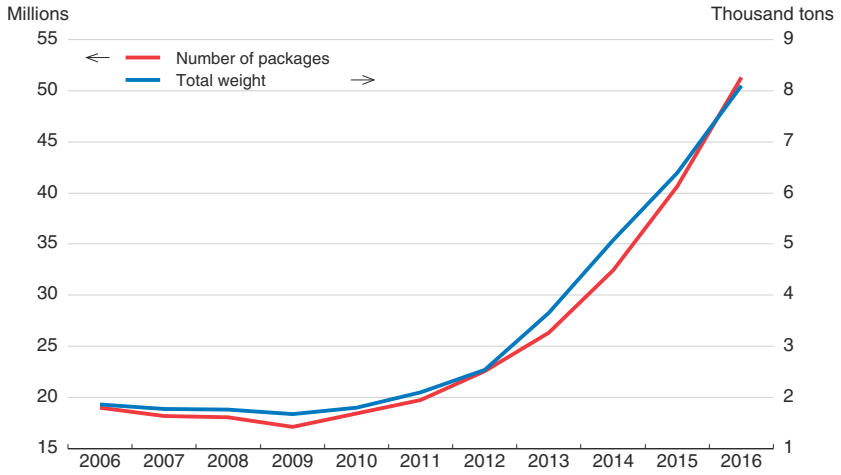


1. Unemployment rate with non-accelerating inflation rate.
2. Three-month moving average of the year-on-year percentage change.
3. Deflated by the consumer price index.

Source: OECD, *Economic Outlook* and *Labour Force Statistics Databases*; Bank of Israel; Central Bureau of Statistics.

StatLink http://dx.doi.org/10.1787/888933672914

Figure 11. **Packages sent to Israel from abroad are rising rapidly**[1]

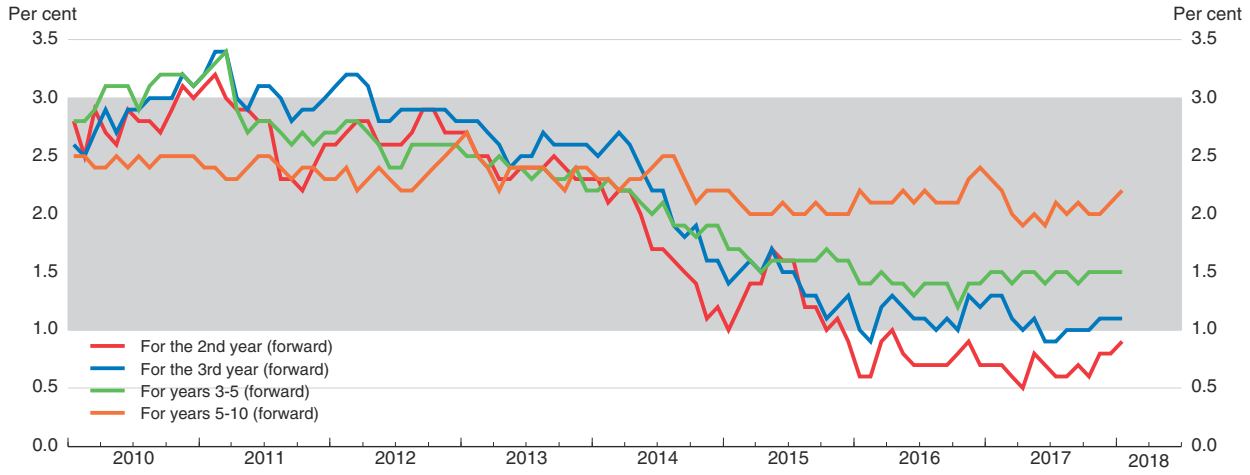


1. Figures for 2016 are incomplete.
Source: Israel Post.

StatLink http://dx.doi.org/10.1787/888933672933

In this context, the Bank of Israel (BoI) is rightly maintaining a very accommodative policy, keeping its official rate at the historically low level of 0.1% since March 2015. The authorities also intervene in the foreign exchange market to limit fluctuations and excessive appreciation that would result from the extraordinarily accommodative monetary policy settings by the world's major central banks. These interventions come on top of a currency purchase programme to offset the exchange-rate pressure (or "Dutch disease") from expanded natural gas production (see Box 3 above). The result of persistent intervention is that the BoI has foreign-currency reserves of USD 118 billion (34.5% of GDP), one of the OECD's highest GDP shares. Since November 2015 the BoI has also provided forward policy guidance to influence investor expectations: this accommodative policy is thus expected to be maintained as long as necessary to entrench inflation within the 1-3% target range (BoI, 2018). Although shorter-term inflation expectations are below 1%, they are well anchored to the target beyond this horizon, indicating monetary policy credibility (Figure 12).

Figure 12. **Inflation expectations are low in the short term but within the target range thereafter**



Source: Bank of Israel.

StatLink http://dx.doi.org/10.1787/888933672952

Nevertheless, the risks of maintaining an accommodative monetary policy too long should not be neglected, as the favourable effects from the terms-of-trade gains could reverse quite rapidly. Low inflation does not seem related to weak demand, and tightening too late would increase the risks of overheating and rising wage pressures, which, with increased competition, would harm business profitability and investment. It would also raise the financial vulnerabilities from the housing-market tensions, which remain significant and partly result from the low interest-rate environment.

Preserving financial stability while strengthening sectoral efficiency

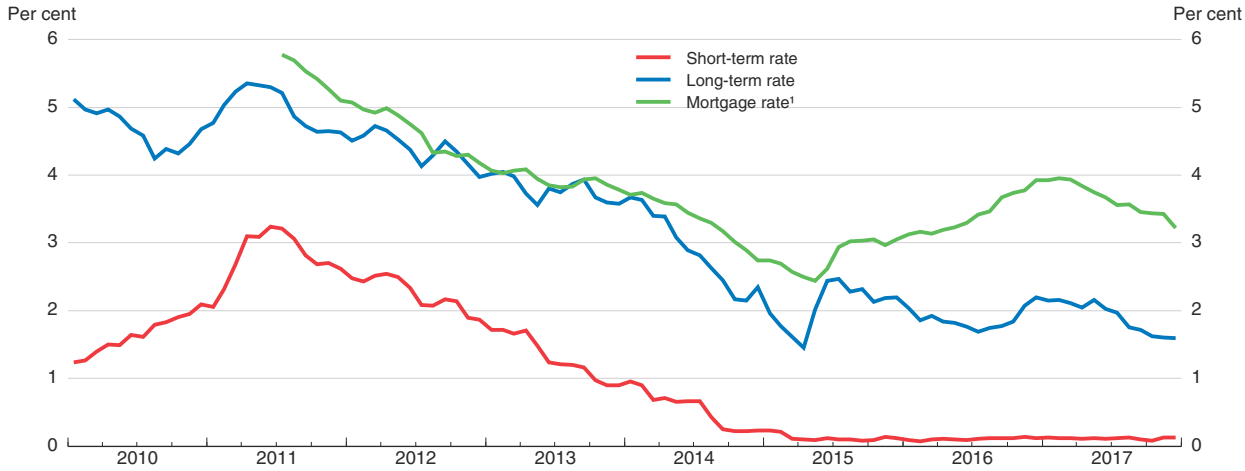
Israel's financial system remains robust. However, as highlighted in the 2016 *Survey*, the oligopolistic banking sector continues to incur high operating costs. In response, the authorities have adopted several measures to boost competition (Table 3). These include the separation of the credit card companies from the two main banks and the creation of a central credit register accessible to all financial entities. Under the BoI's pressure, banks have also launched plans to reduce their operating costs, develop online banking and lower their fees (BoI, 2017c).

Table 3. **Past recommendations on improving the stability and efficiency of the financial system**

Recommendations in previous *Surveys*	Action taken since January 2016
Monitor and respond to financial market risks. Remove the supervisory duties currently carried out by CMISD from the Ministry of Finance. Further strengthen oversight communication and co-ordination.	In November 2016 the "Capital Market, Insurance, and Savings Authority" (CMISA) (ex-Capital Markets, Insurance and Savings Division or CMISD) was separated from the Ministry of Finance and established as an independent public authority. In May 2017 discussions started in the Knesset about the creation of a Financial Stability Committee.
Strengthen mechanisms for dealing with banks in difficulty, for instance by augmenting the powers of the Bank of Israel for early intervention. Create a deposit insurance system.	The Bank of Israel, the Ministry of Finance and the Ministry of Justice have started discussions on setting up a deposit insurance scheme and a bank resolution framework.
Promote the entry of new competitors in retail banking, including non-banking credit entities, with adequate prudential and consumer protection regulation. Focus in particular on regulatory reform and supervision of the non-banking financial sector.	The Economic Arrangement Law of 2017-18 allowed credit unions to enter the credit market. The regulatory authority of the CMISA has been expanded to include responsibility for protecting customers' interest in entities and organisations, including non-bank credit providers in addition to institutional investors.
Make the changes required to increase uptake of direct debit cards. Separate the credit card companies from the two largest banks.	In January 2017 the separation of the two largest banks from their credit card companies was approved by the Knesset. A special committee was created to monitor the impact of this measure.
Finalise the improvements to the credit-reporting system.	Creating a central credit register was approved in March 2016. The central bank will handle that.

Macro-prudential policies have been tightened since 2009, reducing the risks associated with the real estate market. The financial system's resilience in the event of a sharp fall in housing prices and severe recession has thus been enhanced. According to 2015-16 stress tests, systemic stability would not be threatened despite substantial losses (BoI, 2016a). The household-debt ratio would also probably remain relatively low as the lower income deciles account for a relatively small share of household credit: the ratio of total debt to annual income ratio is 0.6 on average and exceeds 1 only for households in the lowest decile (for which it is close to 3). However, only 3.5% of total loans have been issued to households in that decile (BoI, 2016b). The BoI's macro-prudential measures have also raised mortgage rates since spring 2015 (Figure 13), which, together with higher taxation on real estate investments, has reduced housing-credit demand, eased housing-market tensions and stabilised banks' exposure (Figure 14).

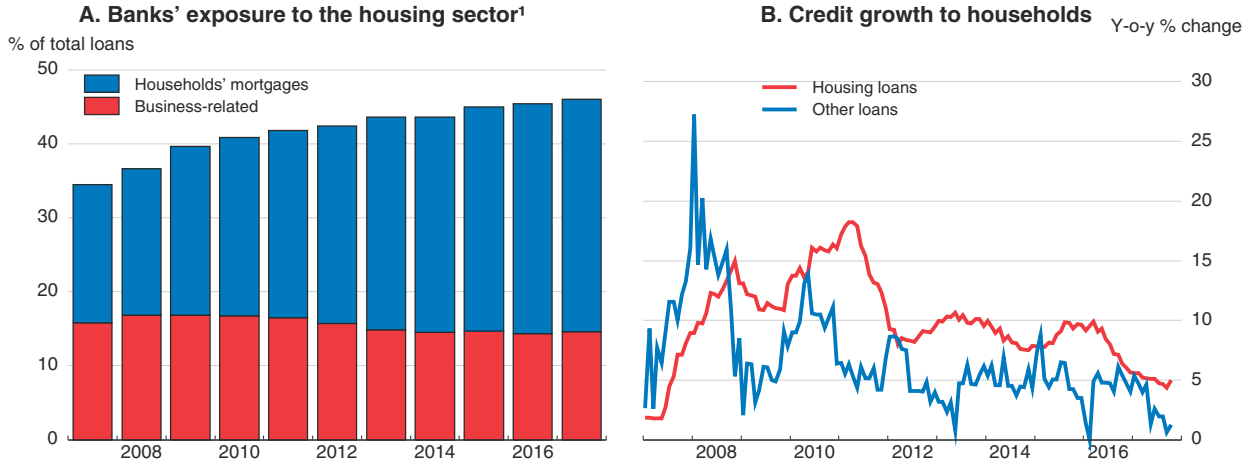
Figure 13. **Market interest rates have stabilised, but mortgage rates have risen somewhat**



1. Average of the rates on unindexed mortgages, from 5-10 years and from 10-15 years.
Source: OECD, *Economic Outlook Database*; Bank of Israel.

StatLink http://dx.doi.org/10.1787/888933672971

Figure 14. **Banks' exposure to the housing sector is high, but housing credit has slowed**



1. End-June data for 2017.
Source: Bank of Israel.

StatLink http://dx.doi.org/10.1787/888933672990

Although the tighter macro-prudential policies have helped to lower risks in the housing market, a severe housing-market correction remains possible, and developments should be monitored very carefully. Further improving stability is thus desirable to fully benefit from ongoing efficiency-enhancing financial reforms such as the planned monitoring of the measures spurring competition on the credit market (see Table 3 above). Hence, further steps are needed and are being considered: a deposit insurance system, a bank resolution framework and a financial stability committee enhancing co-ordination between the BoI, the Ministry of Finance and the Securities Authority would all further strengthen financial stability.

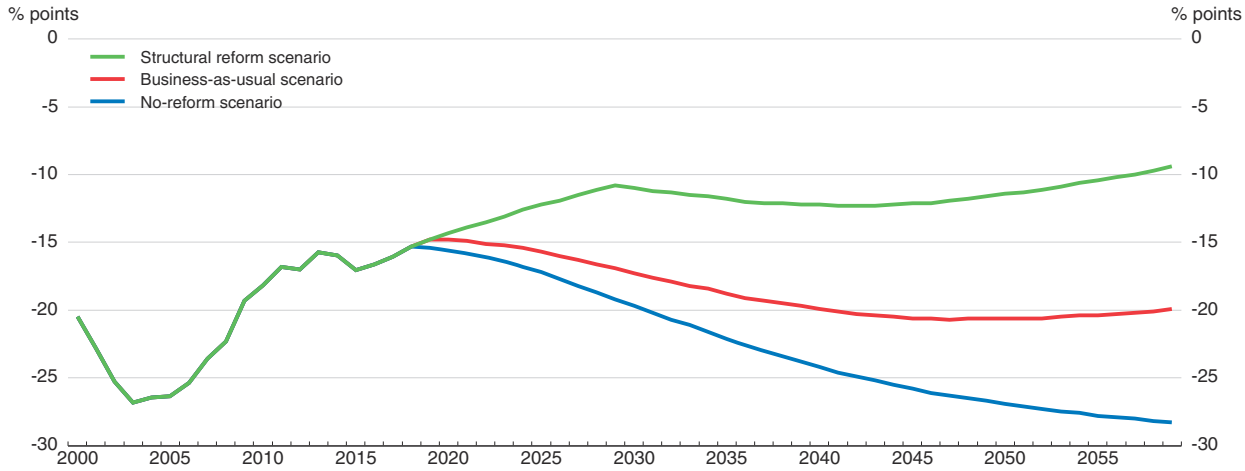
Continuing catch-up faces longer-term challenges

Over the longer term demographic trends imply a large increase in the population (from 8.5 million in 2015 to 18.5 million in 2060), even with modest immigration, and a substantial

change in population composition. Given the high fertility of Haredi women, which is assumed to remain largely unchanged, the share of that community in the total population would triple in the next 45 to 50 years, with the total share of Israeli-Arabs and Haredim rising from one-third to one-half over this period (CBS, 2017b). Despite recent improvements, these groups have poorer labour-market outcomes and much lower productivity than non-Haredi Jews, and labour force participation remains particularly weak among Haredi men and Israeli-Arab women. Moreover, even though Israel currently has the OECD's youngest population due to its high birth rates, the share of over-65s will nevertheless increase from 10% now to 17% in 2059.

These demographic changes mean that per capita GDP growth will probably slow in coming decades. Empirical research suggests that, if the recent rate of convergence in terms of labour market outcomes of Haredim and Israeli-Arabs with the rest of the population is maintained, productivity gains will weaken considerably relative to their already slow trend and the average employment rate will fall somewhat (Geva, 2015). In such a business-as-usual scenario, the convergence in living standards with the OECD average will cease and even reverse, with the per capita GDP gap rising from 15% in 2015 to around 20% by 2059 (Figure 15). Without reforms the number of working poor will rise (see below).

Figure 15. **The gap in GDP per capita with the OECD average could shrink further with ambitious reforms**[1]



1. The business-as-usual scenario consists of the updated projections for the Economic Outlook No. 102 until 2019, with an extrapolation of real growth per capita based on Geva (2015), at an average annual rate of 1.5%. This scenario assumes that the convergence of employment rate and productivity level of Haredim and Israeli-Arabs with the rest of the population continues at the same pace as in the last decade. The no-reform scenario is also based on Geva (2015) and assumes no convergence of Haredim and Israeli-Arabs, with an annual average real growth of per capita GDP of 1.2%. The structural reform scenario differs from the previous scenarios by assuming gains from structural reforms entailing higher real GDP per capita growth by 0.6 percentage points during the period 2019-29. At the same time, the productivity of Haredim and Israeli-Arabs compared to non-Haredi Jews will increase from 60% currently to 80% and the employment rate of Haredim and Israeli-Arabs will be close to the level of non-Haredi Jews in 2059.

Source: OECD (2017), *Economic Outlook 102 Database*; A. Geva (2015), *Demographic Changes and their Implications for Fiscal Aggregates in the Years of 2015-2059*, *www.mof.gov.il/ChiefEcon/EconomyAndResearch/ArticlesSet/Article_20150518.pdf*.

StatLink http://dx.doi.org/10.1787/888933673009

However, launching ambitious reforms in product markets, infrastructure and education would substantially boost growth performance and living standards. According to OECD estimates, promoting a more business-friendly environment, represented by the OECD average, could enhance efficiency and increase per capita GDP by almost 6% over a 10-year period (OECD, 2016b). Better infrastructure and educational outcomes supported by

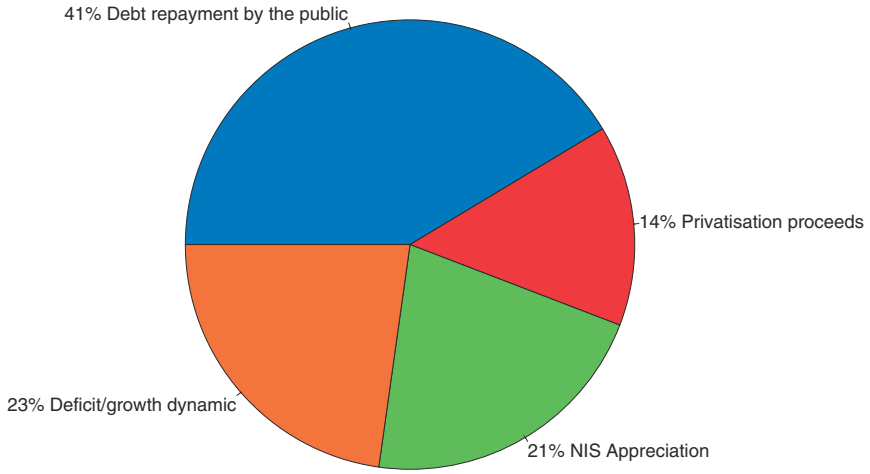
ambitious reforms (see below) also have an essential role to play in improving labour-market and productivity outcomes in disadvantaged communities. For instance, further improving the Haredim and Israeli-Arabs' (youth in particular) integration into society through better education and training leading to a lower productivity gap with non-Haredi Jews from around 40% currently to, say, 20% in 2059 would raise average annual per capita GDP growth by 0.2 percentage point. These reforms would shrink existing income disparities within Israeli society and the shortfall in living standards *vis-à-vis* the OECD average to 10% in 2059 (see Figure 15 above). By contrast, if the authorities fail in their enhanced integration efforts and these groups keep their current employment and productivity gaps, average Israeli incomes would fall to close to 30% below the OECD average in 2059, almost double the current gap.

Preserving prudent fiscal policy while addressing spending needs

Israel has succeeded in reducing its government debt from 90% of GDP in 2002 to 62% in 2016, thanks to the normal deficit-growth dynamics due in part to a prudent budgetary framework, which combines an expenditure-based fiscal rule with deficit targets, and a robust growth performance. In addition, gross debt has been pushed down by the amortisation of mortgages granted to the public until the early 2000s, sales of government-owned land and shekel appreciation (which has cut the shekel value of foreign-currency debt) (Figure 16). Currently, the annual real spending-growth ceiling is set at 2.6%, and the deficit targets are 2.9% of GDP for 2017-19 and then 2.5% and 2.25% of GDP in 2020 and 2021. This framework has recently been strengthened to ensure better compliance with these rules (Table 4). Since the 2017-18 budget the government can no longer adopt new spending or tax cuts that breach these spending or deficit limits over a three-year period without offsetting measures. A multi-year defence plan was also introduced to lower fiscal uncertainty in this domain and to slightly reduce these expenditures from their relatively high current level (6% of GDP and 15% of public spending). However, the pre-2009 downtrend in such spending as a share of GDP was not maintained, and military spending has grown steadily since then. Accordingly, further efforts to promote efficiency gains in this area would be desirable.

Figure 16. **Factors contributing to the gross debt-to-GDP decline between 1998 and 2016**

Share in total decline



Source: A. Brender, "Fiscal Policy – the Journey to Reduce the Public Debt Ratio and Government Size", forthcoming.

StatLink http://dx.doi.org/10.1787/888933673028

Table 4. **Past recommendations on fiscal policy**

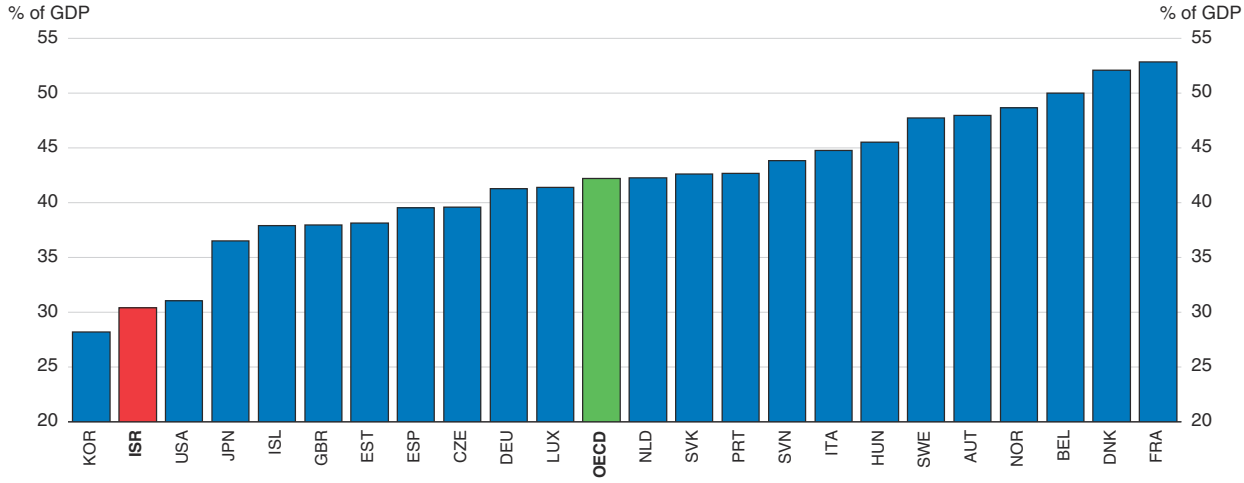
Recommendations in previous *Surveys*	Action taken since January 2016
Implement effectively the plan ensuring the consistency of commitments for future spending and tax cuts with the spending ceiling and deficit-target rules.	New legislation that took effect in 2016 and lays out a Medium Term Budget Framework prevents the government from making new budgetary commitments or cutting taxes (without a financing source) outside the normal budget-approval process if that would violate the multi-year spending rule or deficit ceilings, respectively.
Reduce the structural deficit and pursue a gradual debt-reduction strategy by raising fiscal revenues, preferably by removing inefficient tax expenditures, raising environmental taxes, exploiting immobile tax bases and fighting against tax evasion.	A temporary cut in dividend taxation from 33% to 25% for shareholders of personal service corporations in the 2017-18 budget led to 0.9% of GDP increase in tax receipts and a transitory decline in the 2017 fiscal deficit. A gradual increase in excise tax on diesel fuel was proposed by the government to the Knesset.
To the extent that savings can be made on military outlays and debt service and sufficient revenues raised, increase civil spending on education, infrastructure and poverty reduction.	A multi-year defence budget agreement, which was approved at the end of 2015, is projected to enable the government to shift spending towards civilian and growth-supporting expenditures.

The budget deficit declined to 2.1% of GDP in 2016, its lowest level since the 2008 crisis. However, with public expenditure growing well above the 2.6% ceiling, the fiscal stance has become somewhat expansionary. Thanks to strong, mostly temporary, tax receipts, such as those arising from the temporarily low tax rate on dividends (which in fact will reduce future revenues) and revenues from capital gains taxation on the sale of Mobileye to Intel, the deficit is projected to have declined to 2.0% of GDP in 2017 before increasing to 2.9% of GDP in 2018, which will lead to a deterioration of the structural balance in 2018, and will slow the public debt decline. However, the planned extra spending of 1% of GDP (BoI, 2017d) is mostly on education, health care and allowances for the elderly and disabled, and is thus likely to promote more inclusive growth, if the measures are well designed and well implemented. In addition, in November 2017 the authorities also unveiled a national nursing care plan offering better protection for seniors in need of long-term care (Barkat, 2017b).

Nevertheless, Israeli civilian spending will remain among the lowest in the OECD even after the 2017-18 increases (Figure 17). Low expenditure, particularly for education, public investment and welfare (see below), limits the state's capacity to counter large socio-

Figure 17. **Primary civilian expenditure**

2016 or latest available data



Source: OECD, *National Accounts Database*.

StatLink http://dx.doi.org/10.1787/888933673047

economic disparities. To better accommodate the country's economic and social needs, the spending-growth ceiling of the existing fiscal rule should be raised. At the same time, Israel needs to retain ample fiscal room for manoeuvre, given its specific geopolitical situation. Therefore, the key fiscal challenge is to maintain fiscal prudence and maintain the downtrend in public indebtedness while providing the additional public resources needed to improve educational outcomes, infrastructure and social cohesion. In particular, since 2017's deficit decline is essentially temporary, adopting permanent tax cuts or unfinanced spending increases would inappropriately weaken the medium-term fiscal position.

The extra spending recommended here can be financed relatively painlessly, since the current tax burden is quite low. The government could in particular: i) abolish inefficient tax exemptions; ii) strengthen the fight against tax evasion; and iii) increase some green taxes. As recommended in previous *Surveys*, removing tax exemptions, such as on fresh fruits and vegetables, or the tax credit for medium-term saving in specific funds (*Kranot Histalmut*), would broaden the tax base (OECD, 2013), even if the former change might be regressive (Table 5). The same applies to the tax and reporting exemption for landlords' rental income below NIS 5000 per month (Gruber, 2015). Fighting tax evasion can also bring additional revenues without increasing tax rates. Although difficult to measure, the share of the country's shadow economy is estimated to be about twice as large as in the United States, the United Kingdom or Canada, even if lower than in some other countries (Gruber, 2014; Feige et al., 2012; Gyomai and Van de Ven, 2014). Tax evasion on rental incomes above NIS 5 000 seems particularly high, because the tax authority lacks the necessary information to collect these revenues (Levi-Weinrib, 2017; MoF, 2017b). The introduction of compulsory income tax reporting could reduce this evasion, as it has done in countries requiring

Table 5. **Past recommendations on tax policy**

Recommendations in previous *Surveys*	Action taken since January 2016
Renew efforts to remove the VAT exemptions on fruit and vegetables and services in Eilat.	No action taken.
Keep the 'green credits', but shift from purchase tax on vehicles to taxing their use, e.g. by fee-based reserved lane systems and urban congestion charging.	An experiment called *Naim Leyarok* ("Going green") has tested the impact of financial incentives to reduce private car use during rush hours in congested areas.
Further develop environmental levies.	A gradual increase in excise tax on diesel fuel was proposed by the government to the Knesset.
Review the net subsidies granted to firms, taking all tax breaks and support schemes into account. Consider paring back targeted business support by the Law for the Encouragement of Capital Investment in exchange for cuts in the rate of corporate income tax.	Since 2017 a new tax regime for high-tech companies has offered a reduced CIT rate on intellectual property-based income and on capital gains from sales of IP of 6% (for incomes over NIS 10 billion) or 12% (for incomes below NIS 10 billion) for a period of at least ten years. Dividends paid by these firms are subjected to a reduced 4% withholding tax. Regulations for the calculation of the income entitled to the benefit were prepared according to the recommendations of the OECD Base Erosion and Profit Shifting project.
Pursue plans to reduce tax compliance costs for business by simplifying the tax code so as to reduce the number of payments required.	No action taken.
Press on with campaigns combatting tax evasion. Consider strengthening the Israel Tax Authority (ITA)'s independence, unifying the collection of tax and social security revenues, and adopting a "functional" approach to tax administration, with, for instance, a unit dealing with large taxpayers.	Campaigns for combatting tax evasion are conducted through intensified press releases on special high-profile and high-interest circumstances. Ongoing actions are taken while negotiating with employee unions as to adopting a more "functional" approach to tax administration. No action taken as to unifying the collection of tax and social security revenues.
Press on with the further development of electronic services in tax administration.	The ITA is rapidly moving forwards in developing electronic systems designed to support client services and procedure facilitation, alongside operational and enforcement activities.

reporting (Ben-David and Kimhi, 2017). Such a change would need to be combined with steps to minimise the administrative burden associated with paying taxes by promoting digitalisation. The authorities have, however, given close consideration to this option and believe that the revenue payoff would not justify the extra burden imposed on taxpayers. In any case more should be done to further exploit the information already available to the Israel Tax Authority and possibly to give it access to individuals' banking data.

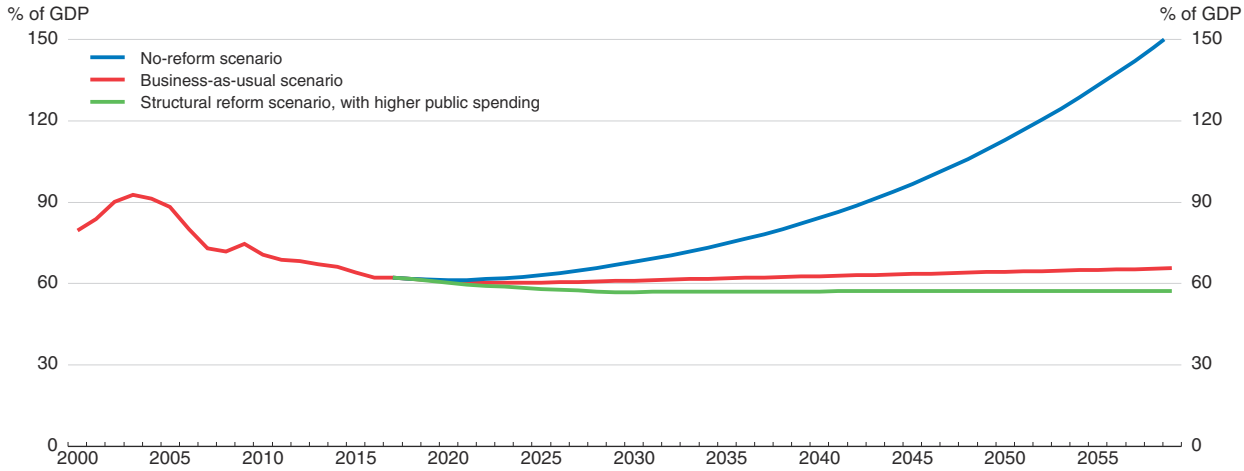
Moreover, the implementation of the minimum standards, best practices and other recommendations of the OECD Base Erosion and Profit Shifting project will protect the corporate tax base and level the playing field. The move towards the automatic exchange of financial account information for tax purposes between tax administrations will increase tax transparency and further support tax collection. It also creates new opportunities to revisit the way Israel taxes capital income at the individual level. Finally, although green taxes are already fairly high (OECD, 2017b), raising diesel and/or other taxes on fossil fuels and eliminating the tax break for company car purchases would also help reduce pollution (OECD, 2016b). Higher taxes on smoking (including rolling tobacco) and harmful beverages should also be considered.

Savings can also be achieved on the expenditure side by strengthening the effectiveness of public management, promoting e-government and digitalisation and further improving the public procurement process. While the government recently undertook procurement reforms to streamline and standardise tender procedures, centralise e-procurement and encourage staff professionalization, only 10-15% of central government public procurement is processed in accordance with the new programme (IMF, 2017). Conducting regular spending reviews is a good way to explore priorities and thereby identify areas for spending restraint.

Increasing public investment in infrastructure and education and adopting ambitious product-market reforms would have a positive growth impact, which would, in turn, help finance these additional expenditures. Under the assumptions of the "structural-reform scenario" discussed above, the improved budget balance resulting only from the product market reforms (i.e. excluding the expected benefits of measures enhancing the education and training system, given their long and uncertain delay of action), coupled with the gradual removal of identified existing tax exemptions and moderate increases in environmental taxation, would allow the authorities to increase their spending-growth ceiling while keeping the same deficit level and bringing debt down to below 60% of GDP over the 2020-59 period (Figure 18). In this scenario, increasing the annual spending-growth ceiling from 2.6% to 3.6% between 2019 and 2025, would provide enough fiscal room to bring childcare, training and secondary education spending relative to GDP close to the OECD average and to increase the generosity of the in-work benefit scheme (Table 6). Between 2026 and 2059, public expenditure could revert to 3.2% per year, i.e. close to the period's post-reform estimated average trend growth rate. While debt sustainability would also be maintained even if current trends are extrapolated (in the business-as-usual scenario), failing to continue with the integration of Haredim and Israeli-Arabs would seriously curb government revenues and lead to an unsustainable debt trajectory, assuming no policy change (Geva, 2015; non-convergence scenario).

Moreover, pressures on public finances would rise if pension expenditures increase. This does not seem to be a serious risk for old-age pensions (OECD, 2016b). On the other hand the situation is different for disability pensions. Although Israel's disability spending is higher (1.4% of GDP in 2013) than the OECD average (1.0% of GDP), the Parliament has approved in February 2018 to gradually increase the disability benefits for the working age population by 30% to 50% between 2018 and 2021 without taking into account beneficiaries' income

Figure 18. **Public debt sustainability would benefit from the enactment of further reforms**[1]



1. The business-as-usual scenario is the same as that presented in Figure 15. It thus consists of the updated projections for the Economic Outlook No. 102 until 2019. From there on, assumptions are based on Geva (2015), with an average annual real GDP growth of 3.0% and a budget deficit stable at 2.5% of GDP from 2020 onwards. According to the no-reform scenario of Haredim and Israeli-Arabs, which is also based on Geva (2015) as explained in the main text and the footnote in Figure 15, the deficit would be higher because of lower revenues due to a weaker annual average real GDP growth of 2.7%. The structural reform scenario, which incorporates the gains of structural reforms (as discussed in the main text and in the footnote of Figure 15) is based on higher real GDP growth (3.3% per year on average). This scenario assumes higher revenues due to the gradual removal of major existing tax exemptions over the 2019-25 period (see Table 6), while expenditure are projected to increase annually by 3.6% in real terms. Thereafter, tax revenues and expenditure are kept constant as a share of GDP.

Source: OECD calculations based on OECD (2017), *Economic Outlook 102 Database;* A. Geva (2015), "Demographic Changes and their Implications for Fiscal Aggregates in the Years of 2015-2059", Ministry of Finance.

StatLink http://dx.doi.org/10.1787/888933673066

Table 6. **Illustrative fiscal cost and financing of additional spending in the structural reform scenario**

Impact at the end of 2025 as a percentage of 2025 GDP

Policy	Measure	Fiscal balance effect
	Additional expenditures	**-3.0**
Additional spending on secondary schools	Increase in educational spending per student as a share of GDP per capita to the OECD average.	-1.9
Additional spending on child-care and pre-school education	Increase the spending on childcare and preschool education per child below the age of 5 to the OECD average.	-0.4
Additional spending on active labour market policies	Increase in active labour market policy (ALMP) spending as a share of GDP to the OECD average.	-0.4
Increasing in-work benefits	Increasing spending on in-work benefit to the US level (from 0.1% of GDP to 0.4% of GDP).	-0.3
	Offsetting measures	**3.0**
Budget balance effect associated with higher GDP induced by product market reforms		
Increased budget balance induced by stronger GDP by the end of 2025	Increase in the budget balance associated with a 4.8% increase in GDP due to product market reforms implementation[1]. Under the assumption of a tax revenue-to-GDP elasticity of one, the public spending of 39.9% of GDP in 2016 is lowered by [0.399] 0.048/1.048 1.8%of GDP.	1.8
	Additional revenues	
Removal of inefficient tax exemptions	Removal of tax preferences on fruits and vegetables (0.23% of GDP), medium-term saving (*Kranot Hishtalmut*) (0.4% of GDP), rental income (0.1% of GDP), Eilat tourism services (0.07% of GDP), company-car benefits (0.02% of GDP).	0.8
Environmental taxation	Increasing the rates on fuel taxation based on Green Taxation Committee recommendations.	0.4

1. Quantification of the impact of product market reforms in Israel assumes an increase in GDP by 6% on a 10-year horizon, according to OECD (2016b). Product market reform would thus assumed to increase GDP proportionally by 4.8% by 2025.

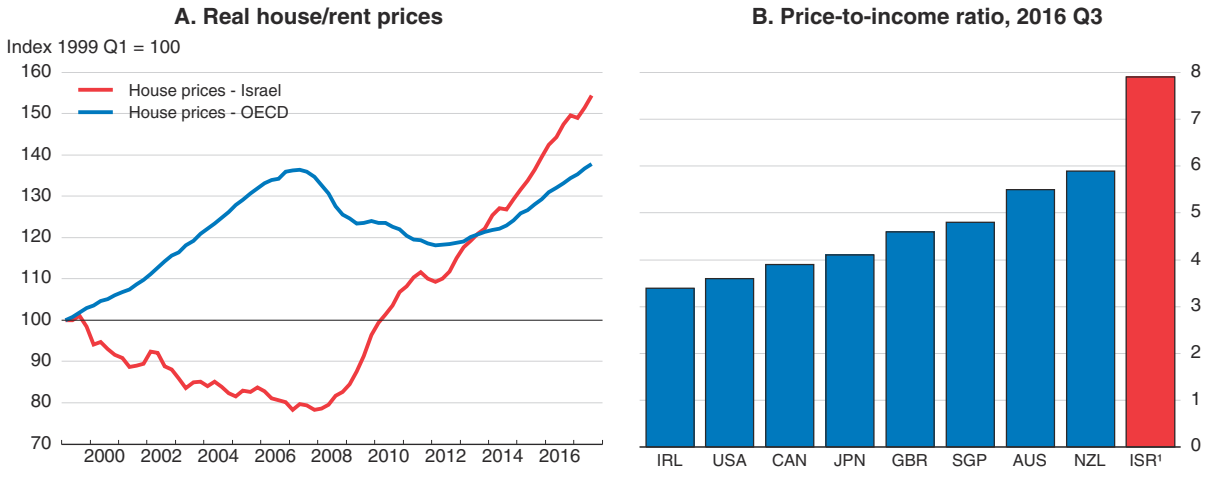
Source: OECD calculations based on OECD (2017), *Economic Outlook 102 Database*; A. Geva (2015), "Demographic Changes and their Implications for Fiscal Aggregates in the Years of 2015-2059", Ministry of Finance; MoF (2014), "Tax Revenues Forecast for 2015-2016", *http://mof.gov.il/ChiefEcon/StateRevenues/StateRevenuesReport/DocLib/2013-2014/Report2013-2014_04.pdf*.

conditions. Official estimates of the resulting annual fiscal cost, which rise from NIS 2.2 billion initially to NIS 4.3 billion (0.3% of GDP) in 2021 could be exceeded, as they do not account for the likelihood of increased demand for these significantly higher allowances, either by older workers or those poorly integrated into the labour market, as shown by other OECD countries' experience. An increase in beneficiaries would not only be fiscally costly but could also seriously undermine ongoing efforts to bring vulnerable workers into employment, if their 5% share in the working-age population increases to the 8-11% level seen in the Netherlands, Hungary or Norway due to poorly designed regulation and incentives. While it is clearly necessary to ensure adequate incomes for the disabled, international evidence shows that the most effective programmes in this area combine financial support and measures helping these vulnerable people to integrate into the labour market and focusing medical assessments on their work capacity and not only their disability level. Although putting more resources into disability programmes might be desirable, simply increasing benefits is unlikely to produce desired outcomes if the measure's design is not improved to strengthen its employment focus and to prevent an improper use of more generous allowances (OECD, 2017c).

Pursuing reforms to improve housing affordability and deepen the rental market

Improving the functioning of the housing sector remains a key concern, given its importance for financial stability, inclusiveness and productivity and implications for tax policy. Since the sharp acceleration in house prices in 2007 that followed a 25% price-adjusted plunge the previous decade, the average house price has become internationally high, at nearly eight times average household income (Figure 19). A declining share of young families are owner occupiers (Brender and Strawczynski, 2015), and households' spending on housing has increased (Figure 20), despite a relatively moderate rise in rents. Moreover, real house prices continue to grow, although there have been signs of stabilisation since end-2016. Purchases remain buoyed by a vigorous labour market and the accelerating number of households, whose growth should rise from around 45 000 per year currently to 60 000 from 2025 (NEC, 2017).

Figure 19. **House prices are elevated and still rising**

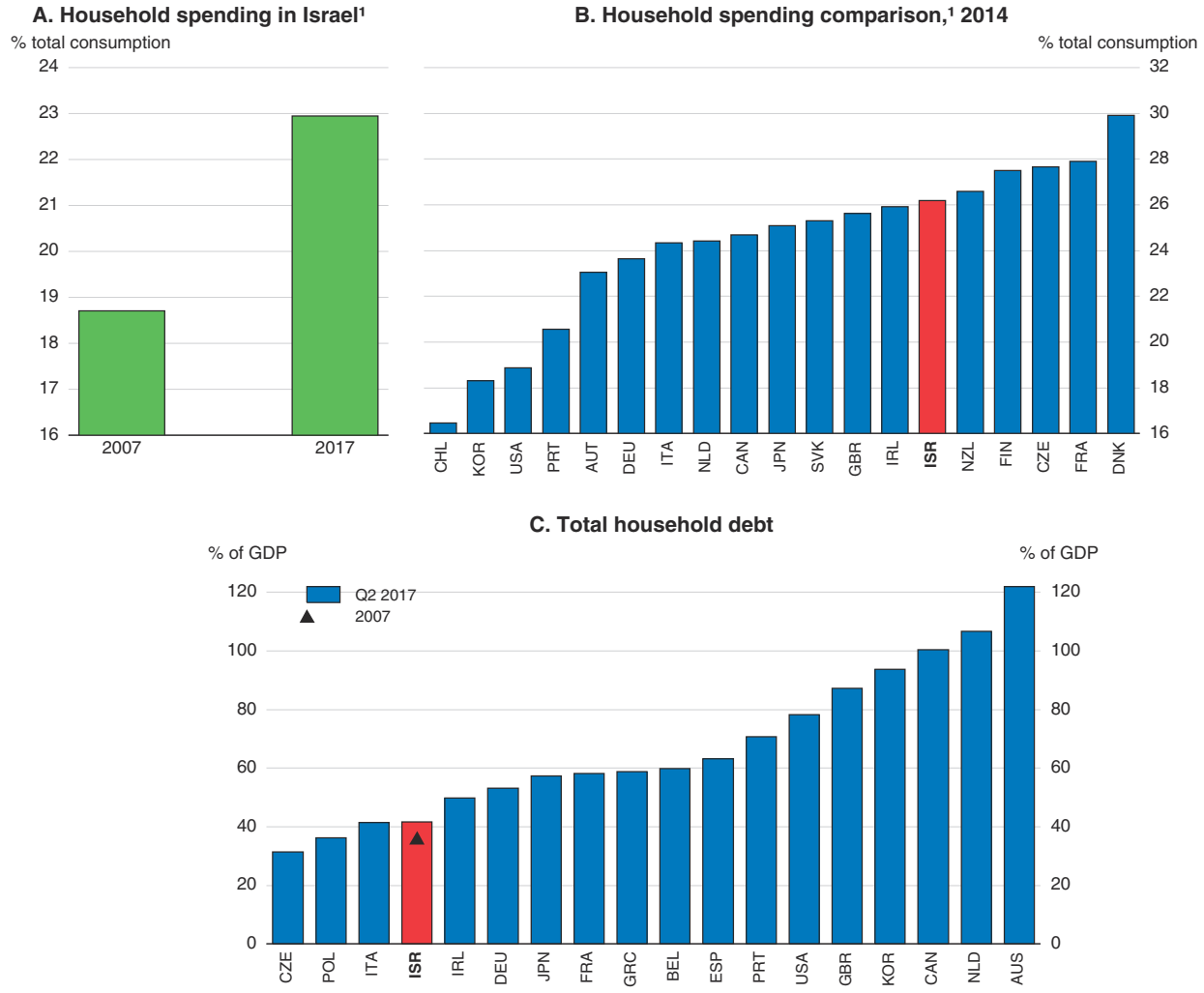


1. Estimate for Israel is based on IMF (2017) and the growth index of the price-to-income ratio in OECD (2017).

Source: OECD (2017), Prices and Purchasing Power Parities – Analytical House Price Indicators database; Demographia (2017), *13th Annual Demographia International Housing Affordability Survey: 2017*, Table ES-3; IMF (2017), *Israel – IMF Country Report*, No. 17/75, March.

StatLink http://dx.doi.org/10.1787/888933673085

Figure 20. **Household spending on housing has increased, but total household debt is low**



1. Household spending on housing has a slightly different coverage in national and OECD data sources.

Source: CBS, *National Accounts*; OECD, *Prices and Purchasing Power Parities and Economic Outlook Databases*; Bank for International Settlements, *Credits to Non-Financial Private Sector Statistics*.

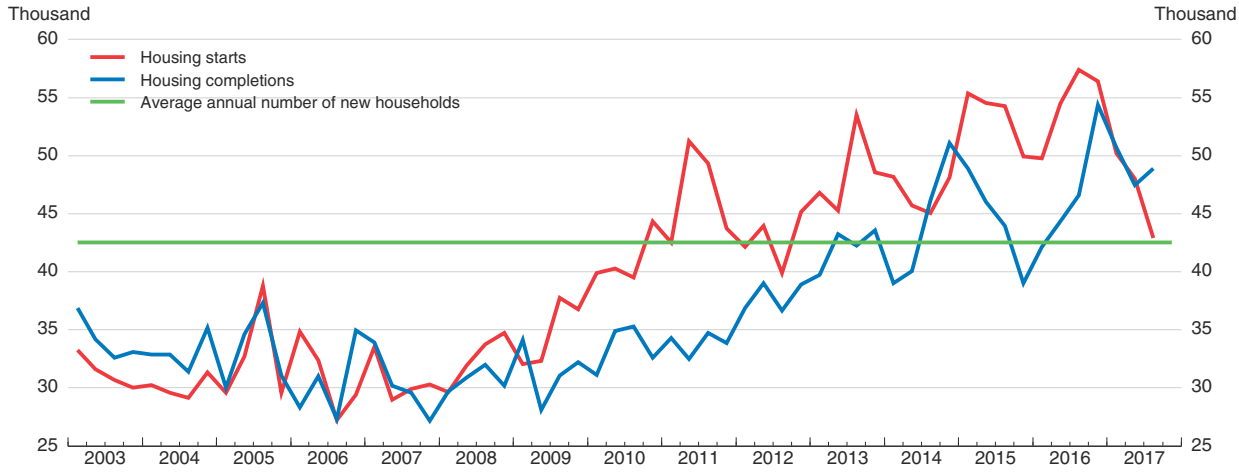
StatLink http://dx.doi.org/10.1787/888933673104

Housing construction has been insufficient to meet the strong demand for homes, causing shortages and higher prices. Reforms have been introduced to enhance housing supply. Land-use planning procedures have been streamlined to reduce their duration from over 11 years by decentralising small residential project approvals (Table 7). New large residential projects were approved under the accelerated procedure introduced in 2014 for a five-year period (the Vatmal programme) (OECD, 2017d) (Figure 21). A long-term strategic plan to 2040 has been adopted to meet the nation's needs (BoI, 2017b). Provisions to reduce the housing tensions in Arab localities have been taken with the planned construction of 40 000 new dwellings houses under the five-year (2016-20) plan of NIS 15 billion to promote the economic development of the Arab sector (Iataskforce, 2016). Moreover, several foreign housing companies are set to enter the Israeli market. This should boost competition and productivity in the construction sector, which are low by international standards (Ben-David, 2013), and reduce construction costs.

Table 7. **Past recommendations on housing policy**

Recommendations in previous *Surveys*	Action taken since January 2016
Pursue plans to decentralise planning through permanent reforms to the Israel Land Authority and planning processes.	The 2014 amendment 101 to the Planning and Building Law has resulted in the devolution to the 127 local planning committees of approval of small-scale housing developments of less than 20 housing units.
Complete the streamlining of the administrative requirements for planning and building a home.	In 2016 a dedicated website was launched, which allows individuals to send to the authorities online the requested approvals (instead of by post). Also, a new private entity will be established to serve as a one-stop shop for permits, working with the Ministries of Health and Environment, IDF's Home Front Command and the Israel Fire and Rescue Services and all other permit providers.
Further develop public transport infrastructure to make it easier to live in lower-price housing areas, and promote labour market participation for those living in remote areas.	Several public transport projects are underway, including a high-speed rail link between Jerusalem and Tel Aviv and the construction of light rail systems in Israel's three largest cities at a cost of NIS 60 billion (4.9% of GDP).
Consider raising property taxation (Arnona).	Since January 2017 owners of three or more dwellings have been subject to a 1% tax on the value of those properties (but the supreme court sent this law back to the Knesset for further discussions, so it is not in force).
Consider raising rent subsidies while cutting support for home purchases. Make eligibility for social housing more uniform. Neglect siblings in the points system.	No action taken.
Introduce minimum criteria in rental contracts.	A "fair rental" law was passed in 2017, clarifying tenants' and landlords' responsibilities in several respects. For example, it limits the amount of financial guarantees that a landlord can ask from a tenant and lays out conditions for an apartment to be suitable for renting.

Figure 21. **Housing supply has strengthened**



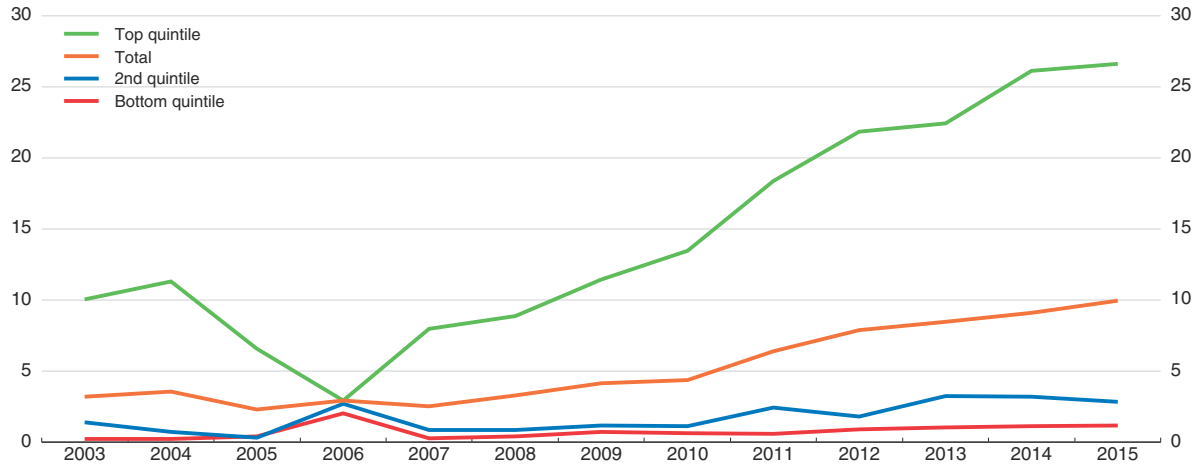
Source: Central Bureau of Statistics, Construction Statistics.

StatLink http://dx.doi.org/10.1787/888933673123

Moreover, the authorities have again raised taxes on real estate investment, which had risen sharply in 2007 (Figure 22). After a first increase in mid-2015, a welcome property tax on owners of three or more dwellings was adopted in 2017. This measure, which was invalidated by the High Court in August 2017 for procedural reasons, is expected to be adopted in the next Knesset session (see Table 7 above). The authorities also launched the "Buyer's Price" programme to facilitate housing purchases by young households by modifying the tendering for public land: public land is sold at fixed, below-market prices to promoters who undertake to build housing at the lowest (bid) prices. By end-2017, 40 000 households were entitled to buy such a house, and their number should reach 100 000 by end-2018. In September 2017 the programme's termination date was extended from 2017 until 2019.

Figure 22. **Investing in real estate picked up sharply after 2007**

Percentage share of households owning two or more dwellings, by income quintile



Source: IMF (2017), *Israel – IMF Country Report*, No. 17/75, March, Figure 6.

StatLink http://dx.doi.org/10.1787/888933673142

These multiple reforms include several useful measures. However, some are costly and could be improved. The Buyer's Price programme, for example, does not increase the supply of public land, despite a non-negligible budgetary cost (0.2% of GDP in 2017-18; IMF, 2017). It also distorts the market because many beneficiaries of its subsidies (who are selected by lottery) will buy a "bargain" dwelling in a location that does not meet their needs, probably merely to rent it (BoI, 2017b). This ultimately stimulates renting rather than owner occupation, the government's original intent.

In any case, assisting young households could best be done by facilitating rental rather than housing purchase and reforming the rental market, as recommended in previous *Surveys*. The recent changes to this weakly regulated market (limiting, for example, the maximum amount of financial guarantees that owners can ask of tenants) are welcome (Table 7). However, other adjustments should be considered to deepen this market, which is somewhat narrower (31% of the total) than the OECD average (37%). Renting would be more attractive, especially for young households, if the minimum landlord-guaranteed duration of leases exceeded one year and the annual increase in rents were capped during the term of the lease, with owners free to adjust them at renewal to avoid the poor investment returns that would eventually limit rental supply. However, such a regulation, which would be similar to a mandatory insurance policy, might raise rents somewhat.

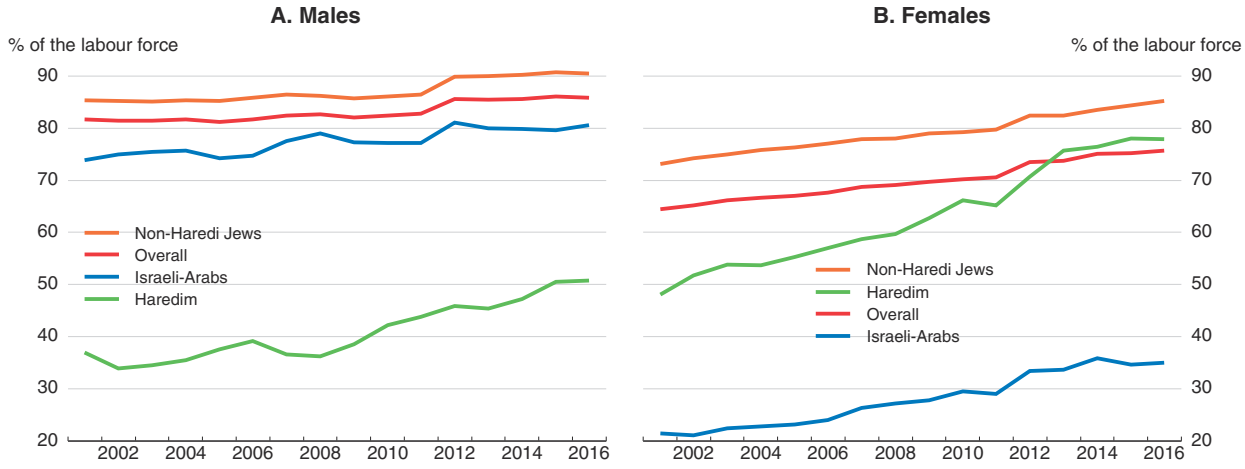
Moreover, the government's legitimate goal of reducing investor demand in the current monetary and financial environment would be reinforced by removing the income tax exemption enjoyed by rental income, as mentioned above (Gruber, 2015). Municipalities should be provided with adequate resources for financing the local infrastructure services needed for new residential developments. Given the low level of taxes on residential properties and the political difficulty of raising them, Israeli cities have strong incentives to prefer business activities to residential neighbourhoods. The coordination under the Vatmal programme between developing large residential tracts in peripheral areas where public land is available and building public transport to the economic centres where jobs are located could be enhanced (see below and Chapter 2). This would be particularly beneficial to social cohesion and reduction of disparities due to the spatial segregation of disadvantaged communities.

Improving social cohesion would promote sustainable growth

Increasing labour-market integration and employment opportunities for disadvantaged groups

The Israeli labour market has improved markedly over the last decade, with the employment rate reaching historically high levels. While this partly reflects remarkable progress for older workers due to the retirement age increase (BoI, 2017e), more and more Haredim and Israeli-Arabs have also found jobs, though their employment rates remain low (MoF, 2017c); the problem is especially severe for Haredi men and Israeli-Arab women; indeed, progress has stalled for both groups (Figure 23). However, there is no guarantee that gains will continue much longer, since the stock of remaining inactive adults in these communities no doubt includes some of the most resistant to joining the labour market.

Figure 23. **Participation rates have improved markedly, particularly for disadvantaged groups**



Source: Ministry of Finance.

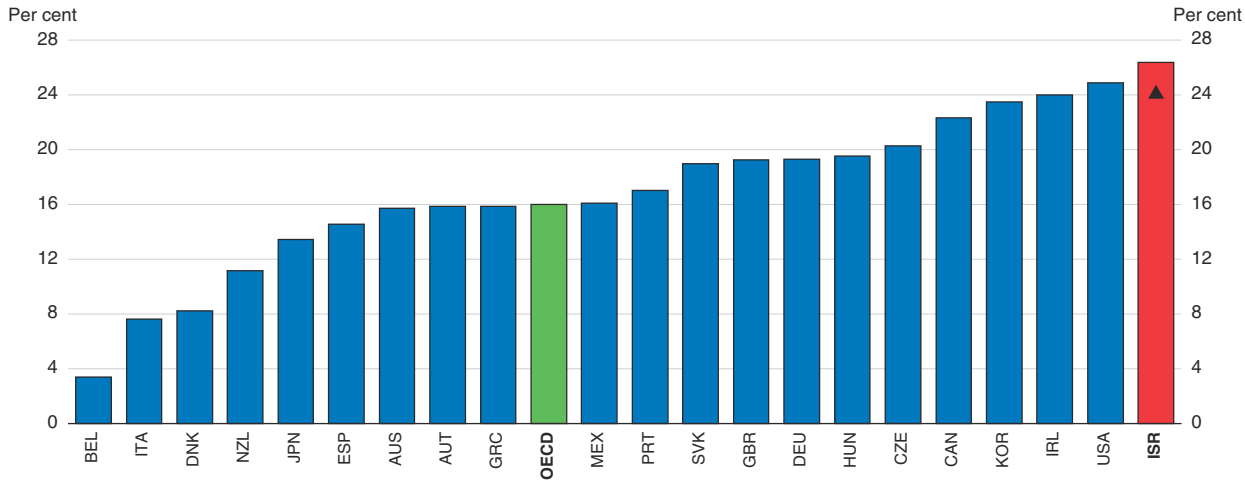
StatLink http://dx.doi.org/10.1787/888933673161

Moreover, the labour market is still characterised by severe duality. On the one hand, there are productive advanced industries, including high-tech sectors, which attract mostly high-skilled workers with high wages. On the other, low-productivity, often non-tradable, sectors employ many Israeli-Arabs and Haredim who are trapped in low-quality, low-wage jobs. Israel's share of low-paid workers is one of the OECD's highest (Figure 24). Moreover, job mobility towards high-productivity sectors is declining, which means that the probability that low-educated individuals will get jobs in high value-added, high-wage industries has decreased over time (Brand and Regev, 2015).

This is worrying, as such industries are facing increasing skilled-labour shortages (see Chapter 1), undermining their growth and competitiveness. More than half of their companies recently reported difficulty filling jobs, particularly for engineers (Manpower, 2017). A special visa exists for skilled workers where there is no local expertise. Despite strong demand, the employment share of the high-tech sectors has remained stable around 12% of employment in the business sector for a decade, and they are said to lack more than 10 000 engineers (MoF, 2016). Israeli-Arabs comprise only about 3% of the high-tech workforce, and Haredim are also under-represented. The situation is similar in many other sectors such as financial and professional services (Irac and Imrpj, 2016). This reflects

Figure 24. **There is a high share of low-paid jobs in the labour market**

Share of low-paid workers,[1] 2016[2]



1. Defined as workers earning less than two-thirds of median earnings. Conscripts with low pay are included as workers in this indicator. However, given the longer duration of military service in Israel (2 or 3 years) than in other countries, an OECD estimate of the population of working poor excluding conscripts (the black triangle) is provided.
2. Or latest available year.

Source: OECD, *Labour – Earnings Database* and OECD estimates.

StatLink http://dx.doi.org/10.1787/888933673180

a number of difficulties and barriers including education and transportation issues, but also other obstacles such as language barriers, cultural and social norms – as well as insufficient inclusiveness of policies and programmes (Yashiv and Kasir, 2014).

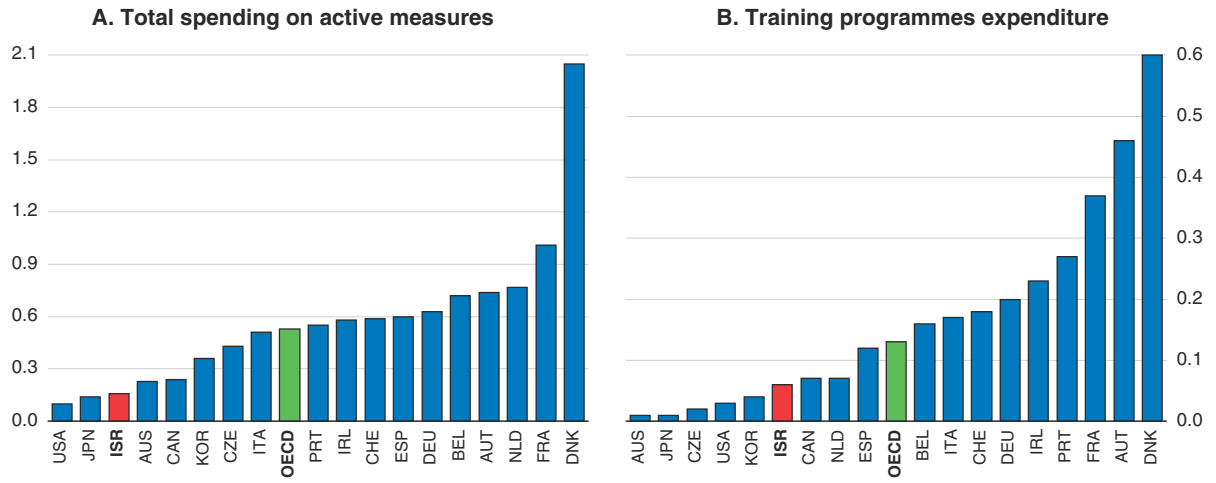
More needs to be done to improve the outcomes of these groups, not only in terms of employment, but also of wages and productivity. The remaining legal barriers to work should be lifted for those Haredi men who have been exempted from military service if they committed to study religion in order to allow them to join the labour market. Moreover, besides reforms in education (Chapter 1) and infrastructure (Chapter 2), active labour market policies need to be strengthened.

Israel's spending on active labour market policies in 2014 amounted to just 0.16% of GDP, well below the OECD average of 0.55% of GDP (Figure 25). Spending on training, which is provided through a voucher system in particular, is meagre, while experience from other OECD countries shows that well-designed training measures are effective in keeping skills up to date and improving labour market matching (Card et al., 2015). Additional resources and better work incentives are needed, together with more careful programme assessment. While there are a plethora of Israeli training provisions, their effectiveness is often unclear due to a dearth of evaluations undertaken (OECD, 2015a), which may result in inefficient programmes continuing to operate.

More attention should be paid to overall job quality, the sustainability of job placements and levels of pay. Public employment services should offer basic-skills and literacy training before placing the unemployed directly into jobs. Increased training incentives for individuals already in work are also needed, particularly for the low skilled who are less likely to receive training (OECD, 2017e). In Germany workers without qualifications and those working in positions unrelated to their initial training for at least four years may receive grants to be retrained in areas with better prospects (OECD, 2015a). So-called "retention and

Figure 25. **Spending on ALMPs,[1] especially training programmes, is low**

As a percentage of GDP, 2015 or latest year available



1. Active labour market programmes.

Source: OECD, *Labour Market Programmes Database*.

StatLink http://dx.doi.org/10.1787/888933673199

advancement services" to increase training incentives for individuals exist in many OECD countries (OECD, 2017e). If the Israeli training voucher scheme proves to be effective after careful programme assessment (see above), it should be expanded and its eligibility widened towards low-skilled workers, especially from disadvantaged groups. Support programmes for Israeli-Arab and Haredi entrepreneurs should also be introduced (OECD, 2016c). These measures should be complemented by better enforcement of existing anti-discrimination regulation. It may also be worthwhile using public procurement to increase incentives for firms to hire more Israeli-Arab and Haredi workers (Sikkuy, 2016).

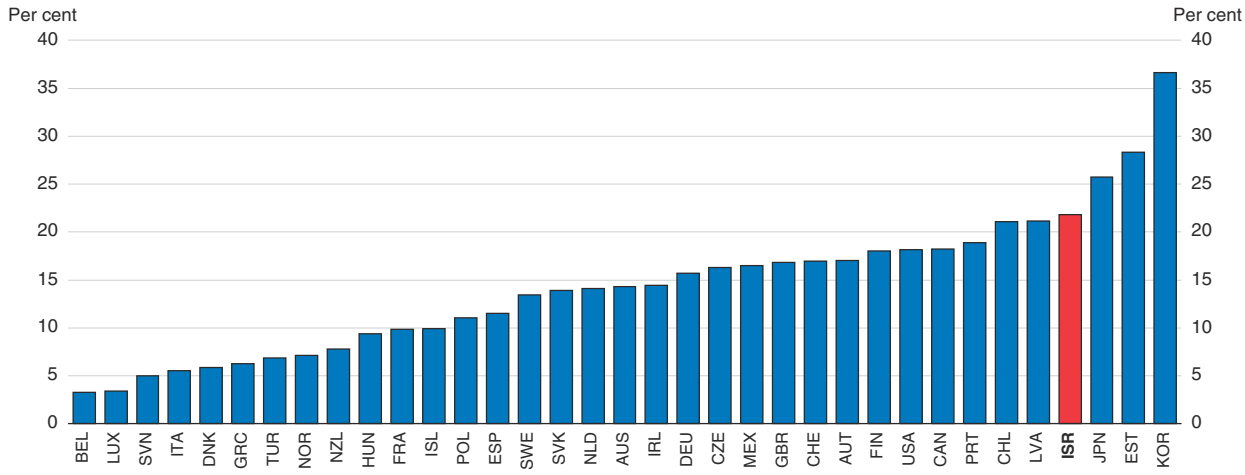
Gender equality also requires policy attention. The median gender wage gap, which is close to 22%, is higher than the OECD average (Figure 26). This gap can be partly explained by lower working hours for women, but also by their choice of education field and industry (Fuchs, 2016): women account for only about 25% of high-tech jobs (Mazuz-Harpaz and Krill, 2017). However, it is also related to the lack of childcare facilities, although corrective efforts are underway (Table 8) (Chapter 2). Although expenditure on child-care and pre-school education relative to GDP is slightly above the OECD average, it is comparatively lower when measured per child under four, given Israel's large share of this population age group. Increasing the number of subsidised *crèche* places for these children would foster labour force participation and would help women to pursue better careers, with higher wages (BoI, 2016c). This would be beneficial particularly for Arab women with low labour force participation (Schlosser, 2011) and Haredi women with large share of part-time work, who currently end up doing much unpaid work for their families. On the other hand, the existing eligibility for subsidised childcare facilities for Haredi families whose father is studying in a yeshiva is likely to be counterproductive for labour-market integration and takes available spaces from two-earner working families.

Reforming the tax-transfer system to support more inclusive and sustainable growth

Inequality and poverty in Israel remain high, despite some improvement resulting from the rising employment rate and recent measures to address the problem, such as increases

Figure 26. **The gender wage gap[1] is pronounced**

2016 or latest available year



1. Defined as the difference between median wages of men and women relative to the median wages of men.

Source: OECD, *Labour – Earnings Database*.

StatLink http://dx.doi.org/10.1787/888933673218

Table 8. **Past recommendations on labour market policies**

Recommendations in previous *Surveys*	Action taken since January 2016
Support for childcare services for Israeli-Arab children warrants particular attention.	In accordance with the government's Economic Development of the Minorities in Israel (2016-2020), 25% of the budget for building day care centres is expected to be allocated to the Arab community.
Further improve enforcement of labour regulation, in particular in sectors dominated by foreign workers. Limit rent-seeking in the foreign workers' permit system.	The allocation of work permits for Palestinian workers in Israel has been changed to make it more efficient and to eliminate the dependence of the worker on the employer.

in the minimum wage and in the earned income tax credit (EITC) (Table 9). In recent years both gross and net income inequality have come down, returning the net measure to the levels seen in the early 2000s, implying important savings on transfer payments. Inequality, as measured by standard Gini coefficient, has decreased from 0.36 in 2011 to 0.34 in 2016. Nevertheless, the fact remains that average disposable income of the 10% richest households was 13.3 times that of the poorest, against a multiple of 9.4 for the average OECD country. Almost one-fifth of the population live in relative poverty (i.e. have a disposable income below 50% of the median), the highest rate in the OECD. All age groups are affected, with a particularly heavy prevalence among children, but also among the elderly. Around half of Arabs and Haredim are poor, against 13.5% of non-Haredi Jews.

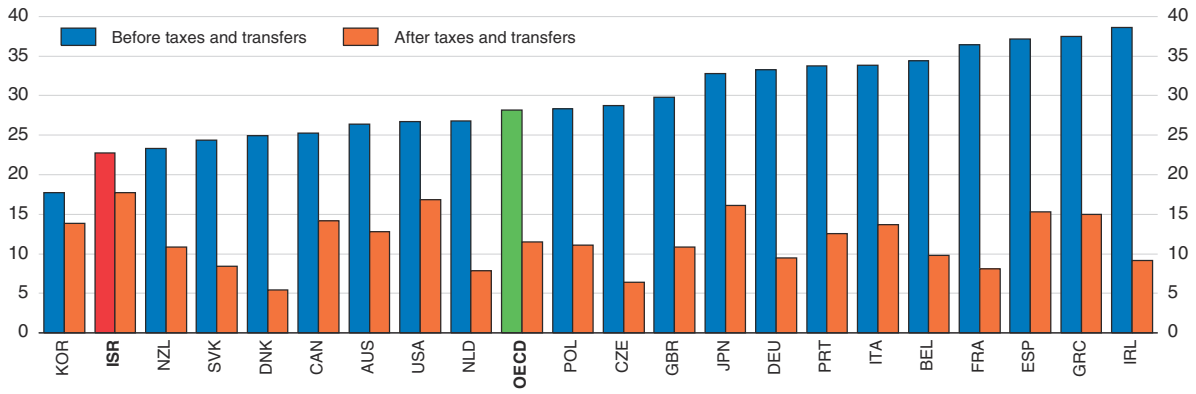
One of the reasons for high poverty rates is the low level of social transfers (BoI, 2016c). While poverty measured before taxes and transfers is lower than in many other OECD countries, poverty after taxes and transfers is higher (Figure 27). As in other OECD countries, transfers do not include in-kind benefits such as free education and health-care services. Israeli social policy follows a "welfare-to-work" approach to tackling poverty in order to avoid measures that may harm work incentives among the Haredi, who value the time dedicated to religious studies, and the Arabs, who have cultural barriers to female employment (Yashiv and Kasir, 2013). Policymakers are concerned that, although easing economic distress in the short term, higher transfers would perpetuate it in the long term by slowing the progress of their employment integration. The critical challenge they face is

Table 9. **Past recommendations on social policies**

Recommendations in previous *Surveys*	Action taken since January 2016
Expand further the earned income tax credit and active labour market policies.	The EITC was expanded for single mothers in 2016 and further expansion for men and working couples will take place in 2018.
Invest more in active social policies. Bring in new levels of benefit for those with more than two children. Avoid further increases in universal child allowances.	The new government increased family allowances, abolishing the cuts carried out by its predecessor. Since 2017 this took the form of monthly government deposits into a new savings account for every child, which can be accessed when the child turns 18. Subsidies for after-school education and the tax credit for working parents of children up to age 6 were also raised.
Reform disability benefits to further promote work incentives. Consider shifting the approach for medical assessment from general disability to capacity for work.	Discussions are ongoing to substantially increase disability benefits, without taking account of beneficiaries' income conditions.
To reduce elderly poverty, as the second-pillar pension system matures, seek a way to increase first-pillar pensions without creating work disincentives.	Income supplement allowances were raised to NIS 1 billion during 2016-18 and elderly allowances to NIS 1.4 billion for 2017-20. Investments in public housing for the elderly were approved at a cost of NIS 500 million in 2017-18, and rent support was raised to NIS 150 million over four years.

Figure 27. **Poverty rate before and after taxes and transfers**

Poverty line 50%, 2016 or latest year available



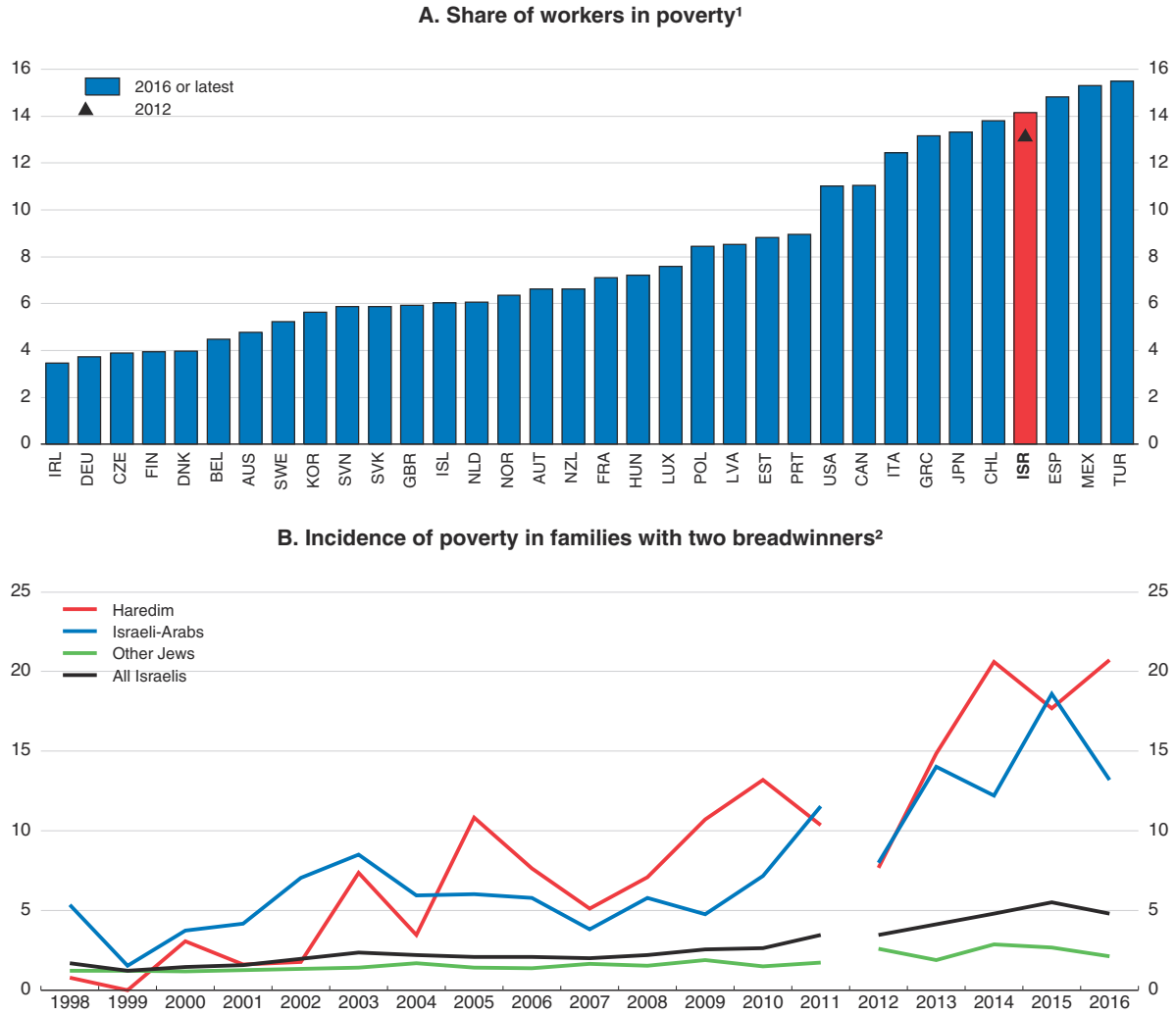
Source: OECD (2017), *Income Distribution Database*, *www.oecd.org/els/soc/income-distribution-database.htm*.

StatLink *http://dx.doi.org/10.1787/888933673237*

that many of those subject to (relative) poverty (specifically: Haredi men) do not want to work and are satisfied with a very low material standard of living.

The Israeli government's strategy of encouraging employment among previously non-working families has met with substantial success. Moreover, the average real income of poor households has risen by 2.7-2.9% in the last six years, while the average real income of wealthier households has increased by only 2.2% (OECD, 2017f). But with so many households with only one provider and a persistent and widespread problem of poor job-related skills, it is just a first step whose benefits have been limited so far by the increase in the working-poor phenomenon. Many disadvantaged workers have been able to find jobs, but their families remain poor, since in most cases these jobs are low-paid. Indeed, the share of the working poor has risen in recent years and is internationally high (Figure 28, Panel A). This is particularly true for the Haredim and Israeli-Arabs, for whom the increased number of breadwinners per family in the last decade (including part-time workers) has had only a limited impact on their poverty risks (Panel B). Therefore, the authorities should focus more on decreasing poverty among those in work.

Figure 28. **The share of working poor is high and increasing**



1. Those with income below the poverty line, living in households with a working-age head and at least one worker.
2. Break in the time series in 2012.

Source: OECD (2017), *Income Distribution Database*; National Insurance Institute.

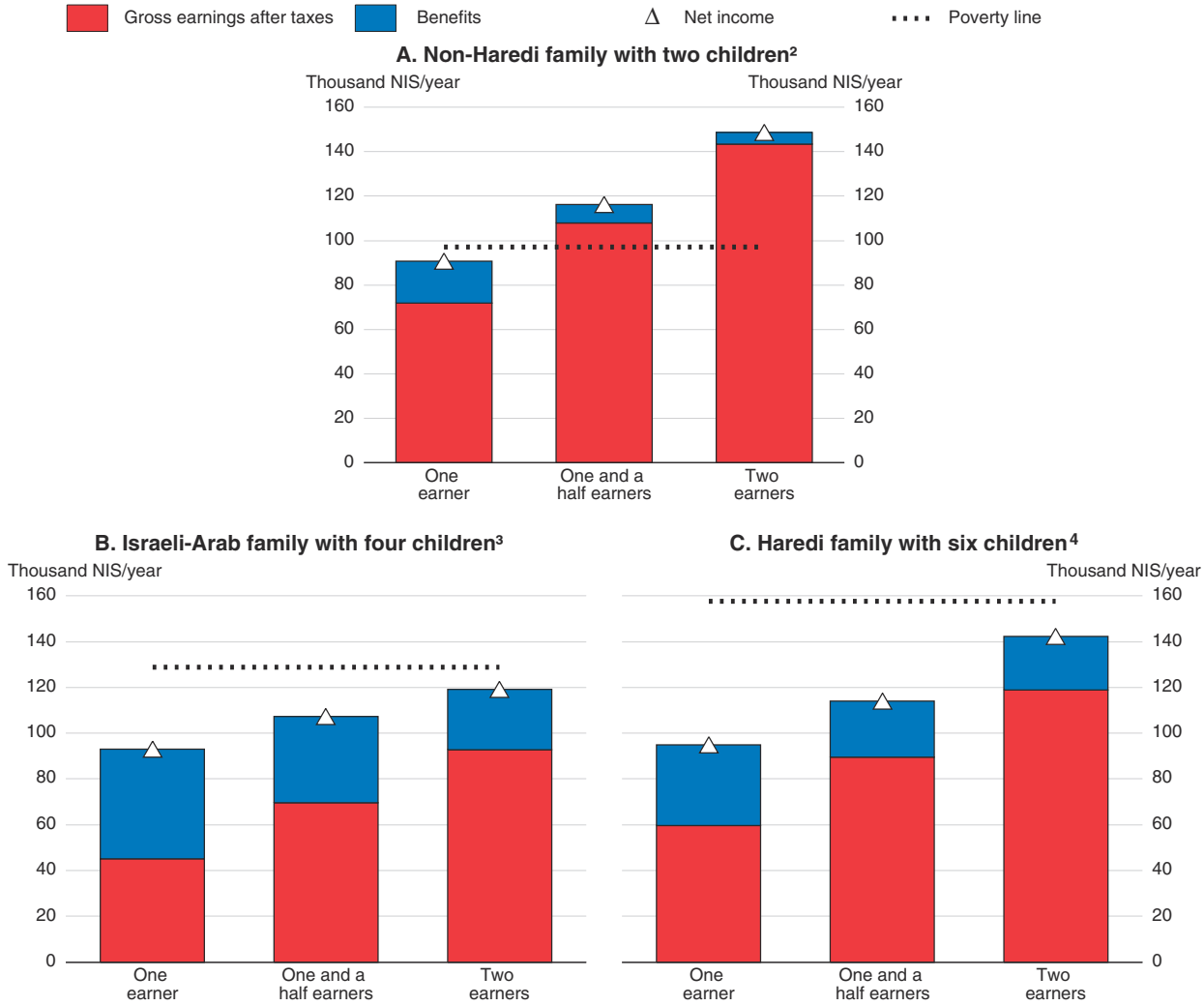
StatLink http://dx.doi.org/10.1787/888933673256

Although increasing the employment rate among the Haredi and Israeli-Arabs is essential, it is unlikely that this will be enough to reduce poverty. Israeli-Arabs and Haredim earn on average only 70% and almost 90% of the median hourly wage, respectively, mostly due to the differences in skills (see Chapter 1) and typically Haredi households have many children and only one breadwinner. According to OECD analysis (see Annex A.1), even if two spouses in these families were working full-time, total family income would not be enough to escape from poverty, given the current tax-transfer system and these households' large number of children (Figure 29). The earnings of an average Arab family with four children would need to reach around 160% of the median wage in order to have a net income exceeding the poverty line, and, in the case of a Haredi family with six children, it would need to reach around 230% of the median wage.

One way to address this poverty issue is to further expand in-work benefits. Israel's "negative income tax" (Earned Income Tax Credit, EITC) boosts take-home pay of the

Figure 29. **Higher employment of Haredim and Israeli-Arabs may not be enough to lift them out of poverty**

Estimates of a family income according to the numbers of earners and its community group[1]



1. One earner corresponds to a family with one earner, one and a half earner corresponds to two-earner family where one works full-time and the second half-time, and two earners corresponds to two-earner family where both work full-time.
2. Workers are assumed to earn 110% of the average wage.
3. Workers are assumed to earn 70% of the average wage.
4. Workers are assumed to earn 90% of the average wage.

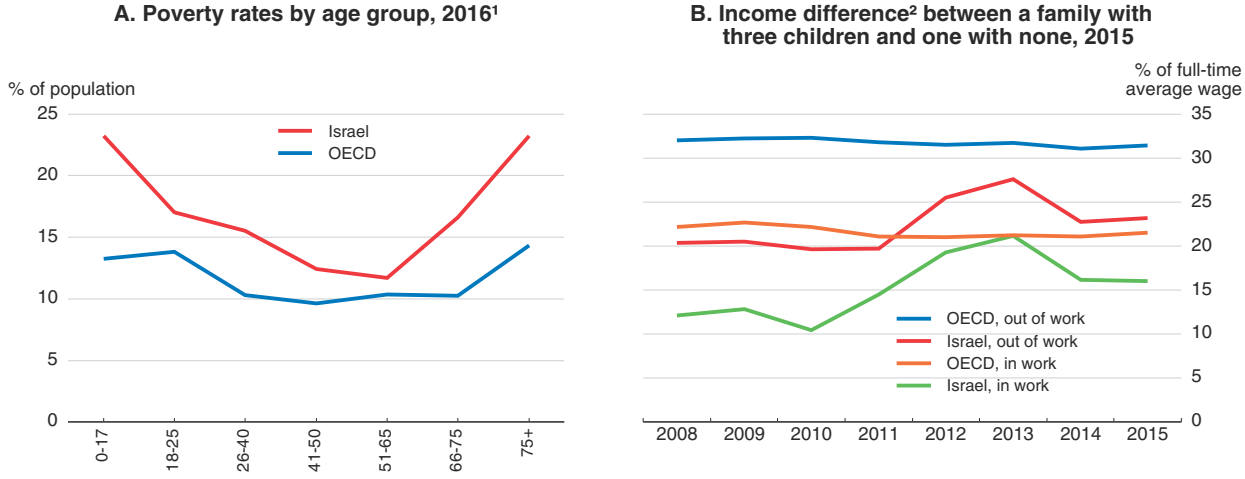
Source: OECD calculations using the OECD Tax-Benefit Model. See Annex A.1 for more details.

StatLink http://dx.doi.org/10.1787/888933673275

average eligible worker by around 16%. It is an effective redistribution measure that also strengthens work incentives of low-skilled workers, in particular those with children (BoI, 2015). But it could be more effective, since its overall budgetary cost is currently only 0.1% of GDP, a fraction of spending on similar programmes in the United States and the United Kingdom (0.4-0.5% of GDP). To encourage second-earner employment, notably for Israeli-Arab women and Haredi men, as is currently being discussed, Israel could provide a negative income tax "bonus" to families in poverty where both members of a couple are in (low-paid) work. For example, the UK negative income tax is conditioned upon the family's hours of paid employment (Brewer et al., 2006).

The authorities should also continue making special efforts to overcome child poverty. The incidence of child poverty remains particularly high among Israeli-Arabs and Haredi, above 60% (National Insurance Institute Israel, 2016). Israel's overall child-related cash support is low by OECD standards, not only for workless households but also for children with working parents (Figure 30; Brender and Strawczynski, 2015). Government support since 2017 for all children in the form of monthly savings deposits accessible at age 18 will be useful for future young adults (see Table 9 above) but does not address acute poverty risks during childhood. To lower child poverty making support conditional on children taking up schooling supplementary to regular learning hours could be considered. This would improve educational outcomes of children from poorer families and reduce poverty (Abhijit et al., 2015). At the same time, working parents' situation should be enhanced. To enable parents to work the school day should be extended, with hot, nutritious lunches served in adequately equipped school cafeterias (Ben-David and Kimhi, 2017).

Figure 30. **Child poverty is high, while effort to overcome it is low**



1. The poverty threshold is 50% of median household income, after taxes and transfers. For the OECD, 2015 or most recent data.
2. The income difference comprises child-related support including both cash benefits and tax concessions. The figure shows averages for lone-parent and couple households without any labour income and relying on minimum-income support ("out of work"), and of lone-parent, one-earner couples and two-earner couples with in-work earnings at the 20th percentile ("in work"). The aggregate OECD is the unweighted average of 34 OECD countries.

Source: OECD, *Income Distribution Database*, *www.oecd.org/social/income-distribution-database.htm*; OECD Tax-Benefit Models, *www.oecd.org/social/benefits-and-wages.htm*.

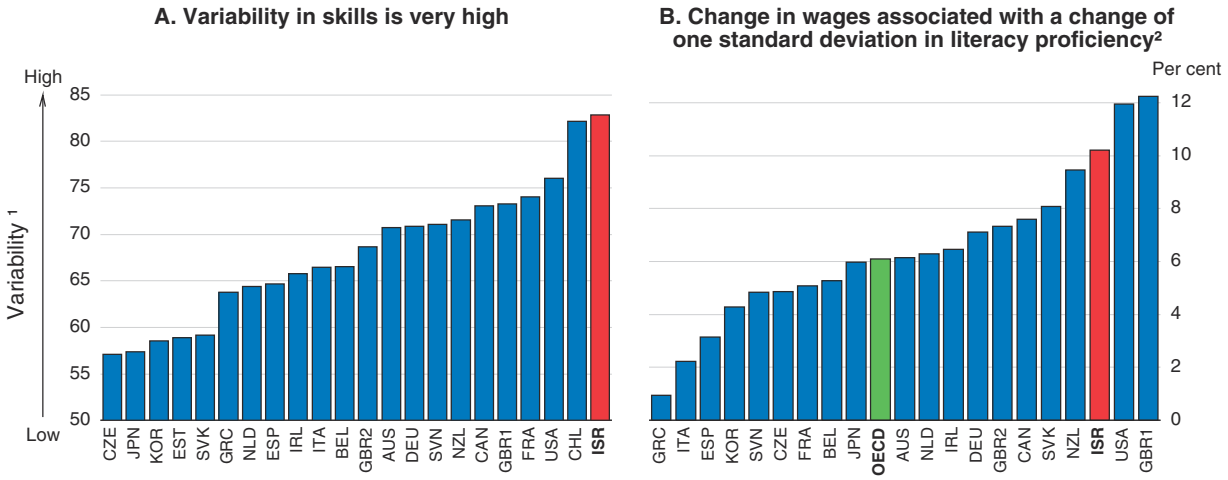
StatLink http://dx.doi.org/10.1787/888933673294

As suggested in the 2016 *Survey*, the authorities should also moderate the impact of the mandatory pension contributions for low-wage workers, which are higher than in most other OECD countries and tend to unbalance low-income households' lifetime income flows. Thus, while the pension system offers a high replacement rate for workers earning less than the average wage, it undermines living standards of young families (OECD, 2016b) and may lead to higher informality. The existing tax deduction on this mandatory contribution provides relief for some but is very regressive: more than half its total value goes to the top decile of the income distribution, while around 45% of employees, including the most vulnerable, do not pay income tax and therefore do not benefit (Brender, 2011). To ensure that relief is provided also to low-income workers it should be converted into a non-wasteable (refundable) tax credit.

Improving the education system to enhance equity

Extensive poverty and inequality in Israeli society are to a significant extent due to the wide dispersion of skills. Israel has one of the largest gaps between adults with outstanding competences and those with weak outcomes (Figure 31, Panel A). The share of adults with top-notch numeracy skills is comparable to the OECD average, but the proportion of low-skilled adults is exceptionally high: for example, almost one-third of Israelis lack basic maths skills. These differences are particularly pronounced between communities, which exacerbates already strong socio-economic divisions in Israeli society. Large wage gaps between Israeli-Arabs and Haredim and the rest of the population can for the most part be explained by differences in skills (BoI, 2016d): the relation between wages and skills proficiency is relatively strong in Israel (Panel B).

Figure 31. **High inequalities are related to differences in skills**



1. The measure of variability used is the interquartile range (difference between the third and first quartiles. Data indicated as Belgium correspond to Flanders; GBR1 = England and GBR2 = Northern Ireland.
2. For more details, see Figure 5.4 of OECD (2016).

Source: OECD (2016), *Skills Matter: Further Results from the Survey of Adult Skills,* Figures 2.15 and 5.4 and Table A5.4; *OECD Survey of Adult Skills (PIAAC) Database (2012 and 2015)*.

StatLink http://dx.doi.org/10.1787/888933673313

Education plays a central role in the acquisition of skills at an early age and is a powerful lever to make society more inclusive. However, international assessments of Israeli students' outcomes (including PISA) show significant differences among students. Hebrew-speaking students have similar or better scores than the average OECD student, while Arabs lag behind. The share of poorly performing Arabic-speaking students was 45%, against 12% for Hebrew speakers. Almost no Arabic speakers reached the top performing cut-off. Particularly poor performance is found in the Bedouin community, whose children (below the age of 14) currently comprise almost one fifth of all Israeli-Arab children.

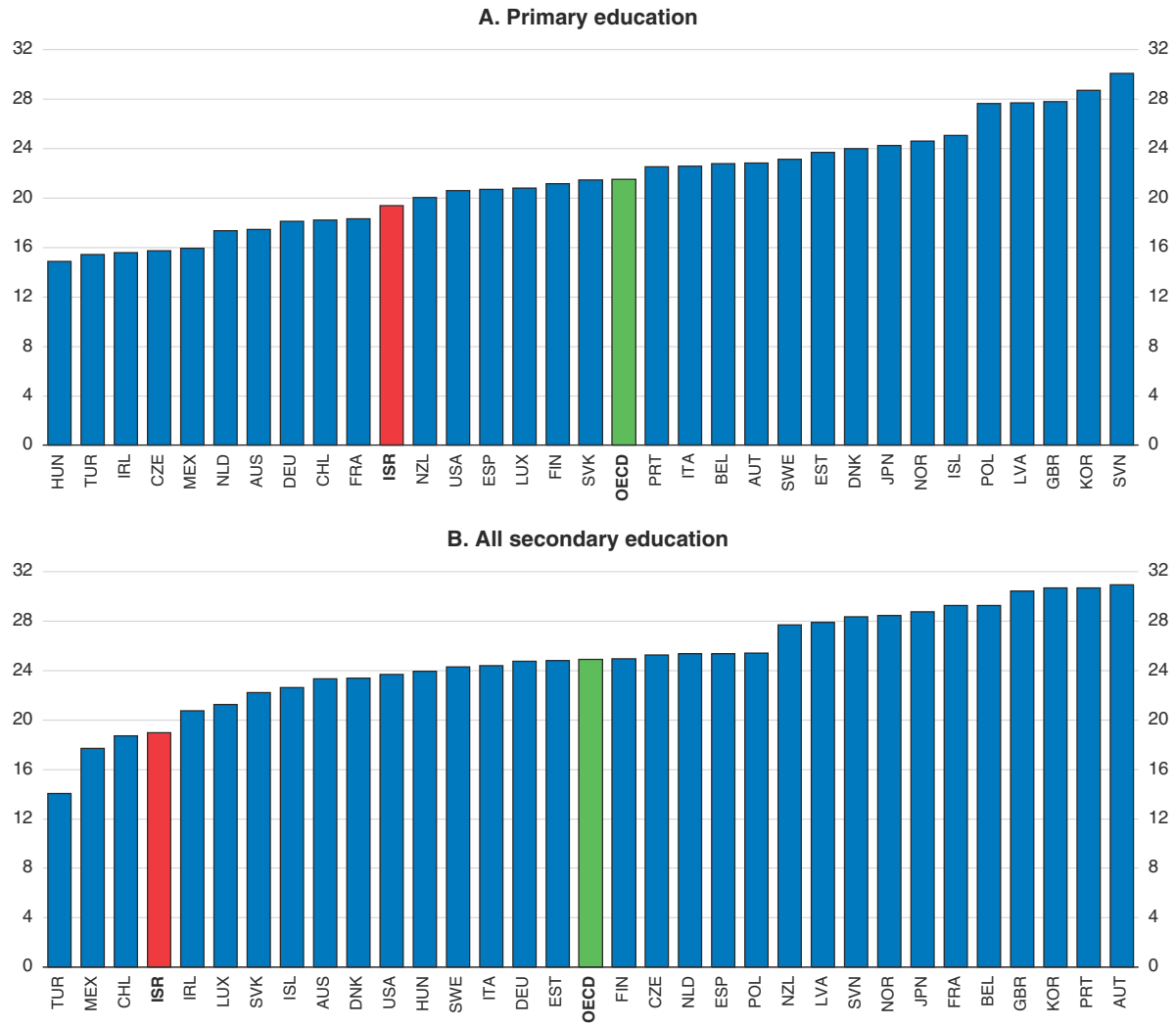
This large dispersion in skills and students' outcomes is related to the segregated education system, which comprises four streams: one for Arabic speakers and three for the Hebrew-speaking communities, including Haredi, state-religious and state schools. In the Arabic stream the instruction language is Arabic, and Hebrew is taught as an additional subject, while all teachers are Arabs. The situation in Haredi schools reflects an explicit choice of studying religious rather than secular subjects. Haredi boys aged 13 usually

continue only with religious studies without secular core subjects, while girls spend much more time on secular subjects. These systemic features weaken skills formation in the Haredi and Israeli-Arab communities and contribute to the considerable inequality in socio-economic outcomes. Since merging all the streams into a single system built around a common core curriculum is politically unrealistic, improving the education system requires building bridges between existing streams with the objective of raising the outcomes of low achievers, especially among Israeli-Arabs and Haredim.

This will require higher public education spending, particularly on disadvantaged schools (see below). Despite significant increases in recent years, expenditures per student remain low (Figure 32). Moreover, budget allocations do not provide enough support for disadvantaged groups. Schools receive a basic budget that is equally distributed according to student numbers and a grant (6% of the total budget) that reflects the school's socio-economic profile. Additional financing comes from the municipalities. Better endowed local

Figure 32. **Education financing remains low, especially at secondary level**

Annual expenditure per student relative to per capita GDP, 2014



Source: OECD (2017), *Education Finance Indicators Database*.

StatLink http://dx.doi.org/10.1787/888933673332

governments can provide 10-20 times higher funding per student than their less affluent counterparts, though the amounts involved are small (OECD, 2016d). Consequently, schools in disadvantaged areas are comparatively underfunded, although the nature of this problem is different between Arab and Haredi schools (Chapter 1).

Disadvantaged schools need much greater funding. Adjustments are planned, and the five-year Economic and Development Plan for the Arab Sector, mentioned above, includes education measures, which if properly implemented, can help reduce these gaps (Table 10). However, much more is needed. For example, in Chile, a weighted voucher system allocates 50% higher resources for students from low socio-economic backgrounds (Elacqua, 2012) to provide extra teaching time or specialised learning materials. The authorities can also increase salaries for teachers working in disadvantaged schools. International experience suggests that much higher salaries are required to attract the best teachers to such institutions, but that financial incentives will be effective only if teachers are given the means to be successful, such as by complementing higher wages with other incentives like smaller classes. Korea offers multiple incentives to candidates working in high-needs schools, including higher pay, smaller classes and additional credits towards future promotion (OECD, 2012a). A cost-efficient option that has had some success abroad is to set up a system allowing teachers to share good teaching practises. Above all, there is a need to reduce the curricular differences between the education streams (see below), which contribute to wide dispersion of average skills and educational outcomes among students from different communities.

Table 10. **Past recommendations on education**

Recommendations in previous *Surveys*	Action taken since January 2016
Require Haredi schools to teach mathematics, science and foreign languages. Consider universal core curriculum requirements.	No action taken.
Increase education funding for disadvantaged groups.	Implementing differential budgeting in elementary and middle schools is expected to be finalised within the next two years. The Ministry of Education (in co-operation with the Ministry of Finance) is developing a new budgeting model for high schools. The Economic Development Plan for the Arab Sector worth NIS 15 billion over five years includes expenditures on education – increasing teaching hours, higher quality of teaching and informal training.
Develop work-based vocational education and training for young adults.	In 2016 an apprenticeship pilot programme was introduced involving 260 people. Expenditure on job training programmes increased, allowing a higher number of participants.
Introduce a mandatory community service programme for Israelis who are currently exempted from military service.	The government has been trying to integrate the Arab and Haredi communities through volunteering under the aegis of the 2014 Civil Service law.

In the Arab stream the government should keep trying to improve the teaching of Hebrew, as only 60% of Arabs have a good understanding of it. A better command of Hebrew would help Israeli-Arabs integrate into the job market (Marom, 2015). While the government recognises the problem and is expanding the number of hours dedicated to teaching Hebrew in Arab schools, more needs to be done. Ensuring substantial teaching of practical Hebrew and/or teaching some core subjects in Hebrew would be desirable. A complementary approach should include expanding pre-school education to children between 0 and 3 (see above) and increasing their exposure to Hebrew. To this end moving the responsibility for this sector to the Ministry of Education would be desirable.

Past efforts to increase the share of core subjects in the Haredi curriculum have failed several times, even though most parents are supportive (Gal, 2015). The latest attempt, which

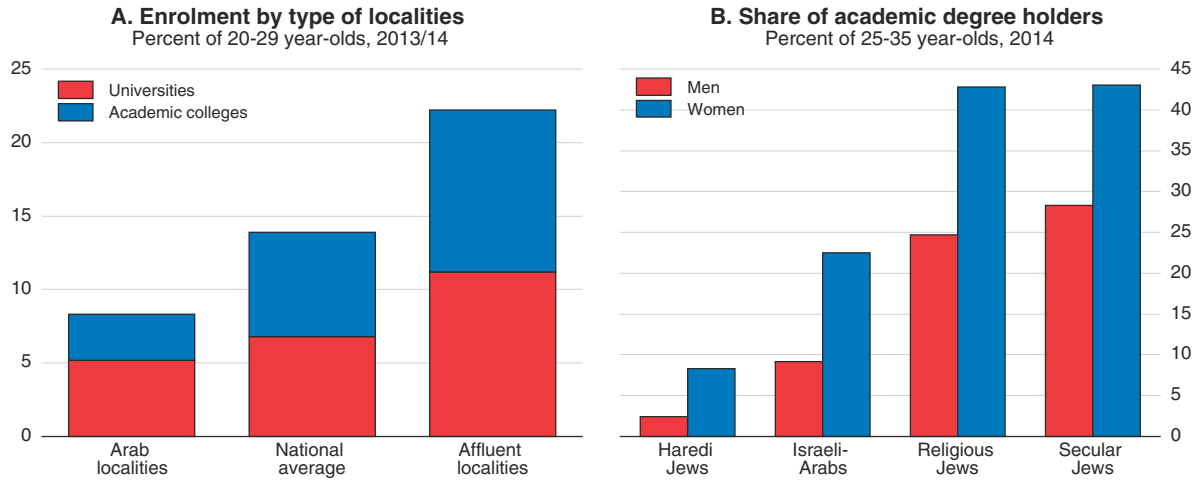
provided budgetary sanctions against Haredi schools not devoting a certain minimum time for secular studies, was repealed in 2015 due to opposition by community leaders and insufficient numbers of Haredi teachers and textbooks for these subjects. The authorities should prepare the ground for a possible future situation where teaching core subjects in Haredi schools is politically accepted and provide additional funding for training Haredi teachers and developing core-subject textbooks to schools willing to teach secular subjects. However, this additional funding should also impose more conditionality on teaching core skills, monitoring and student testing. Better enforcing this monitoring and testing in those Haredi schools that are already committed to teach core subjects in exchange for public financing is also needed. This would also improve statistical information on Haredim results, which decision-makers lack. Complementary steps could include the aforementioned introduction of support for poor families conditional upon children taking up additional formal education and systematically subsidising the acquisition of formal knowledge by Haredi students after their religious studies.

Another problem that exacerbates skills differences is the low quality of the initial vocational education and training (VET) system. Firms regularly express concern about VET graduates' lack of professional and technical skills (Musset et al., 2014). Particularly weak outcomes are found among students from the lower vocational track, which have much lower probabilities of qualifying for the Bagrut and higher dropout rates (Blank et al., 2015). Moreover, studying on the lower VET track worsens graduates' labour market outcomes compared to those following the academic track (MoF, 2017d) and relative rates of return to VET prior to military service, may be low over the long run (Hanushek et al., 2015). As a consequence many young people who pursue lower vocational tracks are poorly equipped for entry to the labour market. In this regard substantial components of work-based learning can be beneficial as it not only helps students to acquire practical skills, but also to develop key soft skills, such as work discipline, teamwork and problem-solving skills, which can be more effectively learnt in workplaces than in classrooms (OECD, 2010). One way forward is to expand apprenticeship and workplace-based learning, co-ordinating with industry partners. In Spain making workplace training mandatory in VET programmes facilitated the transition of VET graduates to jobs (Homs, 2007).

Israel's tertiary education is well developed, with impressive academic achievements, including high citation rates, unsurpassed Nobel laureates per capita and large numbers of high-tech start-ups. However, it also faces two serious challenges: i) making tertiary education more accessible for Haredim and Israeli-Arabs; and ii) improving the matching of students' skills to changing labour-market needs.

The expansion of colleges and Haredi campuses has improved tertiary education access to students from peripheral regions, with lower socio-economic status and from disadvantaged groups. The enrolment rate of Arab and Haredi students in the relevant age cohorts has increased significantly. However, the disparities between social and community groups remain large. The share of young Haredim and Israeli-Arabs completing tertiary education is significantly lower than for the rest of the population (Figure 33). This results mainly from weaker secondary school outcomes (see above), but there are other barriers preventing wider tertiary access (Chapter 1). OECD research suggests that student financial-support systems that provide both loans with income-contingent repayments and means-tested grants improve access to higher education and outcomes for weaker students (OECD, 2012b). At the same time, pre-tertiary preparatory courses for disadvantaged students should be expanded to increase their access and reduce drop-out rates, although these preparatory courses have proved to be less effective for Haredi students.

Figure 33. **Poorer students, Haredi and Israeli-Arab students are less likely to enrol in tertiary education**



Source: Swirski, S., E. Konor-Attias and R. Zelingher (2015), *Israel: A Social Report 2015*, Adva Center; Regev, E. (2016), "The Challenges of Integrating Haredim into Academic Studies", in *State of the Nation Report 2016*, Taub Center for Social Policy Studies.

StatLink http://dx.doi.org/10.1787/888933673351

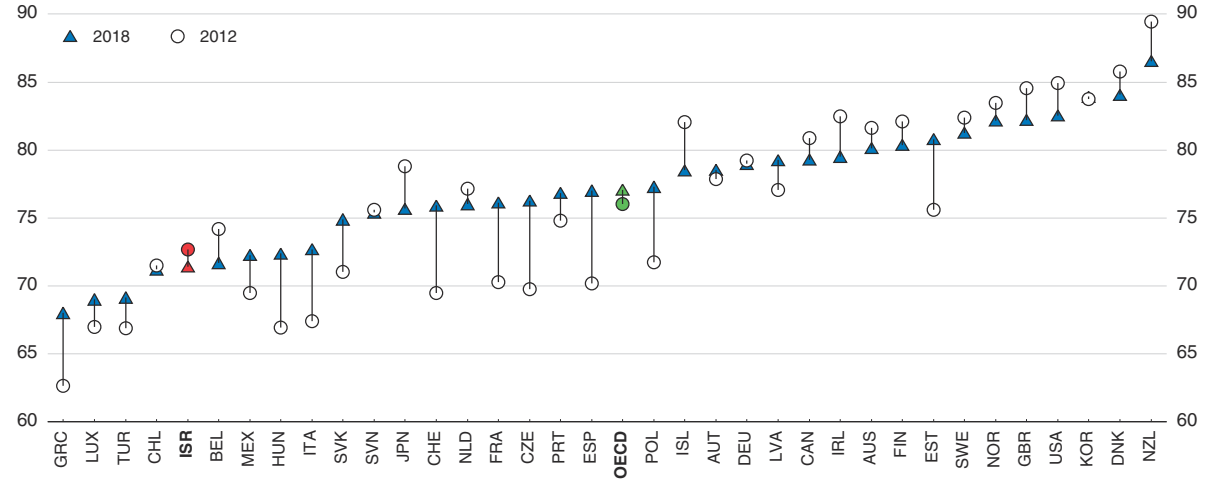
Many Israeli tertiary graduates are employed in jobs not matching their field of studies, and this phenomenon is more pronounced than in other OECD countries (Said, 2015; OECD, 2016e). The government is rightly trying to increase the number of engineering graduates to meet labour market demands. At the secondary level it is increasing the number of students completing high-level mathematics and increasing their share from around 10% to 15%-30%. Empirical research confirms that relatively few pupils study math at higher levels, but those who do so access more prestigious study tracks in universities and enjoy higher pay in employment (Kimhi and Horovitz, 2015). At the tertiary level, the government is planning to increase the number of college and university students with technology-oriented majors by 40% within five years (Israel Innovation Authority, 2017). Complementary steps to reduce such mismatch should involve making publicly available high-quality data and analysis concerning graduate labour market outcomes. Better information on market returns of various career paths would help individuals to better adjust to labour market signals. Students' choice of field of studies would also be better served through a strengthened and scaled-up career counselling system. For Israeli-Arabs and Haredim these steps should be complemented with measures widening their employment opportunities (see above) to ensure that greater attainment leads to better jobs.

Pursuing product market reform to boost productivity and wages in traditional economic sectors

Promoting competition to boost productivity is an important policy challenge in Israel and a key ingredient for fostering inclusive growth. As highlighted in the 2016 *Survey*, Israel is less open to foreign trade than most OECD countries and the business environment less favourable (Figure 34). These persistent difficulties contribute to low average productivity gains and large productivity and wage gaps between sectors exposed to international competition and their more traditional counterparts, often made up largely of SMEs (Figure 35), where workers from disadvantaged groups are usually employed.

Figure 34. **Israel's business environment remains less favourable than in other OECD countries**

Distance to frontier, from 0 (worst performance) to 100 (best performance)



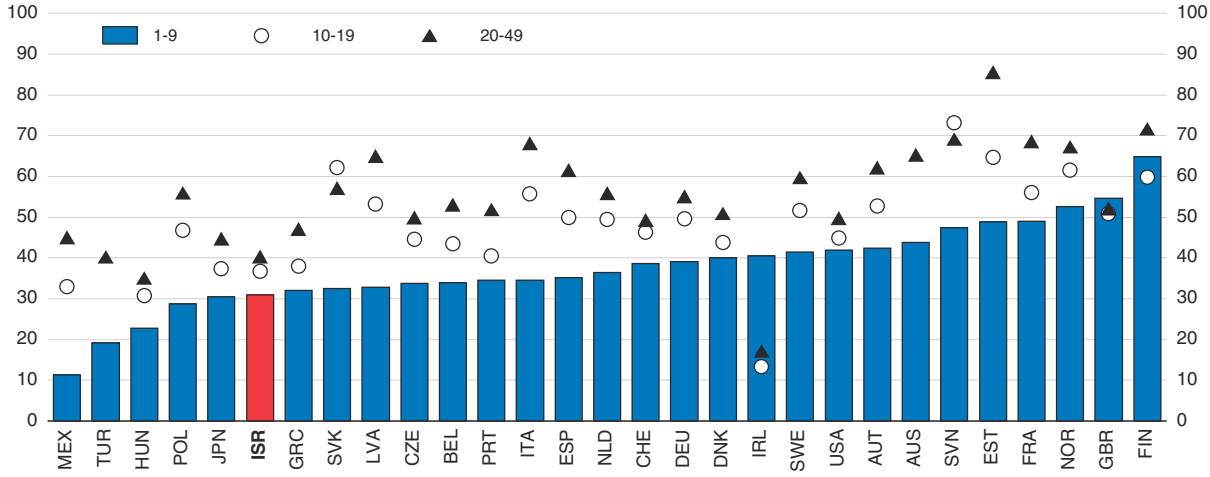
1. The distance to frontier helps assess the absolute level of regulatory performance over time. It measures the distance of each economy to the "frontier", which represents the best performance observed on each of the indicators across all economies in the Doing Business sample since 2005.

Source: World Bank (2017), *Doing Business 2018: Reforming to Create Jobs*.

StatLink http://dx.doi.org/10.1787/888933673370

Figure 35. **The productivity[1] penalty of small firm size is fairly high in Israel**

Value added per person employed, manufacturing, index 250+ = 100, 2013[2]



1. Labour productivity is measured as gross value added in current prices per person employed.
2. Or latest available year.

Source: OECD (2016), *Entrepreneurship at a Glance 2016*, Figure 3.2.

StatLink http://dx.doi.org/10.1787/888933673389

Improving product-market functioning has been high on the policy agenda since the 2011 "tent protests", and helpful reforms have progressed in recent years. Measures have been taken to stimulate competition in the banking sector (see Table 3 above) and to increase domestic market exposure to parallel imports via the Internet. Import tariffs have been reduced on several products, including foodstuffs, and some import procedures have been simplified (Table 11). Moreover, the government has committed to cutting the regulatory burden on businesses implied by the stock of existing regulations imposed by all

Table 11. **Past recommendations on improving product market regulation and lowering trade protection**

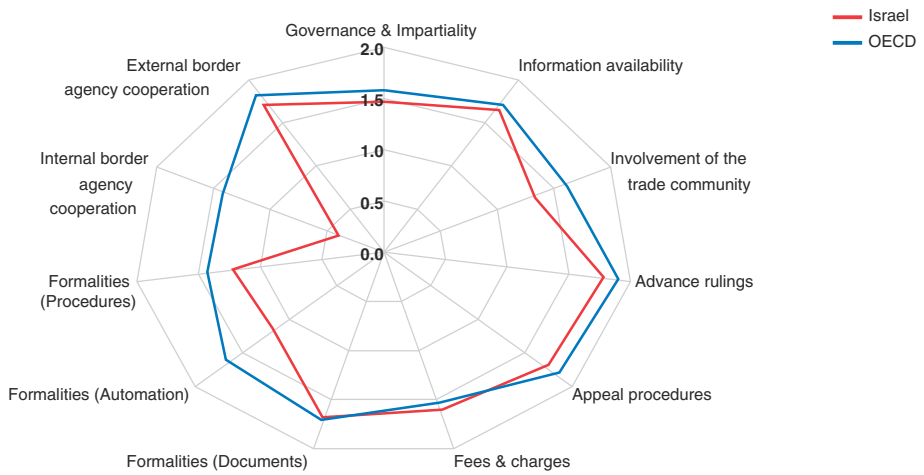
Recommendations in previous *Surveys*	Action taken since January 2016
Lower non-tariff barriers with simpler import procedures and alignment of import standards with those of other developed economies as recommended by the Lang Committee. Adopt the EU import procedures on non-sensitive foodstuffs as well as EU standards for sensitive agricultural goods.	The Israeli government has taken steps to bring its regulation for imports into line with that of most developed countries, i.e. introducing post-market surveillance. However, the switch from *ex ante* to *ex post* checking of compliance with required import standards is incomplete, and so is the implementation on the ground. At the end of 2016 a comprehensive reform of standards regulation was approved to open to competition the compliance tests that, up to now, have been carried out by only one entity – the Standards Institution of Israel. The target of the reform is also to move closer to international norms. Local import standards not aligned with international norms were abolished in 61 areas, and around 300 local specifications were removed. The reform does not, however, cover other standard-setting entities such as the Ministry of Health, which gives rise to potential regulatory barriers to trade in some specific sectors, e.g. pharmaceuticals, medical devices and equipment. The application of EU standards on non-sensitive foodstuffs is no systematic, and considerable barriers persist regarding sensitive foodstuffs.
Lift the barriers to foreign services providers: extend the maximum initial visa for workers on secondment from foreign firms; relax restrictions on foreigners buying property; and abolish the residency conditions widely applied to business leaders.	No action taken.
Replace quotas, guaranteed prices and customs tariffs with direct payments to farmers.	Several reforms to reduce bureaucratic costs due to phytosanitary and veterinary controls and their imports are being implemented. Lower tariff rates were adopted for several food products such as fresh meat and tuna. Also, during 2016 tax-free quotas were established for products such as meat, fish, cheese and olive oil.
Further cut customs tariffs and non-tariff barriers.	Some customs duties were cut, for example on children's clothes and cellular devices in 2017.
Rigorously apply the law on the promotion of competition in the food sector at the local level, and assess it when sufficient time has passed.	Not enough time has passed since the food law came into effect in 2015. But retailers' obligation to publish their prices on a designated website has led to a 5% decrease in prices, according to the Israeli authorities.
Eliminate regulatory constraints on opening new shops, the protection enjoyed by existing firms and specific restrictions for opening new supermarkets.	The Antitrust Authority instructed Super-Pharm (Israel's largest drug store chain) to stop preventing malls from renting out floor space to its competitors.
Ensure that the planned cut in the regulatory burden relies on high-quality Regulatory Impact Assessments (RIAs).	Mandatory RIA was introduced for new regulatory texts as from 2016. The government also aims to reduce the cost of existing regulations by 25% by 2019.
Pursue state-owned enterprise reform and privatisation with a view to enhancing competition.	No action taken.

ministries by 25% by 2019 and now assesses the competition impact of all new laws. It is still early to evaluate the impact of these reforms. However, the recent persistence of price stability in the face of buoyant demand, which seems to have resulted from improved supply conditions, is an encouraging sign. Further progress in streamlining product market regulation could be expedited if co-operation between the multiple government bodies involved in this reform process (Prime Minister Office, Ministry of Economy, Accountant General and Chief Economist in the Ministry of Finance) were enhanced.

Nevertheless, much remains to be done to ease foreign trade and streamline regulation. Trade-facilitation reforms could, for instance, reduce trade costs by as much as 12% (OECD, 2015b). Further measures should focus on streamlining border procedures and border agency co-operation, with expanded use of "trusted traders" programmes and targeted controls (Figure 36). Import barriers could be further lowered by broadening post-market surveillance of imported goods to new domains, including communication products. Regulatory barriers for personal imports of goods over the Internet implying cumbersome administrative approvals could be also lowered for these products. As recommended in the 2016 *Survey*, the use of EU health rules for non-sensitive products should be extended to "sensitive" products, such as dairy, eggs and meat, which represent over half of all imported foodstuffs. The agricultural

Figure 36. **Israel could do more to facilitate trade**

Score from 0 (worst performance) to 2 (best performance), preliminary 2017 data



Source: OECD, *Trade Facilitation Indicators Database*, *www.oecd.org/trade/facilitation/indicators.htm*.

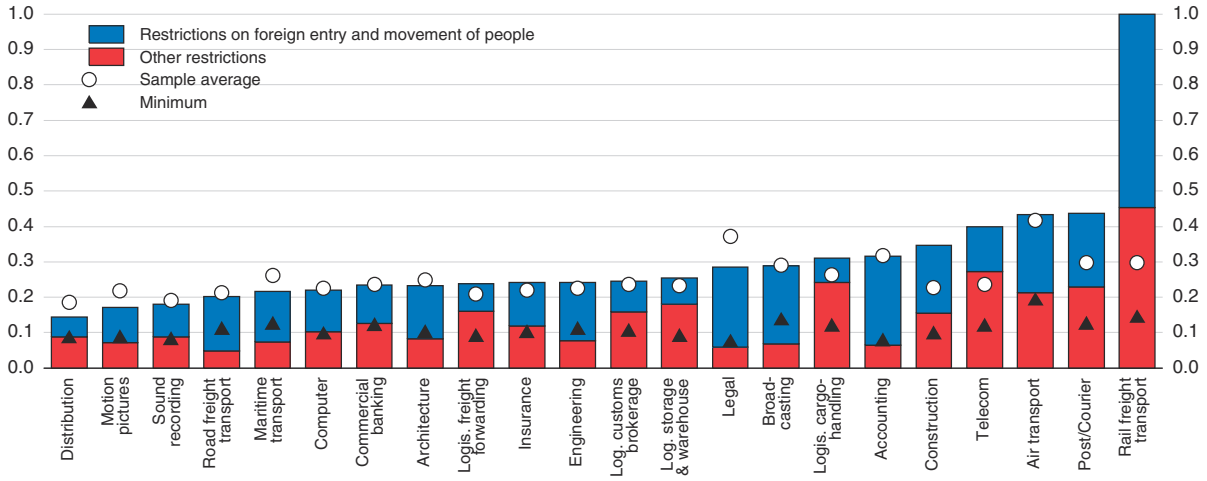
StatLink http://dx.doi.org/10.1787/888933673408

reform process should continue, with the replacement of quotas, price guarantees and customs tariffs by direct payments to farmers to avoid distorting markets (OECD, 2017g).

Competition in key services, such as telecommunications, construction and postal/courier services, could be also enhanced by eliminating existing restrictions that impose the equivalent of a 10-25% tax on business users (Rouzet and Spinelli, 2016) (Figure 37). For instance, in the fixed high-speed Internet segment some operators hold substantial market power, and Israel maintains a cap of 80% on foreign equity in the sector and stringent nationality and residency conditions for business leaders. Entry conditions for foreign

Figure 37. **There is room to further reduce barriers to trade in services**

Services trade restrictiveness index from 0 (open) to 1 (closed), 2016



1. The STRI records measures on a most-favoured-nation basis; preferential trade agreements are not taken into account. Air transport and road freight cover only commercial establishment (with accompanying movement of people). The cross-country average refers to the 35 OECD Members, plus Brazil, China, Colombia, Costa Rica, India, Indonesia, Lithuania, the Russian Federation and South Africa.

Source: OECD, *Services Trade Restrictiveness Index Database*, *www.oecd.org/tad/services-trade/services-trade-restrictiveness-index.htm*.

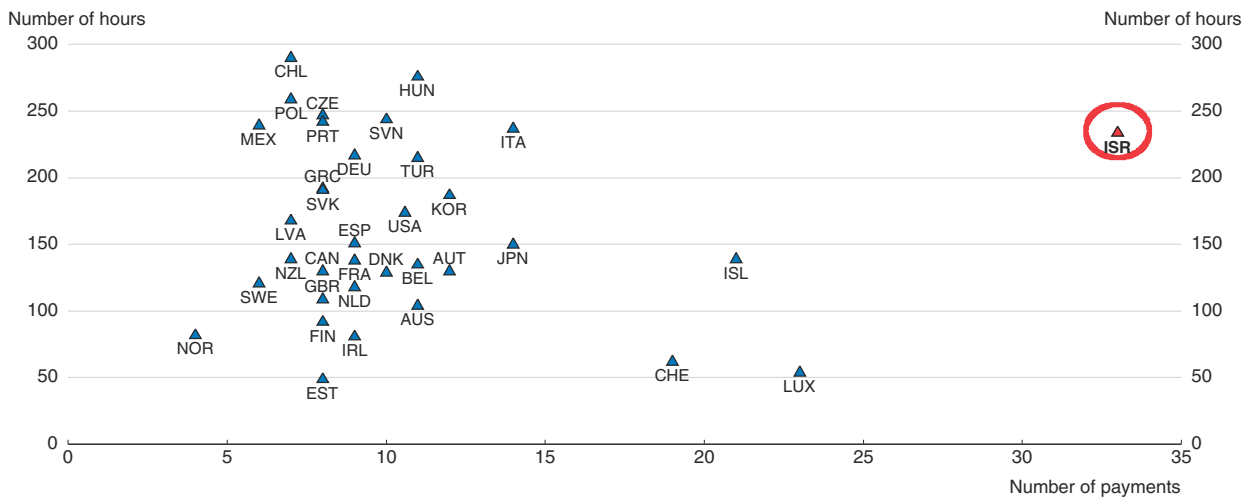
StatLink http://dx.doi.org/10.1787/888933673427

workers should also be relaxed, especially in high-tech sectors and, in this respect, recent provisions streamlining the application and allocation of work permits for foreign experts by high-tech firms through an online application is most welcome (Yefet, 2018). Moreover, competitive pressures in the banking sector would be reinforced if switching banks were simplified, as the authorities plan to do.

Certain aspects of business regulation, such as the business licensing and permit system administered by local municipalities, remain cumbersome, especially for SMEs. Approximately 40% of existing Israeli companies need a license according to national regulations; however, one-quarter of them operate without one, thus bordering on informality (OECD, 2016c). Key barriers include a lack of information on standardised procedures and long delays in municipal permit issuance. Heavy bureaucratic costs of environmental licensing could also be cut by as much as 30% if the currently fragmented approach were streamlined in an integrated procedure (OECD, 2016b; Eshet and Karni, 2016). More generally, Israel should introduce a "silence-is-consent" rule when appropriate, as Portugal has done. It should also promote the digitalisation of business licensing and permit systems, as Denmark, Estonia and Norway have done. Online procedures for registering property transfers, obtaining building permits and paying taxes (Figure 38) would also reduce unnecessary administrative burdens on firms and households (Lopez-Claros, 2016).

Figure 38. **Tax procedures for businesses are onerous**

Number of payments and time required to comply with taxes per year, 2017 data



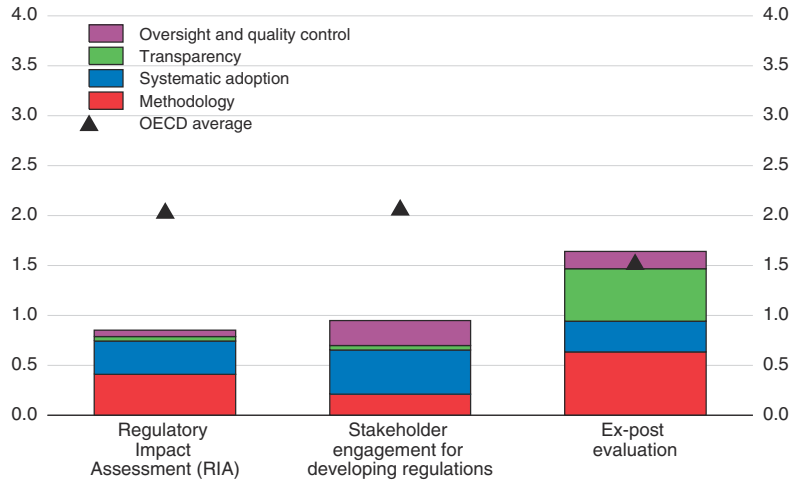
Source: World Bank (2017), *Doing Business 2018: Reforming to Create Jobs*.

StatLink http://dx.doi.org/10.1787/888933673446

Although Regulatory Impact Assessments (RIAs) have been part of the regulatory management process since 2016 (OECD, 2017h), further progress can be made (Figure 39). Mechanisms for co-ordinating the regulatory policy agenda have been established, but competencies are not yet clearly defined, and ministries and agencies continue working in silos, rather than adopting a whole-of-government approach. The mandatory consultation on draft legislation concerns only the final version and does not apply to the preliminary stages of the process, thereby leaving too little time for improvements. It is also unclear if these consultations with stakeholders are occurring systematically, with only 20 RIAs of draft laws published to date. To reduce administrative burdens it is first necessary to measure them and make more use of evidence in designing regulations. Moreover, the new

Figure 39. **Regulatory management processes can be enhanced**[1]

Composite indicator, from 0 (worst performance) to 4 (best performance), 2014



1. The results for stakeholder engagement and RIAs apply exclusively to processes for developing primary laws initiated by the executive, which in Israel account for about 58% of all laws.

Source: OECD (2015), *OECD Regulatory Policy Outlook 2015*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264238770-en*.

StatLink *http://dx.doi.org/10.1787/888933673465*

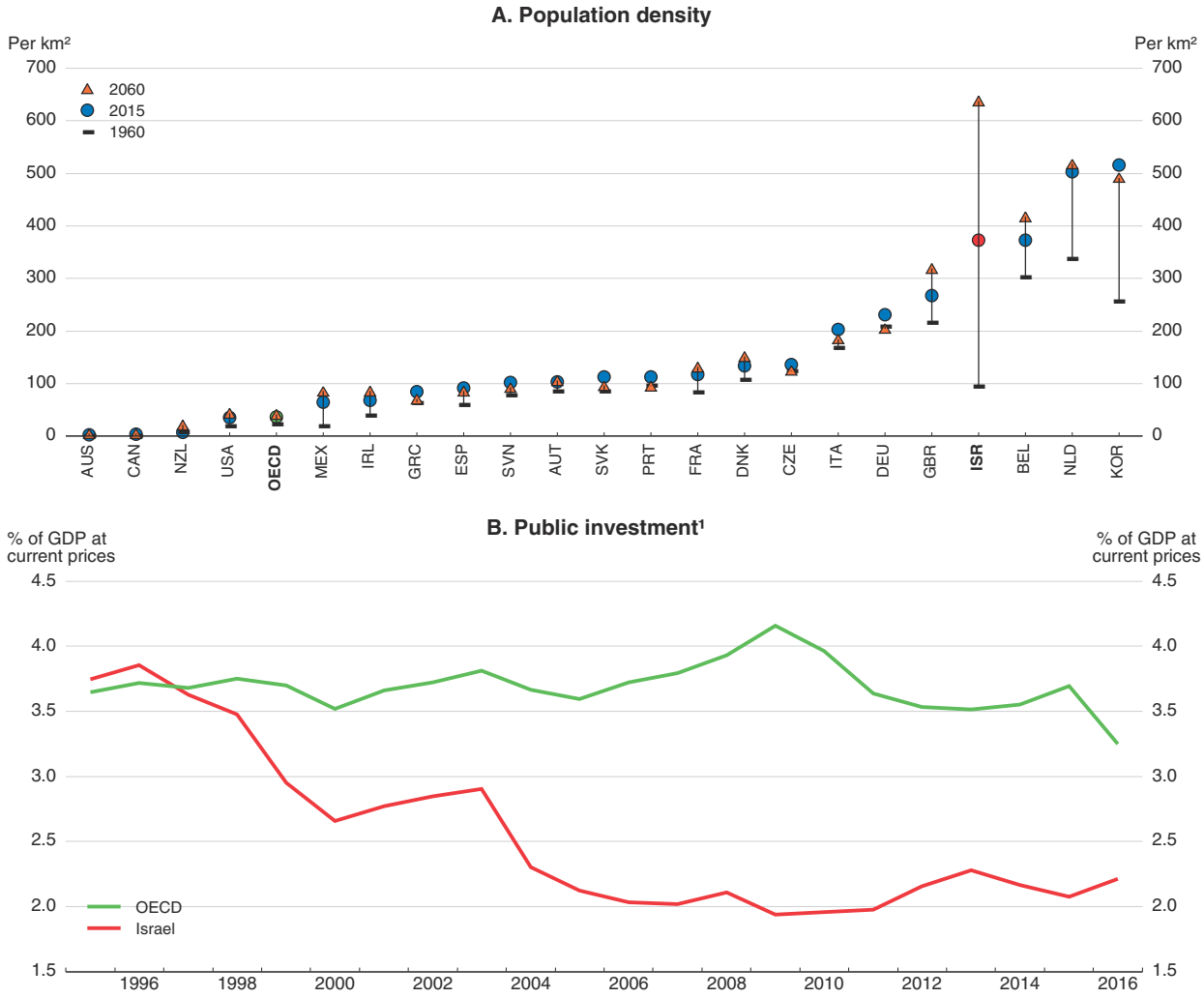
RIA requirement applies only to laws initiated by the government and not to those introduced by parliamentarians (MKs). While this is also the case in many other OECD countries, 42% of all primary laws are introduced by MKs in Israel, making this exception relatively important.

Improving infrastructure to boost productivity and well-being

Suitable and well-functioning infrastructure is crucial for growth, inclusiveness and well-being. It bolsters trade, competition and innovation and enhances access to public services. These benefits are important for Israel because of its relative remoteness from other markets and its high and rising population density, which increases the social returns on infrastructure investment in domains like transport and telecommunications (Chu, 1997; Deole, 2014; Glover and Simon, 1975) (Figure 40, Panel A). However, Israel has a sizeable infrastructure deficit due to its short history and public underinvestment since the early 2000s (Panel B). The biggest gap concerns public transport, which results in very heavy use of private vehicles (Figure 41, Panel A), causing costly road congestion (whose estimated cost was 1.5% of GDP in 2012) and local pollution problems. Moreover, renewable electricity production is low, and the electricity sector is still dominated by the state-owned incumbent whose inefficiency is shown by its high labour costs due to overstaffing and elevated wage levels (OECD, 2016b). The cost and quality of airport services are also substandard. Hospitals are overcrowded. And access to infrastructure services is unequal between regions and communities, with Arab towns often lacking adequate facilities (Panel B).

The government is aware of these problems and has taken corrective measures. Over 50% of recent transport investment concerned public transport following its strategy to shift ridership away from private vehicles to achieve a market share for public transport of 40%. A high-speed rail link between Jerusalem and Tel Aviv will open in the course of 2018. The government also aims to develop light rail systems in the country's three main cities between 2019 and 2023. There is also a plan to increase renewables' share of electricity.

Figure 40. **Public investment in Israel doesn't match its population density, which is rising rapidly**



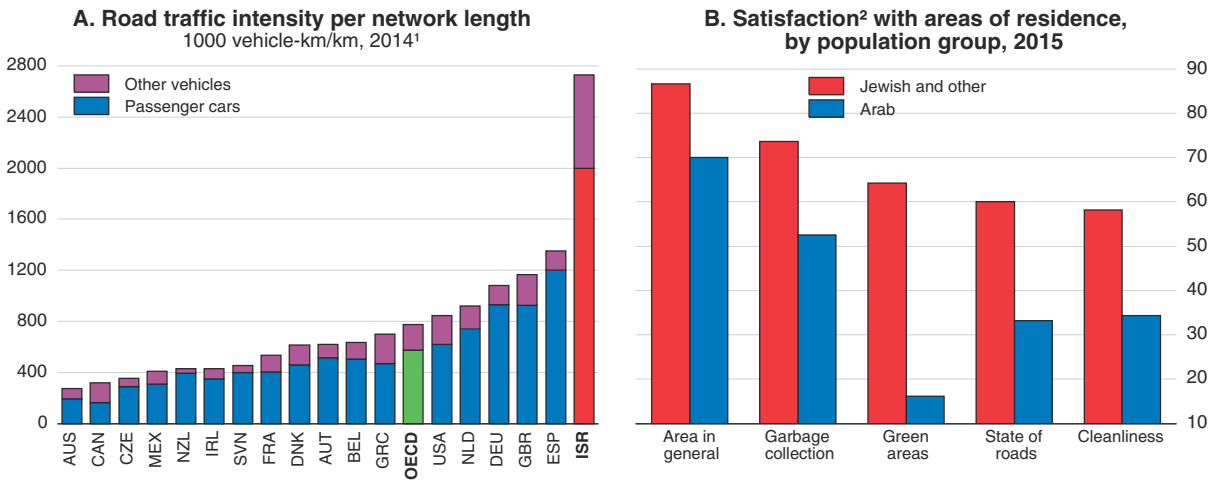
1. Excluding capital transfers to state-owned enterprises for infrastructure development, which have been significant in Israel.
Source: UN Department of Economic and Social Affairs, Population Division (2017). *World Population Prospects: The 2017 Revision*; OECD, *Economic Outlook Database*.

StatLink http://dx.doi.org/10.1787/888933673484

Israeli-Arab communities' access to infrastructure services is being improved, with a five-year (2016-20) plan worth NIS 15 billion (1.2% of GDP) mentioned above to enhance transport, education, social services and housing in Arab towns. In addition, in mid-2017 an inter-ministerial committee was set up to improve infrastructure planning and to advance, monitor and coordinate these projects (Flug, 2017c).

These positive aspects must, however, not be offset by any weakening of public finances. To this end, the increased use of Private-Public Partnerships (PPPs) planned by the authorities, in particular in public transport, is welcome but must be carefully managed. Most importantly, PPPs should not be chosen just to avoid budget constraints, and the various risks must be carefully and clearly allocated. They can help government make the most of private-sector know-how but are difficult to use and bear a risk of management failure that can lead to additional contingent public debt (Araújo and Sutherland, 2010).

Figure 41. **Inadequate public transport and infrastructure, especially in Arab areas, hinders well-being**



1. Or latest available year.
2. Percentage share of respondents that were satisfied or very satisfied.

Source: OECD (2015), *Environment at a Glance 2015: OECD Indicators*, Figure 2.11; CBS, *2015 Social Survey Table Generator*, *http://surveys.cbs.gov.il/survey/surveyE.htm*.

StatLink http://dx.doi.org/10.1787/888933673503

PPPs need to be cautiously implemented, with careful planning relying on adequate funding. Entrusting the management of these contracts to a single public agency, as recently decided by the government, will also help centralise public-sector PPP expertise (BoI, 2017b).

Efficient infrastructure pricing helps identify the needs and adjustments of service demand to available capacities. Charging users for the service also ensures more disciplined selection of investment projects (Glaeser, 2016). Promoting user-financed infrastructure is thus desirable, including for roads, which are currently funded by levies and taxes that are only weakly linked to road transport use. A recent Israeli pilot measure has shown that modest financial incentives can reduce private car use during rush-hour in congested areas, with positive impacts on environment (Bar-Eli, 2016). Road tolls can regulate demand effectively and should be used more widely. In the longer term a more ambitious overhaul of the management and funding of road transportation should also be considered. Technological advances now make it possible to price the use of road networks through metering systems, paving the way for user- rather than taxpayer-based financing (Cramton and Geddes, 2017). Australia plans to introduce such a system within the next decade (Infrastructure Australia, 2016), and toll systems for trucks already exist in Germany and Poland (Queiroz et al., 2016), although one failed to gain approval in France.

The infrastructure sector also needs a more rigorous and transparent process of project selection based on a clear long-term strategic planning. Israeli authorities use solid cost-benefit analyses, especially in transport (Shiftan et al., 2008). However, the detailed results of this work are not systematically published, and policymakers do not have to justify their choices, even if they approve projects with negative evaluations. The authorities should create an independent entity, like Infrastructure Australia, which would systematically publish technical analyses before the government decision, with policymakers obliged to formally justify their choices. This specialised entity could also usefully carry out regular *ex post* audits and monitor the country's infrastructure needs. The management and implementation of

infrastructure projects would also benefit from closer inter-ministerial coordination with local governments and better public consultation, especially during the initial phases of projects. Such difficulties have often led to substantial cost overruns (Chapter 2).

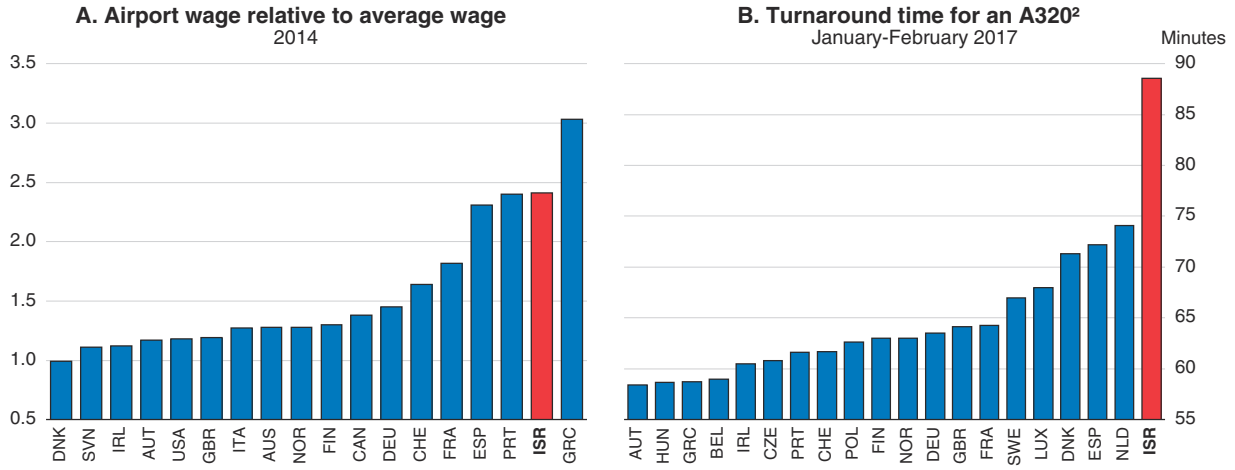
Despite some reforms (Table 12), there remains much room for better infrastructure regulation:

- The electricity sector is still dominated by a cost-heavy vertically integrated public enterprise, the Israel Electric Company (IEC). It would benefit from the creation of a separate, regulated infrastructure operator and an efficient wholesale market. A reform proposal currently being discussed between the authorities, IEC and its unions is expected to address some of these issues, reduce IEC overstaffing and stimulate competition in electricity production (Gorodeisky, 2017).
- Reforming airport management, currently run by a public monopoly, the Israeli Airport Authority, could reduce the high wages and operating costs and long aircraft turnaround time at Ben Gurion airport (Figure 42). Competition should be introduced by opening up ground services to private firms and adopting best practices such as EU directives on access to these services at airports; creating an independent air traffic control operator; and building an additional privately managed international airport (State of Israel, 2017).
- Opening up the taxi market to ride-hailing firms would be desirable, as they are 30-50% more efficient than traditional taxis and can increase options for urban mobility and reduce congestion and urban pollution problems (Cramer and Kruger, 2016; Rayle et al., 2014; Li et al., 2016). However, it should be accompanied by measures helping traditional taxi companies and their employees to adjust to these structural changes.

Table 12. **Past recommendations on infrastructure**

Recommendations in previous *Surveys*	Action taken since January 2016
Create independent regulators in telecoms and postal services, with well-defined mandates.	No action taken.
Turn the IEC into a holding company with distinct subsidiaries for different activities, and create a separate infrastructure operator.	Discussions have been held over the past year with IEC's management and union on reforms and a new business structure.
Create a wholesale electricity market with enough producers making sure that none has a dominant position. Sell or privatise IEC power plants if necessary.	New independent power producers now have 30% of the market. IEC intends to sell its Ramat Hovev facility. The regulator is working on a new electricity trade model.
Allow more competition in maintenance activities for railway rolling stock.	Some items are being tendered (motorised carriages procurement, the infrastructure for track electrification).
Pursue postal reforms to open these services more widely to private competitors, to enhance the management autonomy of the public operator (Israel Postal Company, IPC) and partially privatise it.	Discussions and preparatory works are underway to allow IPC's competitors access to distribution centres. Actions have been taken to improve IPC's financial situation before partial privatisation, including a retirement plan, additional distribution centres, less waiting time and upgrading mail delivery performance.
Implement the compromise agreement negotiated between the government and Noble-Delek to ensure the development of the Leviathan gas field and of the infrastructure needed to introduce competition in this market in the future.	In November 2016 the documents of the first competitive procedure for allowing licenses for exploration and production of oil and gas in the marine territory of Israel were released. As part of the procedure, 24 blocks were offered for licensing. In December 2016 leases on Karish and Tanin were transferred to Energean (a company based in Greece), and by July 2017 12.75% of Noble leases on Tamar were transferred to other companies. Noble Energy's investment decision regarding the Leviathan project was finalised in February 2017.
Speed up the development of regional gas distribution networks to promote domestic demand by clarifying the standards applicable and improving co-ordination among the responsible agencies. Create an independent sectoral regulator. Consider relaxing export restrictions.	In 2016 the authorities adopted several measures improving the framework for developing the distribution infrastructure and removing the obstacles and simplifying the administrative procedures (regulatory uncertainties, problems with obtaining building permits, etc.) that had previously hindered the conversion of industrial facilities to natural gas. The 2017-18 budget offered support for industrial and transportation firms converting to natural gas, as well as for regional gas distribution firms.

Figure 42. **Lack of competition weakens efficiency in airport management**[1]



1. Data refer either to the airport of the capital (or the average when there is more than one), or the average of the most important ones if the capital's is not available.
2. Time from landing till taking off. Data extracted from Flightradar, based on real time flights during January-February 2017, not including flights from hubs, late flights and connection flights.

Source: Air Transport Research Society, *Flightradar database*.

StatLink http://dx.doi.org/10.1787/888933673522

Better access to infrastructure in disadvantaged areas, especially Arab cities, would ensure more equitable opportunities for all citizens and promote more inclusive growth. The poorest municipalities cannot develop adequate services because of deficiencies in the property tax system (*Arnona*) (Fitoussi et al., 2016). In 2017 the authorities created an equalisation fund, the *Arnona* fund, to redistribute resources across municipalities more equally. Moreover, the above-mentioned five-year NIS 15 billion plan will increase the resources of local Arab communities through special budgetary allocations in many sectors. This plan, monitored by a steering committee including central government representatives and the mayors of Arab municipalities, also aims to enhance the skills and management capacity of Arab municipal personnel. These changes are welcome. However, the additional resources transferred to the weakest municipalities from this new equalisation fund may be insufficient. Moreover, the five-year plan's success depends on its implementation and trust between the Arab municipalities and the central government and between the Arab citizenry and their elected officials. A rigorous evaluation of the results of the reform, in terms of improving the efficiency, professionalism and transparency of municipal administrative management, will thus have a key role in enhancing this trust (Brender, 2007).

Improving Arab municipalities' public services also requires addressing the lack of public land available for infrastructure. This in turn means solving the problems of urban planning, the lack of accuracy of the cadastre and illegal housing construction in these towns where most of the land is private. As suggested in 2014 by the so-called "120-day" task force, the authorities should limit financial penalties when illegal construction is put in order with a means-testing mechanism to incentivise low-income households to register their property and adopt measures to decentralise and strengthen the transparency of land planning. Arab families have traditionally been unwilling to sell their land, preferring to bequeath it to their children. Because of this longstanding practise, land needed for public use (notably roads) is extremely difficult to acquire. Given local authorities' reluctance to resort to land expropriation even in areas with high concentrations of illegal construction, experimental

land-planning frameworks relying on consultations and agreements of residents could be developed. Moreover, public incentives, including state provision of additional land in areas where this is possible, would be useful, as in the city of Umm al-Fahm (OECD, 2017d).

Greening the economy

Following the 2015 United Nations Climate Change conference in Paris, the Israeli government approved a plan for reducing greenhouse gas emissions per capita by 26% by 2030 compared to 2015 (Table 13). To this end, public funding has been allocated to energy efficiency programmes, including reduction of coal use for electricity generation. The production share of renewables is planned to rise from 2.6% in 2016 to 17% in 2030. These welcome measures, which should not increase electricity prices much, given the declining production costs of solar power generation, need to be well implemented, although they are likely to require additional investment in the electricity grid (BoI, 2017f).

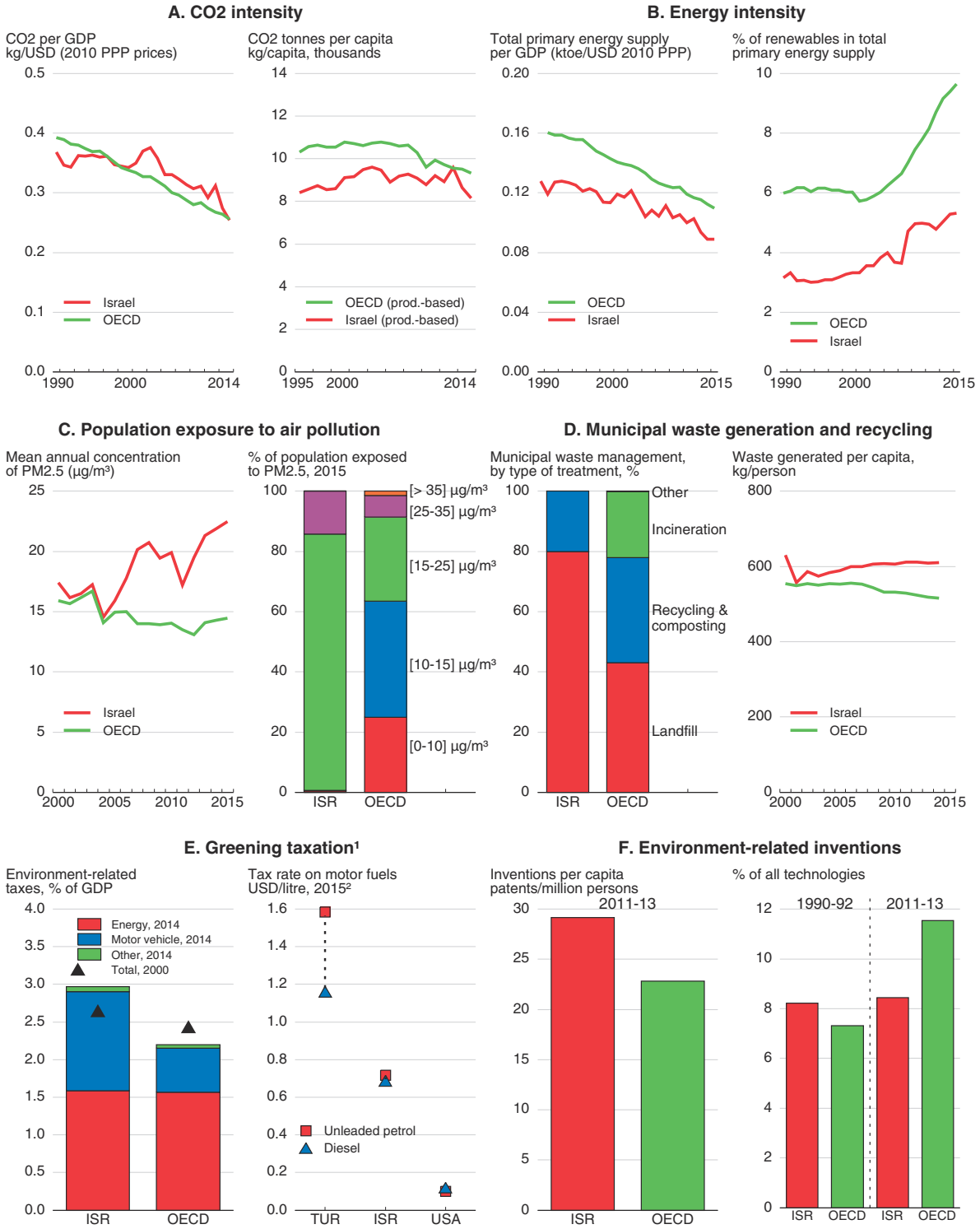
Table 13. **Past recommendations on environmental policies**

Recommendations in previous *Surveys*	Action taken since January 2016
Introduce GHG monitoring and a system of rolling targets extending beyond 2020.	A system for measurement, reporting and verification is being established to measure the effectiveness of government policy in implementing the measures defined in the National Plan for Reducing GHG Emissions. Israel submitted a 2030 target to the UNFCCC of reducing GHG emissions per capita by 26% by 2030 compared to 2015 to 7.7 tonnes (CO_2 equivalent). Implementation is well underway, and methodologies for follow-up are currently being formulated.
Consider basing an economy-wide carbon tax on the existing excise tax on primary fuels, and aim for greater participation in international emissions trading.	No action taken.
Improve energy efficiency in buildings. Introduce energy-efficiency standards and certification.	In June 2016 a government report was published with recommendations for an action plan to promote compliance with the Green Building Standard. The Ministry of Energy will publish energy efficiency standards and undertake certification.
Further raise taxes to curb vehicle use rather than ownership, and prune tax breaks for company cars.	A successful experiment involving 1 000 drivers with rental payments based on time and location of vehicles was conducted, and its expansion is being considered.

Air quality in Israel is poor, well below the OECD average (Figure 43). As discussed in Chapter 2, more developed mass transport, including a better rail network, would benefit the environment and curb air pollution. Israel already adopted a unique Green Tax scheme in 2009, which adjusted the vehicle purchase tax according to each model's emissions of five key pollutants. This led to significant reduction of market shares of heavily polluting cars (OECD, 2016f). A complementary approach would be to diversify car taxation by transferring at least part of the burden to vehicle use rather than ownership.

Despite a substantial reduction in the use of water from natural sources thanks to Israel's unique and innovative approach to water management based on a heavy recourse to desalination and water recycling, problems of overexploitation persist. This results from a decline in their natural replenishment following recent droughts, which has led to pollution problems. To guarantee a sustainable management of these natural resources, it would be advisable to set clear objectives for the minimum acceptable water quality in these reserves and to set appropriate upper limits on their exploitation by increasing the production of desalinated water if necessary. To ensure compliance, they could be written into law, as was done for Lake Kinneret.

Figure 43. **Environmental indicators**



1. Includes taxes at both central and lower levels of government.
2. 2014 for the United States.

Source: OECD (2017), *OECD Environment Statistics Database* (Green Growth Indicators: Exposure to Air Pollution, Patents: Technology Development, Municipal Waste); *OECD National Accounts Database*; IEA (2017), *IEA World Energy Statistics and Balances database*; *IEA Energy Prices and Taxes database*.

StatLink http://dx.doi.org/10.1787/888933673541

Bibliography

Abhijit, B., E. Duflo, N. Goldberg, D. Karlan, R. Osei, W. Parienté, J. Shapiro, B. Thuysbaert and C. Udry (2015), "A multifaceted program causes lasting progress for the very poor: Evidence from six countries", *Science*, Vol. 348, Issue 6236, *www.econ.yale.edu/~cru2/pdf/Science-2015-TUP.pdf*.

Araújo, S. and D. Sutherland (2010), "Public-Private Partnerships and Investment in Infrastructure", *OECD Economics Department Working Papers*, No. 803, OECD Publishing, Paris, *http://dx.doi.org/10.1787/5km7jf6q8f0t-en*.

Bar-Eli, A. (2016), "Israeli experiment shows that offering drivers sweeteners can cut traffic jams", Haaretz press article, 30 October, *www.haaretz.com/israel-news/business/1.749964*.

Barkat, A. (2017a), "S&P upgrades Israel's rating outlook", *Globes*, 6 August, *www.globes.co.il/en/article-sp-rating-outlook-for-israel-changed-from-neutral-to-positive-1001200055*.

Barkat, A. (2017b), "Kahlon unveils national nursing care insurance plan", Globes, 21 November, *www.globes.co.il/en/article-kahlon-unveils-national-nursing-care-insurance-plan-1001212568*.

Ben-David, D. (2013), "Labor Productivity in Israel", in D. Ben-David (ed.), *State of the Nation Report: Society, Economy and Policy in Israel 2013*, Taub Center for Social Policy Studies in Israel, *www.tau.ac.il/~danib/israel/SNR2013-Productivity(Eng).pdf*.

Ben-David, D. and A. Kimhi (2017), "Israel's primary socioeconomic challenges and policy areas requiring core treatment", *Shoresh policy briefs*, May, *http://shoresh.institute/policy-brief-eng-strategic-challenges.pdf*.

Blanchard, O. and F. Giavazzi (2004), "Improving the SGP Through A Proper Accounting of Public Investment", *CEPR Discussion Paper*, No. 4220.

Blank, C., Y. Shavit and M. Yaish (2015), "Tracking and attainment in Israeli secondary education", in *State of the Nation Report 2015*, Taub Center for Social Policy Studies in Israel, Jerusalem.

BoI (2015), "Report by the Research Team Monitoring the Earned Income Tax Credit Program", *www.bankisrael.gov.il/en/NewsAndPublications/PressReleases/Pages/03-05-2015-Labor.aspx*.

BoI (2016a), *Financial Stability Report December 2016*, January, *www.boi.org.il/en/NewsAndPublications/RegularPublications/Research%20Department%20Publications/Financial%20Stability%20Report/FSR201602e.pdf*.

BoI (2016b), *Financial Stability Report June 2016*, September, *www.boi.org.il/en/NewsAndPublications/RegularPublications/Research%20Department%20Publications/Financial%20Stability%20Report/june-2016.pdf*.

BoI (2016c), *Annual Report* – 2015, Box 8.2 "The effect of Subsidized Child Care on Maternal Employment", *www.boi.org.il/en/NewsAndPublications/RegularPublications/Pages/DochBankIsrael2015.aspx*.

BoI (2016d), "Fiscal Survey and Selected Research Analyses", Bank of Israel, Research Department, *www.boi.org.il/en/NewsAndPublications/RegularPublications/Research%20Department%20Publications/RecentEconomicDevelopments/red141e.pdf*.

BoI (2017a), *Financial Stability Report for the first half of 2017*, June, *www.boi.org.il/en/NewsAndPublications/RegularPublications/Pages/FSR2017h.aspx*.

BoI (2017b), *Annual Report* – 2016, March, *www.boi.org.il/en/NewsAndPublications/RegularPublications/Pages/DochBankIsrael2016.aspx*.

BoI (2017c), *Israel's Banking System Annual Survey* – 2016, May, *www.boi.org.il/en/NewsAndPublications/PressReleases/Pages/24-05-17.aspx*.

BoI (2017d), "Fiscal Survey and Selected Research Analyses", June, *www.boi.org.il/en/NewsAndPublications/RegularPublications/Research%20Department%20Publications/RecentEconomicDevelopments/red142e.pdf*.

BoI (2017e), "The composition of those joining the labour market in the first decades of the century", Fiscal Survey and Selected Research Analyses, Research Department, Jerusalem, June, *www.boi.org.il/en/NewsAndPublications/RegularPublications/Research%20Department%20Publications/RecentEconomicDevelopments/red142e.pdf*.

BoI (2017f), "The Development of the Electricity Market in Israel: Toward a Sustainable Electricity Market", September, *www.boi.org.il/en/NewsAndPublications/PressReleases/Pages/27-9-17.aspx*.

BoI (2018), "Monetary Committee Decision", 10 January, *www.boi.org.il/en/NewsAndPublications/PressReleases/Pages/10-1-18-InterestRate.aspx*.

Brand, G. and E. Regev (2015), "The Dual Labor Market: Trends in Productivity, Wages and Human Capital in the Economy, 2015", in State of the Nation Report 2015, Taub Center, Jerusalem, *http://taubcenter.org.il/wp-content/files_mf/theduallabormarketenglish.pdf*.

Brender, A. (2007), "Does municipal segregation alleviate the economic disadvantage of Israeli Arabs? : local tax collection as an indicator", Harry S. Truman Research Institute for the Advancement of Peace, Hebrew University of Jerusalem, *https://searchworks.stanford.edu/view/7861000*.

Brender, A. (2011), "First Year of the Mandatory Pension Arrangement: Compliance with the Arrangement as an Indication of its Potential Implications for Labor Supply", *Bank of Israel Discussion Paper,* No. 2011.05, May, *https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2042453*.

Brender, A. and M. Strawczynski (2015), "Government support for young families in Israel", *Israeli Economic Review*, Vol. 12, No. 2, May, *www.boi.org.il/en/Research/Periodicals/Documents/adimichel1.pdf*.

Brewer, M., A. Duncan, A. Shephard and M.J. Suárez (2006), "Did working families' tax credit work? The impact of in-work support on labour supply in Great Britain", *Labour Economics*, Vol. 13, No. 6.

Card, D., J. Kluve and J. Weber (2015), "What Works? A Meta Analysis of Recent Active Labour Market Program Evaluations", *NBER Working Papers*, No. 21431, *www.rwi-essen.de/media/content/pages/publikationen/ruhr-economic-papers/rep_15_572.pdf*.

CBS (2017a), "Development of the high-tech sector in Israel 1995-2014", Central Bureau of Statistics *www.cbs.gov.il/webpub/pub/text_page_eng.html?publ=73&CYear=2014&CMonth=1*.

CBS (2017b), "CBS demographic projections until 2065", Central Bureau of Statistics *www.cbs.gov.il/reader/newhodaot/tables_template_eng.html?hodaa=201701138*.

Chu, C. (1997), "Population Density and Infrastructure Development", *Review of Development Economics*, Vol. 1, No. 3, *http://onlinelibrary.wiley.com/doi/10.1111/1467-9361.00020/pdf*.

Cramer, J. and A.B. Krueger (2016), "Disruptive Change in the Taxi Business: The Case of Uber", *American Economic Review: Papers & Proceedings*, Vol. 106, No. 5, May, *http://dx.doi.org/10.1257/aer.p20161002*.

Cramton, P. and R. Geddes (2017), "Markets in Road Use: Eliminating Congestion through Scheduling, Routing, and Real-Time Road Pricing", *www.cramton.umd.edu/papers2015-2019/cramton-geddes-markets-in-road-use.pdf*.

Deole, S. (2014), "Population Density, Optimal Infrastructure and Economic Growth", *CESifo Working Paper Series*, *http://dx.doi.org/10.2139/ssrn.2119923*.

Elacqua, G. (2012), "The impact of school choice and public policy on segregation: Evidence from Chile", *International Journal of Educational Development,* Vol. 32, No. 3, *https://doi.org/10.1016/j.ijedudev.2011.08.003*.

Eshet, A. and O. Karni (2016), "Integrated Environmental Licensing – Regulatory Improvement Report", Ministry of Environmental Protection, Environmental Policy Division, November (in Hebrew).

Feige, E.L. and R.J. Cebula (2012), "America's Underground Economy: Measuring the Size, Growth and Determinants of Income Tax Evasion in the U.S", *Crime, Law and Social Change*, Vol. 57, Issue 3, *https://ssrn.com/abstract=2735051*.

Fitoussi, S., I. Yakir and M. Sarel (2016), "The Roles and Preferences of the Local Authorities in the Development of Residential Real Estate" in *Removing the Barriers to Housing Development in Israel*, Kohelet Policy Forum, *Policy Paper*, No. 27, March, *http://en.kohelet.org.il/wp-content/uploads/2016/05/KPF055_eReal_estate_240416.pdf*.

Flug, K. (2017a), "Governor's Remarks at the Press Conference Presenting the Bank of Israel 2016 Annual Report", *www.boi.org.il/en/NewsAndPublications/LecturesSpeechesAndPresentations/Pages/29317.aspx*.

Flug, K. (2017b), "Remarks by the Governor of the Bank of Israel at the Eli Hurvitz Conference on Economy and Society: 'One Society – One Economy'", 19 June, *www.boi.org.il/en/NewsAndPublications/LecturesSpeechesAndPresentations/Pages/19617.aspx*.

Flug, K. (2017c), "Remarks by Bank of Israel Governor Dr. Karnit Flug at the Cabinet meeting on the multi-year infrastructure development plan", *www.boi.org.il/en/NewsAndPublications/PressReleases/Pages/3-9-17.aspx*.

Fuchs, H. (2016), "Gender Gaps in the Labour Market: Wage and Occupational Segregation", in *State of the Nation Report 2015*, Taub Center for Social Policy Studies in Israel, Jerusalem.

Gal, R. (2015), "How to bring Haredim to science and technology?", Samuel Neaman Institute for National Policy Research, June (in Hebrew) *www.neaman.org.il/EN/How-bring-Haredim-science-technology*.

Geva, A. (2015), "Demographic changes and their implications for fiscal aggregates in the years of 2015-2059", Ministry of Finance, *www.mof.gov.il/ChiefEcon/EconomyAndResearch/ArticlesSet/Article_20150518.pdf*.

Glaeser, E. (2016), "If You Build It . . . Myths and realities about America's infrastructure spending", *www.city-journal.org*, summer, *www.city-journal.org/html/if-you-build-it-14606.html?ftcamp=crm/email//nbe/MartinSandbusFreeLunch/product*.

Glover, D. and J. Simon (1975), "The Effect of Population Density on Infrastructure: The Case of Road Building", Economic Development and Cultural Change, Vol. 23, No. 3, *www.journals.uchicago.edu/doi/pdfplus/10.1086/450808*.

Gorodeisky, S. (2017), "Israel Electric to lay off 2,800 as reform agreed", *Globes,* 27 December, *www.globes.co.il/en/article-israel-electric-to-lay-off-2800-as-reform-agreed-1001217230*.

Gruber, N. (2014), "The Shadow Economy in Israel", Taub Center, December, *http://taubcenter.org.il/the-shadow-economy-in-israel/*.

Gruber, N. (2015), "Comments on Finance Minister Moshe Kahlon's housing plan", *Shoresh policy brief*, August, *http://shoresh.institute/policy-brief-Eng-Gruber-15-08-housing.pdf*.

Gyomai, G. and P. van de Ven (2014), "The Non-Observed Economy in the System of National Accounts", *OECD Statistics Brief*, No. 18, June, *www.oecd.org/std/na/Statistics%20Brief%2018.pdf*.

Hanushek, E., G. Schwerdt, L. Woessmann and L. Zhang (2015), "General education, vocational education, and labor-market outcomes over the lifecycle", *Journal of Human Resources*, Vol.52, No. 1.

Homs, O. (2007), "La Formación Profesional en España, Hacia la Sociedad del Conocimiento", *Colección Estudios Sociales*, Vol. 25, Fundación Caixa, Barcelona, *www.nber.org/papers/w21431*.

IMF (2017), *Article IV Israel Country Report,* No. 17/75, March, *www.imf.org/en/Publications/CR/Issues/2017/03/28/Israel-2017-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-44769*.

Iataskforce (Inter Agency Taskforce on Israeli Arab Issues) (2016), "Government Resolution 922 Economic Development Plan for the Arab Sector: Current Status, Government Work Plans and Civil Society Involvement", July, *http://iataskforce.org/sites/default/files/resource/resource-1462.pdf*.

Infrastructure Australia (2016), "Australian Infrastructure Plan – Priorities and reforms for our nation's future", February, *http://infrastructureaustralia.gov.au/policy-publications/publications/files/Australian_Infrastructure_Plan.pdf*.

Irac and Imrpj (Israel Religious Action Center and Israel Movement for Reform and Progressive Judaism) (2016), "Heroes of Health -Israel's Healthcare System as a Model of Jewish-Arab Coexistence", December, *www.iataskforce.org/sites/default/files/resource/resource-1496.pdf*.

Israel Innovation Authority (2017), "Israel Innovation Authority Report – 2017", October, Jerusalem, *http://economy.gov.il/English/NewsRoom/PressReleases/Documents/2017IsraelInnovationAuthorityReport.pdf*.

Kimhi, A. and A. Horovitz (2015), "Impact of the Level of High School Math on Israeli Pupils' Academic and Career Outcomes", *Policy Paper*, No. 2015.01, Taub Center for Social Policy Studies in Israel, *http://taubcenter.org.il/wp-content/files_mf/theimportanceofmath2015english.pdf*.

Levi-Weinrib, E. (2017), "Israel Tax Authority targets owners of 2 homes", *Globes*, 6 September, *www.globes.co.il/en/article-tax-authority-targets-owners-of-2-homes-1001204192*.

Li, Z., Y. Hong and Z. Zhang (2016), "Do Ride-Sharing Services Affect Traffic Congestion? An Empirical Study of Uber Entry", August, *http://dx.doi.org/10.2139/ssrn.2838043*.

Lopez-Claros, A. (2016), "Doing business in Israel: An international perspective", presentation for the Aaron Institute for Economic Policy Annual Conference, 20 June.

Manpower Group (2017), "2016-2017 Talent Shortage Survey", Manpower Group, Milwaukee *www.manpowergroup.com/talent-shortage-explorer/#.WTVKmE2we70*.

Marom, S. (2015), "The Importance of Learning Hebrew for Integrating and Promoting the Arab Population in the Israeli Job Market", *Adult Education in Israel*, Vol. 14.

Mazuz-Harpaz, Y. and Z. Krill (2017), "Jumping to high-tech", MoF economy and research paper, (in Hebrew), *http://mof.gov.il/ChiefEcon/EconomyAndResearch/ArticlesSet/Article_10092017.pdf*.

MoF (Ministry of Finance) (2016), "Development in high tech sector in Israel", Ministry of Finance, (in Hebrew) *www.mof.gov.il/chiefecon/economyandresearch/doclib/skiracalcalit_140216.pdf*.

MoF (2017a), *Weekly Economic Review*, 19 February, (in Hebrew) *www.mof.gov.il/chiefecon/economyandresearch/doclib/skiracalcalit_19022017.pdf*.

MoF (2017b), Quarterly Review of the Real Estate Sector, Q4 quarter 2016, February, (in Hebrew) *http://mof.gov.il/ChiefEcon/EconomyAndResearch/DocLib2/SkiratNadlan_2016Q4.pdf*.

MoF (2017c), Weekly Economic Review, 24 September, (in Hebrew) *www.mof.gov.il/chiefecon/economyandresearch/doclib/skiracalcalit_24092017.pdf*

MoF (2017d), Weekly Economic Review, 19 November, (in Hebrew) *http://mof.gov.il/chiefecon/economyandresearch/doclib/skiracalcalit_20171119.pdf*.

Musset, P., M. Kuczera and S. Field (2014), *A Skills Beyond School Review of Israel*, OECD Reviews of Vocational Education and Training, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264210769-en*.

National Insurance Institute (2016), *Poverty and social gaps report 2015*, *www.btl.gov.il/English%20Homepage/Publications/Poverty_Report/Pages/default.aspx*.

NEC (2017), "Future Housing Needs of the Israeli Population", National Economic Council Report, *www.pmo.gov.il/English/PrimeMinistersOffice/DivisionsAndAuthorities/TheNationalEconomicCouncil/Pages/kalpeilut.aspx#Future Housing Needs of the Israeli Population*.

OECD (2010), *Learning for Jobs*. Reviews of Vocational Education and Training, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264221840-en*.

OECD (2012a), *Equity and Quality in Education: Supporting Disadvantaged Students and Schools*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264130852-en*.

OECD (2012b), "How Are Countries Around the World Supporting Students in Higher Education?", *Education Indicators in Focus*, No. 2, OECD Publishing, Paris, *http://dx.doi.org/10.1787/5k9fd0kd59f4-en*.

OECD (2013), OECD Economic Survey: Israel 2013, OECD Publishing, Paris, *http://dx.doi.org/10.1787/eco_surveys-isr-2013-en*.

OECD (2015a), *Employment and Skills Strategies in Israel*, OECD Reviews on Local Job Creation, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264232969-en*.

OECD (2015b), "Implementation of the WTO Trade Facilitation Agreement: The Potential Impact on Trade Costs", *Policy note*, June, *www.oecd.org/tad/tradedev/WTO-TF-Implementation-Policy-Brief_EN_2015_06.pdf*.

OECD (2016a), "*OECD Science, Technology and Innovation Outlook 2016. Country profile: Israel*", OECD Publishing, Paris, *http://dx.doi.org/10.1787/sti_in_outlook-2016-68-en*.

OECD (2016b), *OECD Economic Survey: Israel 2016*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/eco_surveys-isr-2016-en*.

OECD (2016c), *OECD Studies on SMEs and Entrepreneurship: SME and Entrepreneurship policy in Israel 2016*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264262324-en*.

OECD (2016d), *Education Policy Outlook – Israel*, OECD Publishing, Paris, *www.oecd.org/israel/Education-Policy-Outlook-Country-Profile-Israel.pdf*.

OECD (2016e), *Skills Matter: Further Results from the Survey of Adult Skills*, OECD Skills Studies, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264258051-en*.

OECD (2016f), "Israel's Green Tax on Cars: Lessons in Environmental Policy Reform", *OECD Environment Policy Papers*, No. 5, OECD Publishing, Paris, *http://dx.doi.org/10.1787/5jlv5rmnq9wg-en*.

OECD (2017a), *OECD Database on Prices and Purchasing Power Parities*, OECD Publishing, Paris, *http://dotstat.oecd.org/?lang=en*.

OECD (2017b), "Environmental Fiscal Reform", OECD, *www.oecd.org/tax/tax-policy/environmental-fiscal-reform-G7-environment-ministerial-meeting-june-2017.pdf*.

OECD (2017c), "Draft reform of the Israeli disability pension system: An initial assessment by the OECD", *www.oecd.org/israel/Israel-disability-pension-note-July-2017.pdf*.

OECD (2017d), *Spatial Planning and Policy in Israel: The Cases of Netanya and Umm al-Fahm*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264277366-en*.

OECD (2017e), "Financial Incentives for Steering Education and Training", *Getting Skills Right*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264272415-en*.

OECD (2017f), *Economic Policy Reforms 2017: Going for Growth*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/growth-2017-en*.

OECD (2017g), *Agricultural Policy Monitoring and Evaluation 2017*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/agr_pol-2017-en*.

OECD (2017h), "Key message and preliminary results from the 2018 Regulatory Policy Outlook", GOV/RPC(2017)13, forthcoming.

Queiroz, C., A. Uribe and D. Blumenfeld (2016), "Mechanisms for Financing Roads: A Review of International Practice", Inter-American Development Bank, December, *https://publications.iadb.org/bitstream/handle/11319/8082/Mechanisms-for-Financing-Roads-A-Review-of-International-Practice.pdf?sequence=1*.

Rayle, L., S. Shaheen, N. Chan, D. Dai and R. Cervero (2014), "App-Based, On-Demand Ride Services: Comparing Taxi and Ridesourcing Trips and User Characteristics in San Francisco", University of California Transportation Center, *Working Paper, www.its.dot.gov/itspac/dec2014/ridesourcingwhitepaper_nov2014.pdf*.

Rouzet, D. and F. Spinelli (2016), "Services Trade Restrictiveness, Mark-Ups and Competition", OECD Trade Policy Papers, No. 194, OECD Publishing, Paris, *http://dx.doi.org/10.1787/5jln7dlm3931-en*.

Said, I. (2015), "A Work-Plan to Redirect Unemployed Members of the Arab Community with Higher Education to High-Tech Employment", Bank of Israel, April.

Schlosser, A. (2011), "Public Preschool and the Labour Supply of Arab Mothers: Evidence from a Natural Experiment", Eitan Berglas School of Economics, Tel Aviv University, September, *www.tau.ac.il/~analias/Public%20PreSchool.pdf*.

Sikkuy (2016), "Government Tenders – The Key to a Breakthrough in the Employment of Arabs in the Private Sector – Encouraging the Employment of Arab Workers by Means of Government Tenders in order to Promote Equality in the Job Market", *www.sikkuy.org.il/wp-content/uploads/2016/11/tenders_policy_paper_en.pdf*.

Shiftan, Y., N. Sharaby and C. Solomon (2008), "Transport Project Appraisal in Israel", *Transportation Research Record*, No. 2079, *http://trrjournalonline.trb.org/doi/abs/10.3141/2079-17*.

State of Israel (2017), "The Inter-Ministerial Tender Committee for PPP Airport Project: Request for Information – Consulting and Management Services to the Government of Israel – With respect to an International Airport Project", *http://itrade.gov.il/canada/files/2017/03/RFI-for-Consulting-and-Management-Services-for-an-International-Airport-in-Israel.pdf*.

Yashiv, E. and N. Kasir (2013), "Arab Women in Israeli Labor Market: Characteristics and Policy Proposals", *Israel Economic Review*, Vol. 10, No. 2, *www.boi.org.il/en/research/periodicals/documents/iser-1-41-2.pdf*.

Yashiv, E. and N. Kasir (Kaliner) (2014), "The labor market of Israeli Arabs – Key Features and Policy Solutions", Tel Aviv University, January, *www.tau.ac.il/~yashiv/Israeli%20Arabs%20in%20the%20Labor%20Market%20--%20Policy%20Paper.pdf*.

Yefet N. (2018), "Israel eases entry of foreign tech experts", *Globes*, 1 January, *www.globes.co.il/en/article-israel-eases-entry-of-foreign-tech-experts-1001217775*.

© OECD 2018

ANNEX A.1

The simulated impact of increasing employment rates on poverty in typical families of the main Israeli communities

This Annex provides additional information regarding the results of a simulation exercise evaluating the potential benefits of an employment increase for lowering the poverty rate for different family types belonging to the Israeli-Arab, Haredi and Jewish non-Haredi communities. In its first part, it describes the main characteristics of the OECD Tax Benefit model that was used for this exercise. The second part presents the main assumptions retained to perform these simulations, and the last part provides a short discussion of the main results.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

OECD Tax-Benefit model

The OECD Tax-Benefit model, versions of which are available for each OECD Member country, are tools designed to assess the redistribution policies, income adequacy and benefit generosity for working people and their families. To this end, these models consist of a set of equations allowing the calculation of disposable income of households taking into account the specific characteristics of the family (for example, the number of people in the household), their labour income, social transfers and income taxes provided by the relevant legislation.

These models, which are presented in detail in OECD (2016), incorporate detailed tax rules and benefit entitlements covering a broad set of social and fiscal policy levers: personal income tax, social security contributions, unemployment benefits, social assistance, guaranteed minimum-income schemes, family benefits, housing benefits for rented accommodation, in-work benefits, childcare support and parental leave benefits. The latest update of the indicators covers the year 2015. Benefits included in the calculations exclude those benefits that are "in-kind". Hence free school meals, subsidised transport, free health care, etc. are not included. In general, occasional or irregular payments are also not included, as are benefits strictly related to the purchase of particular goods and services (other than housing or childcare as described below), such as transport, domestic fuel, medical insurance and prescription medicines.

Net incomes are defined as gross earnings plus cash benefits minus income taxes and social security contributions. Any taxes or contributions not paid directly by the wage earner or benefit recipient are not included in gross incomes. Housing costs and any other forms of "committed expenditure" are not deducted when computing net incomes.

For each country the Tax-Benefit model allows the calculation of net household incomes for a wide range of policy-relevant family situations. Computing tax and benefit amounts using existing policy rules illustrates the features of these redistributive instruments. And by repeating these calculations for a number of different household situations, they permit an assessment of the circumstances (e.g. family situation or income level) for which each of these features becomes relevant.

Family size and income level assumptions

For the specific simulations carried out for the draft *Economic Survey*, the tax-benefit model has been used to evaluate the impact of the tax-benefit system for representative households of the three main Israeli communities (Israeli-Arabs, Haredim and non-Haredi Jews) given their characteristics (their number of children) and differences in income levels. The model has also been used to estimate the impact of higher employment on family income for each of these three different groups. To perform these simulations it was therefore necessary to specify their average wage level and their average number of children for each standardised family type.

As shown in the Table A.1.1, the earnings difference between communities is substantial. Non-Haredi Jews earn around 110% of the median hourly wage and around 110% of the median monthly wage. On the other hand, Israeli-Arabs and Haredim work in low-productivity, often non-tradable sectors with low wages. Israeli-Arabs earn only around 70% of the median hourly wage and 74% of the median monthly wage. The Haredim earn around 87% of the median hourly wage, but only 68% of the median monthly wage. This difference stems from high share of part-time workers among this group. In the simulations, for the standardised families we have thus assumed that workers earn 110% of the median hourly wage in non-Haredi families, 70% in Israeli-Arab families and 90% in the Haredi families.

Table A.1.1. **Gross earnings in 2015**

	Share of median (%)		Share of average (%)	
	Hourly earnings	Monthly earnings	Hourly earnings	Monthly earnings
All those in this age group	100.0	100.0	100.0	100.0
Men	104.3	117.0	107.0	118.8
Women	95.7	85.0	90.8	80.3
Haredim	87.2	68.2	79.8	62.3
Haredi men	85.1	79.4	80.7	73.6
Haredi women	91.5	59.9	78.7	53.1
Israeli Arabs	70.2	73.9	61.7	60.1
Arab men	70.2	76.7	61.8	66.4
Arab women	70.2	59.1	61.5	46.8
Non-Haredi Jews	108.5	110.6	108.0	109.6
Non-Haredi Jewish men	119.1	139.5	119.1	133.9
Non-Haredi Jewish women	97.9	90.9	94.8	86.1

Source: Ministry of Finance based on Labour Force Survey data.

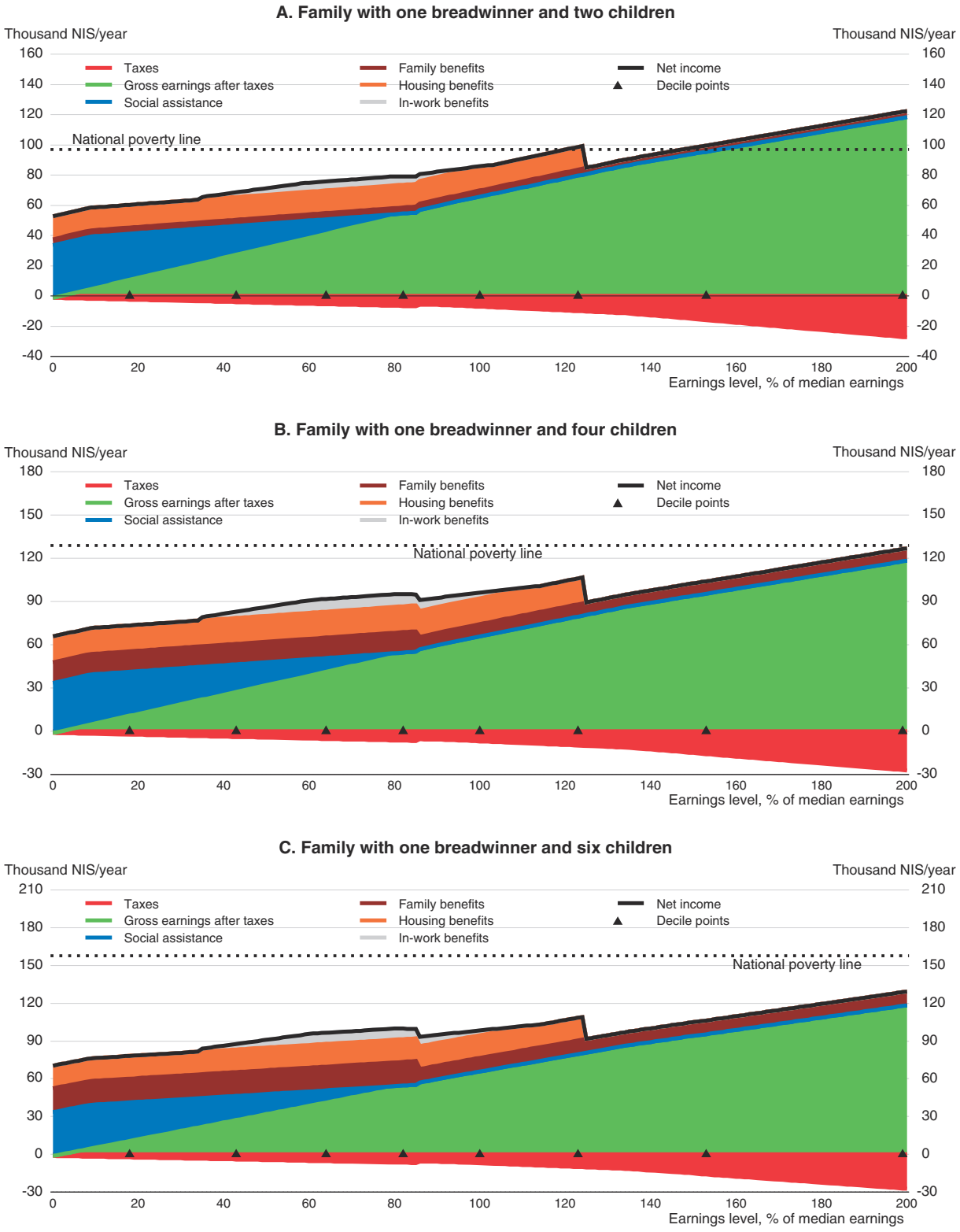
Disadvantaged groups have much larger families. The fertility rate in Israel is 3.1 children per mother, the highest in the OECD (OECD, 2017). The fertility rate of non-Haredi Jews is somewhat above 2. The Israeli-Arab fertility has decreased substantially from around 4.5 children in 2000-04 to above 3 (CBS, 2017a). The average rate among Haredi families is estimated to be around 6-7 (CBS, 2017b). For the simulations, it was assumed that average non-Haredi families have two children and Haredi families six. As fertility rate of Israeli-Arabs came down to 3 only in recent years, we assume the average number of children in Israeli-Arab families is still four.

Results of simulating the Tax-Benefit model for Israel

The results of the simulations suggest that with the current Israeli tax-transfer system, it is difficult to escape poverty for families with only one breadwinner and children. In a family with two children, the wage of the breadwinner must exceed at least 150% of the national median wage for household income to exceed the national poverty line (Figure A.1.1, Panel A). While the direct taxation system makes a contribution to a reduction of inequality similar to the OECD country average (Bank of Israel, 2016), the overall redistributive effect of the country's tax-transfer system is low because of the low level of social assistance and benefits (Figure A.1.1, Panel A).

For larger families with one breadwinner it is even more difficult to escape poverty. The family poverty line increases with the number of children, but the level of transfers does not sufficiently adjust for these increases, mainly because of a low generosity of child

Figure A.1.1. **Families with one breadwinner[1] are less likely to escape poverty**



1. One-earner couple where the breadwinner works 40 hours per week.

Source: OECD calculations using the OECD Tax-Benefit model.

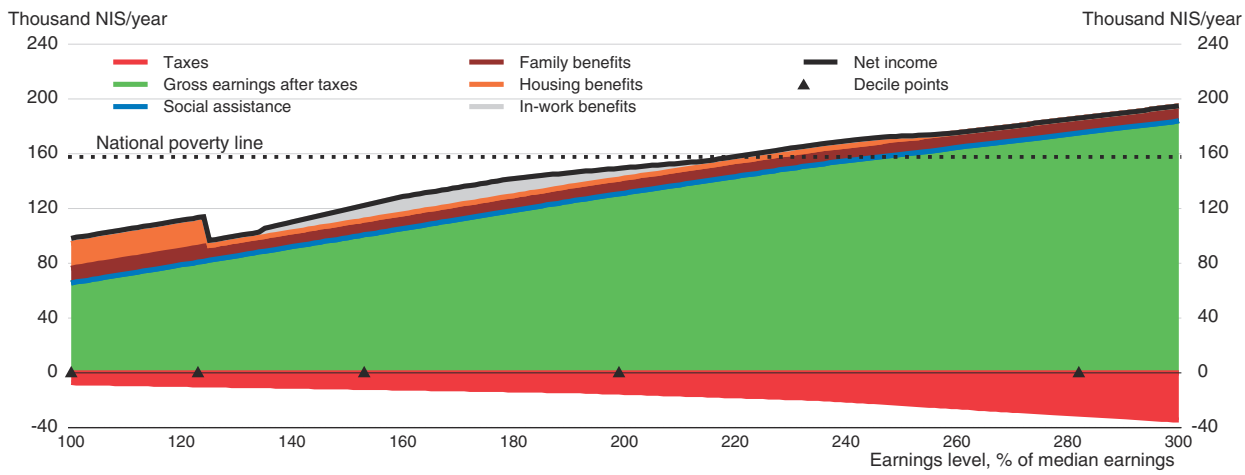
StatLink http://dx.doi.org/10.1787/888933673560

allowances. Therefore, the gap between family income and the poverty line increases with the number of children. In families with four or more children, even if the breadwinner earns double the median wage, it would not be sufficient for the family to escape poverty (Panels B and C).

The main route out of poverty in Israel is by increasing the number of breadwinners in the family. However, even increasing employment would not necessarily help to escape poverty in a case of disadvantaged groups. For example, the household income of the Haredi family with six children and a wage of around 90% of the median wage would be approximately 180% of the median earnings, but this would still not be enough for the family to escape poverty (Figure A.1.2).

Figure A.1.2. **Large families even with two breadwinners[1] would not necessary escape poverty**

Haredi family with two breadwinners and six children



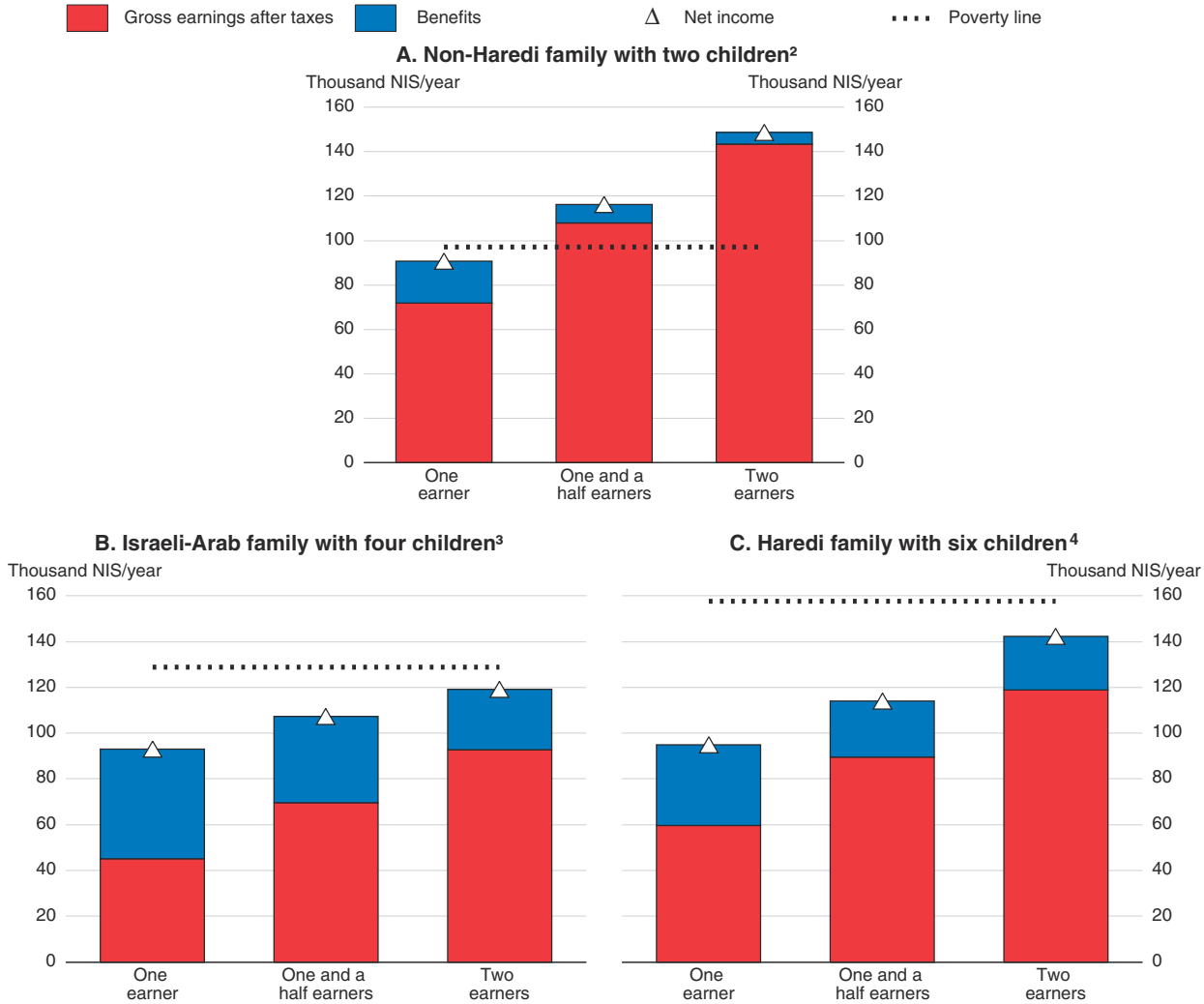
1. Two-earner couple where both spouses work 40 hours per week.
Source: OECD calculations using the OECD Tax-Benefit model.

StatLink http://dx.doi.org/10.1787/888933673579

In non-Haredi Jewish families with expected income of 110% of the median wage and two children, even part-time work for the second spouse would be enough to help family income exceed the poverty threshold (Figure A.1.3, Panel A). However, for the typical Israeli-Arab family with income of around 70% and four children, even two earners in the family would not be enough to escape poverty (Panel B). Also in the case of Haredi with almost 90% of the median hourly wage and six children additional income coming from the salary of the second earner would not be enough to exit poverty (Panel C). The earnings of workers in an average Arab family with four children would need to reach around 160% of the median wage for net family income to exceed the poverty line, and, in the case of a Haredi family with six children, it would need to reach around 230% of the median wage. In sum, the results suggest that the effect of increasing employment on poverty rate reduction can be limited for these disadvantaged groups.

Figure A.1.3. **Higher employment of Haredim and Israeli-Arabs may not be enough to lift them out of poverty**

Estimates of family income according to the numbers of earners and the community group[1]



1. One earner corresponds to a family with one earner, one and a half earners corresponds to two-earner family where one works full-time and the second half-time, and two earners corresponds to two-earner family where both work full-time.
2. Workers are assumed to earn 110% of the average wage.
3. Workers are assumed to earn 70% of the average wage.
4. Workers are assumed to earn 90% of the average wage.

Source: OECD calculations using the OECD Tax-Benefit Model.

StatLink http://dx.doi.org/10.1787/888933673275

Bibliography

Bank of Israel (2016), *Annual Report – 2015*, Jerusalem, *www.boi.org.il/en/NewsAndPublications/RegularPublications/Pages/DochBankIsrael2015.aspx*.

CBS (2017a), "Statistical abstract of Israel" No. 68, Subject 3, *www.cbs.gov.il/reader/shnaton/templ_shnaton_e.html?num_tab=st03_13&CYear=2017*.

CBS (2017b), "Projections of the population of Israel up to 2065", *http://cbs.gov.il/reader/?MIval=cw_usr_view_SHTML&ID=811*.

OECD (2016), "OECD tax and benefits model- methodology", *www.oecd.org/els/soc/Methodology.pdf*.

OECD (2017), OECD, *Family Database*, *www.oecd.org/els/family/SF_2_1_Fertility_rates.pdf*.

© OECD 2018

ANNEX A.2

Progress in structural reform

This table reviews action taken on recommendations from previous Surveys, *which are not mentioned in the main text of the Issues for Discussion document. Recommendations that are new in this* Survey *are listed at the end of the relevant chapter.*

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

1. Pensions	
Recommendations in previous *Surveys*	Action taken since January 2016
Moderate the impact on net current income of relatively high mandatory contributions to pension savings for low-wage workers.	The Earned Income Tax Credit was increased for certain populations as a response to the high mandatory contributions to pension savings for low-wage workers.
Increase employee pension contributions for public employees recruited before 2002-04.	No action taken.
Gradually raise women's eligibility age for the first-pillar pension to equal men's (67 years). Index the retirement age to life expectancy at 65, so as to hold constant the share of adult lifetime spent in retirement.	A public committee, appointed by the Minister of Finance, has published its report recommending an increase in women's retirement age to 64 over eight years, and then indexing retirement age to life expectancy. The issue is being discussed in the Knesset.
Require pension providers to offer low-cost pension funds as their default option, for example, by proposing passively managed (indexed) assets or streamlining distribution channels. Encourage the growth of mutually managed pension funds.	No action taken.
Significantly reduce the implicit tax rate on continuing to work beyond the pension eligibility age by lowering the reduction of first-pillar basic pension entitlements in the presence of work-related income.	No action taken.
Increase transparency of the pension system for defence, police and prison personnel, and transfer its management from the Ministries of Defence (MoD) and Internal Security to the Ministry of Finance (MoF). Increase the transparency of the State's contingent liabilities for those public entities having independent budgets.	New mechanisms for transparency were introduced as part of the agreement between the MoF and MoD.
Phase out tax breaks on savings in the "advanced training funds".	No action taken.

2. Health-care policy	
Recommendations in previous *Surveys*	Action taken since January 2016
Governance of the health insurance system	
Ensure universal National Health Insurance (NHI) services remain at the core of the system. Provide adequate public funds for it.	NHI remains at the core of the system. In recent years funding has risen by an average annual rate of 7%, one of the highest rates of any public spending area.
Widen the scope of reductions in co-payments to low income households.	The share of co-payments funding public health expenditure fell substantially in recent years from 8% in 2012 to 5.4% in 2015. This trend is ongoing in 2016-17 as well. Moreover, actions were taken to decrease co-payments of certain low-income households such as holocaust survivors and other elderly populations at a cost of over NIS 250 million per year.
Put an end to direct management of government-run hospitals by the Ministry of Health through conversion to independent hospital trusts or by putting them in the hands of the health funds.	A new hospital owned by a firm controlled by a health fund was opened on June 2017 in the city of Ashdod. Furthermore, another similar type of hospital will open in Beersheba. As to the governmental hospitals, no action has been taken.
Policy towards health-care professionals	
Further expand medical schools and nurse training. Strive to shorten the time taken to acquire qualifications and specialisations.	Several actions were taken to expand medical and nurse training. A new medical school was opened in the city of Zfat, and a multi-year plan was developed to increase the number of medical and nursing students by another 15%. In total, the number of new medical students is planned to grow from 440 in 2009 to over 900 in 2022 and nursing students from 850 to over 3 100.
Further exploit the potential for shifting tasks between professions, e.g. from doctors to nurses.	A new profession ("Doctor Assistant") was introduced. These are paramedics employed at hospitals with tasks and responsibilities aimed at reducing doctors' workload.
Encourage older professionals to continue working, and provide childcare facilities for staff.	No action taken.
Consider extending requirements to work in the NHI system for those that have benefitted from subsidised medical training.	No action taken.
Funding mechanisms	
Consider adding further socio-economic variables to the capitation formula that determines government transfers to the health funds.	No action taken.
Further shift payment mechanisms away from input-based measures (such as *per diem* charging for hospital care) and towards output-based formulae such as Diagnosis Related Group (DRG) mechanisms.	In the past five years over 500 new DRG-based prices were published. This is a work in progress, but already today over 70% of billings between hospitals and HMOs are done on a DRG basis or at ambulatory-care prices.

Quality of care, health promotion and data	
Further increase health spending, especially within the hospital sector to reduce hospital overcrowding.	Public health-care spending has increased substantially over the past few years – a 60% increase between 2010 and 2017 – worth over NIS 22 billion. Hospitals have benefited from much of this increase, alongside other public providers. Unfortunately, much of the increase went for wage increases and not better service or care. Currently, Israeli physicians and nurses' wages are among the OECD's highest, and health-care wages have risen at a far faster rate than other wages and prices.
Further develop the collection and dissemination of information on the quality of hospital care.	In recent years the Ministry of Health started a programme of measuring hospital quality, indicators of which are published annually.
Long-term care	
Simplify access to public support for long-term care (LTC) services. Create a one-stop shop for assessing LTC needs.	Thanks to additional funding and changes to community LTC, the queues for LTC services both in the community and in nursing homes have been eliminated.

Thematic chapters

© OECD 2018

Chapter 1

Improving the education system to enhance equity

Israel suffers from substantial income inequality and a high poverty rate. The labour market is characterised by severe polarisation. At one end are the high-tech industries with high-quality jobs and on the other end are low productivity jobs with low wages. This reflects substantial dispersion in skills, which is the highest among all OECD countries. Israel has adults with outstanding skills and at the same time a large share of low-skilled adults. Education should play a major role in reducing these differences, but students' outcomes are dispersed and weak for disadvantaged groups, and their share in the total population is expected to increase. Changes in the education system require a reduction in the significant differences between individual educational streams. This is challenging due to existing cultural barriers. Another major challenge is to improve the achievement of disadvantaged children. The educational system should also be more linked to the labour market in order to increase wages and job satisfaction for all graduates. There is scope to use skills at work more effectively by introducing training programmes for adults who have already left initial education without proper skills.

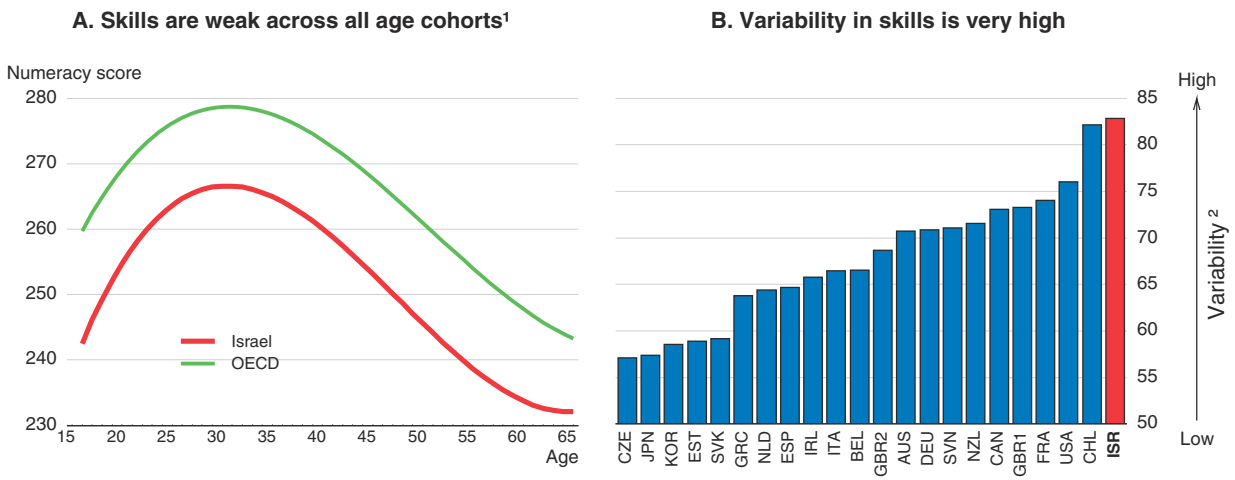
The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Large dispersion in skills contributes to inequalities

High share of adults in Israel is lacking basic skills

The skills of Israel's adult population appear relatively weak when measured by the results of the OECD's 2015 Survey of adult skills (PIAAC). Despite having on average more years of education than the OECD mean, those surveyed demonstrated poor reading, math and problem-solving skills. Skills are weak at each level of education and are low across all age cohorts (Figure 1.1, Panel A). Weak average results stem from a large dispersion of skills across society. Israel has one of the largest achievement gaps between adults with outstanding skills and those with weak outcomes (Panel B). On the one hand, the share of adults with outstanding numeracy skills is comparable to the OECD average. On the other, the proportion of low-skilled adults is exceptionally high, as almost one-third of Israelis lack basic maths skills and more than a quarter performed poorly in reading.

Figure 1.1. **Adults in Israel have weak numeracy skills with significant variability**



1. A cubic specification of the trend curves is found to be most accurate in reflecting the distribution of scores by age in most countries/economies. Results account for cross-country differences in OECD average scores by age cohort. Foreign-born adults are excluded from the analysis. See corresponding tables mentioned in the source below for regression parameters and significance estimates.
2. The measure of variability used is the interquartile range (difference between the third and first quartiles). Data indicated as Belgium correspond to Flanders; GBR1 = England and GBR2 = Northern Ireland.

Source: OECD (2016), *Skills Matter: Further Results from the Survey of Adult Skills*, Figures 2.15 and 3.6, Table A3.6 (N); *OECD Survey of Adult Skills (PIAAC) Database* (2012 and 2015).

StatLink http://dx.doi.org/10.1787/888933673598

More worryingly, the skills differences rooted in strong cultural and socio-economic divisions in Israeli society are much more pronounced between communities. Differences in skills are prominent between Jewish, Israeli-Arab and Ultra-Orthodox (Haredi) adults. Jewish adult scores are significantly higher compare to Israeli-Arabs, which scores are similar to the countries ranked at the bottom. The gaps between the Arab and Jewish populations are even more evident when examining computer skills, as a third of Arab adults lack them even at basic levels, compared with only 9% of Jewish adults and an OECD

average of 15%. At the same time, average test scores of young Ultra-Orthodox adults are much weaker than those of the rest of the Jewish population (BoI, 2016).

High dispersion in skills contributes to a segregated labour market

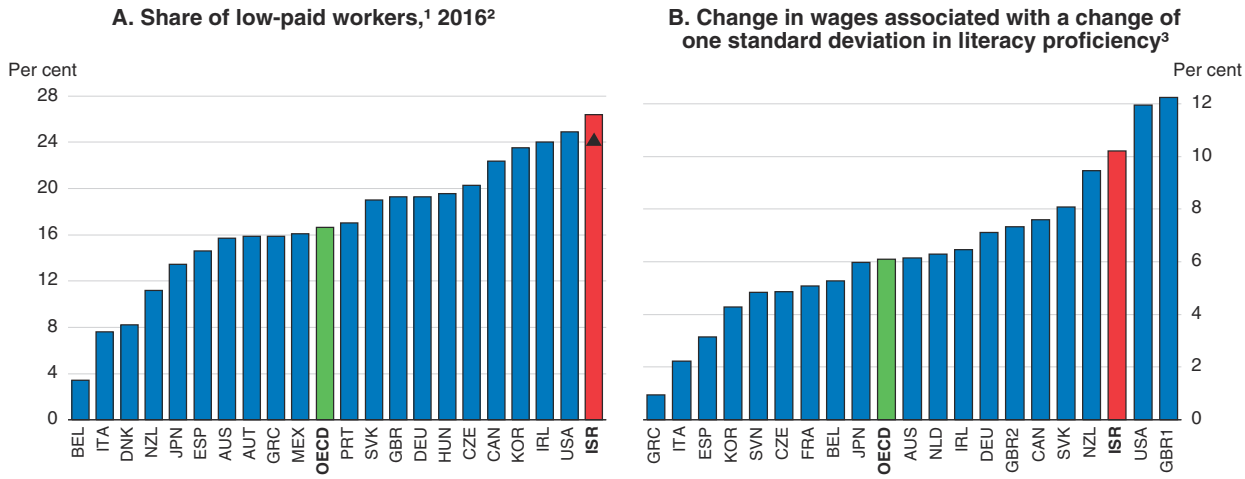
This significant skills dispersion is contributing to the highly segregated labour market. On the one hand, booming high-tech, banking and financial sectors offer attractive working conditions with high and growing wages. On the other, low skilled disadvantaged workers are employed in blue-collar occupations with low wages in industries such as construction. There is a significant and growing gap between these sectors in terms of wages and productivity, which can be explained mainly by differences in workers' skills (BoI, 2016). Mobility between these two sectors is low and decreasing over time (Brand and Regev, 2015), meaning that the labour market continues to be polarised.

The high-tech sector, which attracts mostly high skilled workers, is facing growing labour shortages, undermining its growth and competitiveness. Employers are voicing concern about this inadequacy of highly skilled labour (Musset et al., 2014). More than half of the companies reported difficulty filling jobs, particularly for engineers (Manpower, 2016). Despite strong demand, the high-tech sector's share of total business employment hovered at about 12% for a decade, and the sector is said to lack more than 10 000 engineers (Ministry of Economy, 2016). Still, less than 2% of Haredim and Israeli-Arabs work in this sector and only 3.4% of Israeli-Arabs work in the financial services sector. A shortage of trained graduates is increasing wage pressures, thereby undermining Israel's cost advantage, especially in the key area of multinational R&D centres, and fuelling growing wage dispersion and inequality. Average salaries at R&D centres in Israel have risen from less than 60% of a corresponding US salary in 2009 to close to 80% in 2014 (Ministry of Finance, 2016), while the average compensation per employee has increased in the same period from 54% to 60% of the US average.

At the same time, the share of low-paid workers is comparatively high (Figure 1.2, Panel A), as many workers are trapped in low-wage jobs partly due to their weak skills. In Israel, the relation between wages and skills proficiency is much stronger than in other countries (Panel B). The wage gap between Arab and Jewish males is 28% and for the most part can be explained by the differences in skills. The same goes for the wage differences between Ultra-Orthodox and other men, which can be entirely explained by the skills gap (BoI, 2016). High skills dispersion contributes to inequalities (Box 1.1).

The considerable dispersion in skills among adults from different communities is a serious issue because of ongoing demographic trends. The wave of migrants from the former Soviet Union that increased the working-age population by 15% some 25 years ago is approaching retirement age. Most of them held a tertiary qualification, and around one-quarter worked as professionals, technicians and managers, which requires higher-level technical and analytical skills. As a result, approximately 100 000 newly trained technical and professional recruits will be needed in the coming decade to replace them (Musset et al., 2014), assuming that the demand composition will not change. At the same time, the share of workers from communities with low skills is increasing. Currently, Haredi Jews and Israeli-Arabs represent one-third of the population, but in 2059 they are projected to represent a half (Central Bureau of Statistics, 2017). For young adults (20-24) for instance, official estimates show that it will increase from around one-third currently to 55% by 2059. This represents a major challenge for the Israeli economy, as Haredi men do not want to study secular subjects, schools in the Arab sector remain underfunded and Arab women face cultural constraints on their ability to work.

Figure 1.2. **Israel has many low-paid workers, and the effect of skills on wages is particularly strong**



1. Defined as workers earning less than two-thirds of median earnings. Conscripts with low pay are included as workers in this indicator. However, given the longer duration of military service in Israel (2 or 3 years) than in other countries, an OECD estimate of the population of working poor excluding conscripts (the black triangle) is provided.
2. Or latest available year.
3. For more details, see Figure 5.4 of OECD (2016). Data indicated as Belgium correspond to Flanders; GBR1 = England and GBR2 = Northern Ireland.

Source: OECD, *Labour – Earnings Database*; OECD (2016), *Skills Matter: Further Results from the Survey of Adult Skills*, Figure 5.4 and Table A5.4; *OECD Survey of Adult Skills (PIAAC) Database* (2012 and 2015); OECD estimates.

StatLink http://dx.doi.org/10.1787/888933673617

Box 1.1. **A more equal skills distribution will help to reduce wage inequalities**

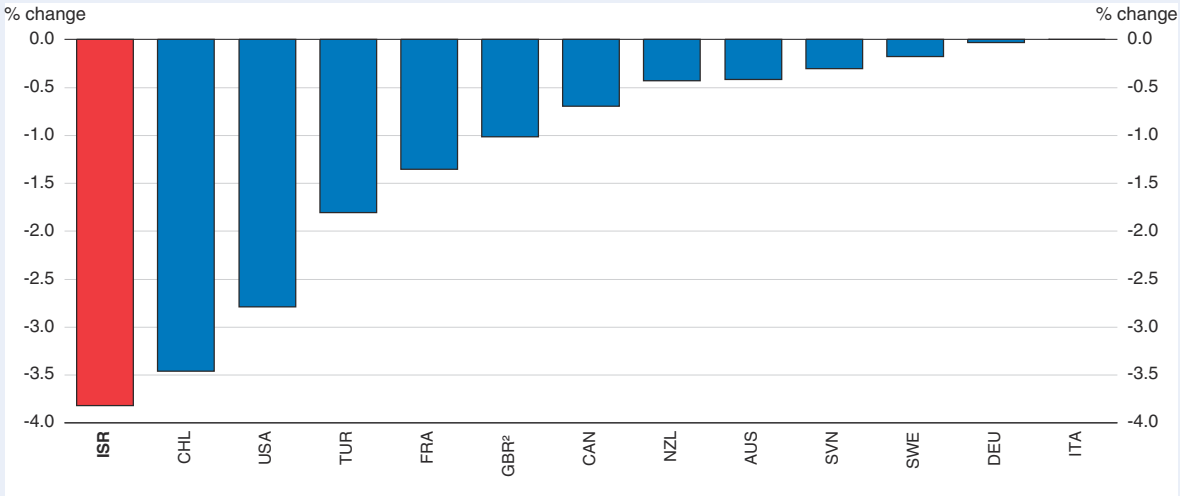
Skills and their dispersion in economy matter for wage inequality. The OECD's *Skills and wage inequalities* (OECD, 2015a) confirms that wage inequalities linked to skills and their prices and that skills can help explain wage gaps between socio-economic groups. This analysis used PIAAC data and simulates alternative wage distributions to assess the role of skills in explaining differences in wage inequality across countries. To estimate the role of skill inequality, each country's skill distribution was "reweighted" so that it has the same skills inequality as the average PIAAC country, while leaving the average level of skills unchanged (for more details see OECD, 2015a). This then allows the calculation of difference in wage inequality associated with changes in skills dispersion.

The results of this analysis (Figure 1.3) indicate that wage inequality would be reduced by almost 4% if Israel had the same skills dispersion as an average PIAAC country. This impact is the highest among OECD countries. This estimate shows only the impact of a change in skills dispersion, but a reduction in wage inequality in Israel will above all require improving the levels of skills of disadvantaged groups (see below). This confirms that skills inequality matters for wage inequality in Israel and that investing in skills, which is a form of active redistribution policy, is likely to lower the need for increased spending on passive redistribution and can help to reduce income inequality.

Box 1.1. **A more equal skills distribution will help to reduce wage inequalities** *(cont.)*

Figure 1.3. **The impact of skill inequality on wage inequality**

Percentage change in wage inequality[1] after imposing the skills dispersion of the average PIAAC country



1. Changes in wage inequality represent changes in the D9/D1 ratio, in the countries with above average skills inequality.
2. England.

Source: Calculation based on OECD (2015), *OECD Employment Outlook 2015*, Figure 2.5; *OECD Survey of Adult Skills (PIAAC) Database* (2012 and 2015).

StatLink http://dx.doi.org/10.1787/888933673636

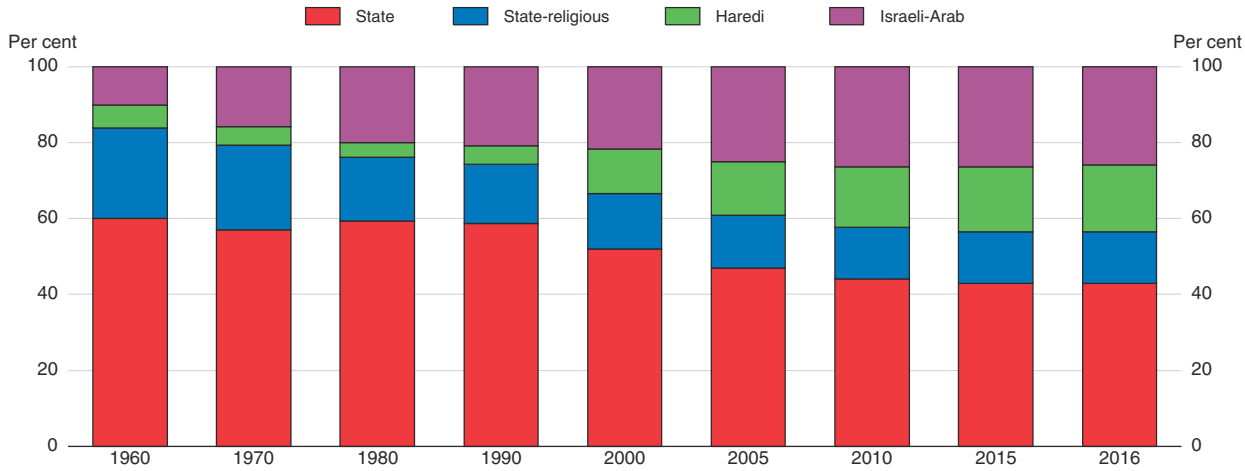
These findings suggest that much more needs to be done to lower skills dispersion and improve the skills at the bottom end in order to reduce income inequality and improve overall well-being. One of the most effective ways is to improve the education system and make it more inclusive by giving all children opportunities for good-quality education. At the same time, the government should also focus on programmes for adults who have already left initial education without proper skills.

Making the education system more inclusive

The education system in Israel is free and obligatory for children aged 3 to 18. Upper-secondary education lasts three years, and around 90% of today's young people are expected to complete upper-secondary education. The education system comprises four main streams. One is for Arabic speakers and three for the Hebrew-speaking communities, which consist of state, state religious and Ultra-Orthodox schools. The share of the pupils in state secular schools has been shrinking over time, while those in Arab and Ultra-Orthodox schools are increasing (Figure 1.4). Almost 60% of students go into general academic upper-secondary education, and one third enrol in technological programmes, while 3% enrol in industrial schools or apprenticeship pathways (ETF, 2014).

Education plays a central role in the acquisition of skills at an early age. However, international assessments of students' outcomes (including PISA) show poor results for Israeli students. Although PISA results for 15 year-old Israeli students show a slight improvement over the last decade, they still lag considerably behind the OECD average across all areas tested (OECD, 2016a; Figure 1.5).

Figure 1.4. **The shares of Israeli-Arab and Haredi pupils are increasing**

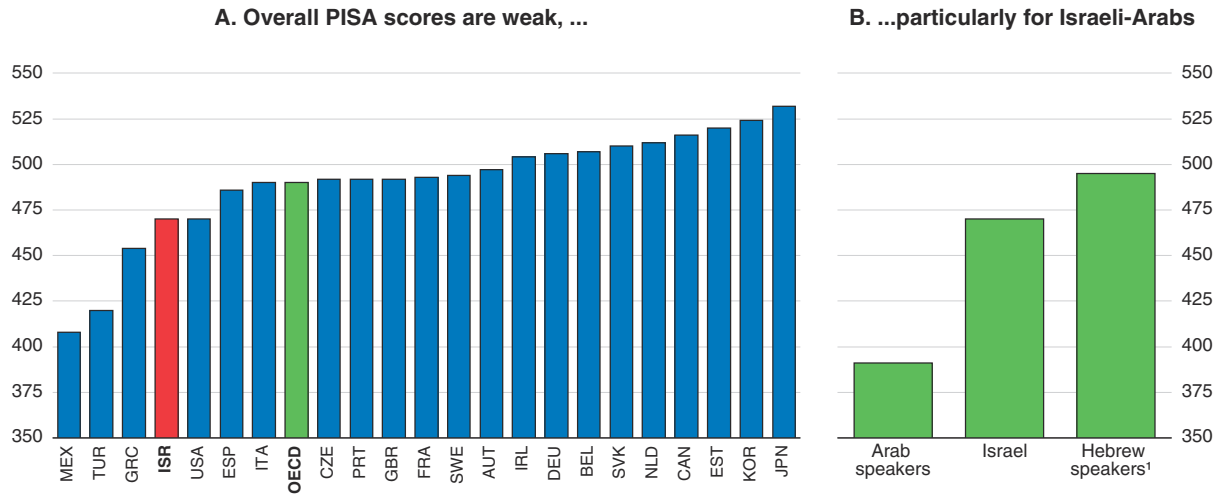


Source: Central Bureau of Statistics, *Statistical Abstract of Israel*, various years.

StatLink http://dx.doi.org/10.1787/888933673655

Figure 1.5. **Israel lags considerably in students' school outcomes, particularly in case of Arab students**

PISA performance in mathematics, 2015



1. Haredi boys did not participate in the PISA test, as they do not study the required material. Results are thus overestimated.

Source: OECD (2016), *PISA 2015 Results: Excellence and Equity in Education*, Annex B1, Chapter 5; Ministry of Education.

StatLink http://dx.doi.org/10.1787/888933673674

The weak results of Israeli students are confirmed by other international testing of 8th grade students in mathematics and science by TIMMS, which shows a significant gap between high performing OECD countries and Israel (TIMMS, 2016). Moreover, these results can be overestimated as Haredi students do not participate in tests and their outcomes might be weak as boys in Ultra-Orthodox streams do not study core subjects (see below).

More worryingly, here too significant differences can be observed in students' results. The Israeli education system shows the largest dispersion in results, including large differences among students and schools. The share of students with exceptional performance in mathematics is comparable to the OECD average, while the share of low

performing students is extremely high. Moreover, the differences in students' outcomes are significant between different communities. PISA results show that Hebrew-speaking students scored similar to or even surpassed the average OECD student, while Arab-speaking students lag behind. The share of poorly performing Arabic-speaking students was 45%, while the share was 12% for Hebrew speakers. Almost no top performing students were found among Arabic speakers. These results confirm considerable differences between different education streams, which weaken skills formation and contribute to the considerable inequality in Israel society. This is in stark contrast to the best performing education systems across OECD countries that successfully combine high quality with little dispersion (OECD, 2012a).

Education funding needs to increase in order to lower dispersion and confront the bottom end

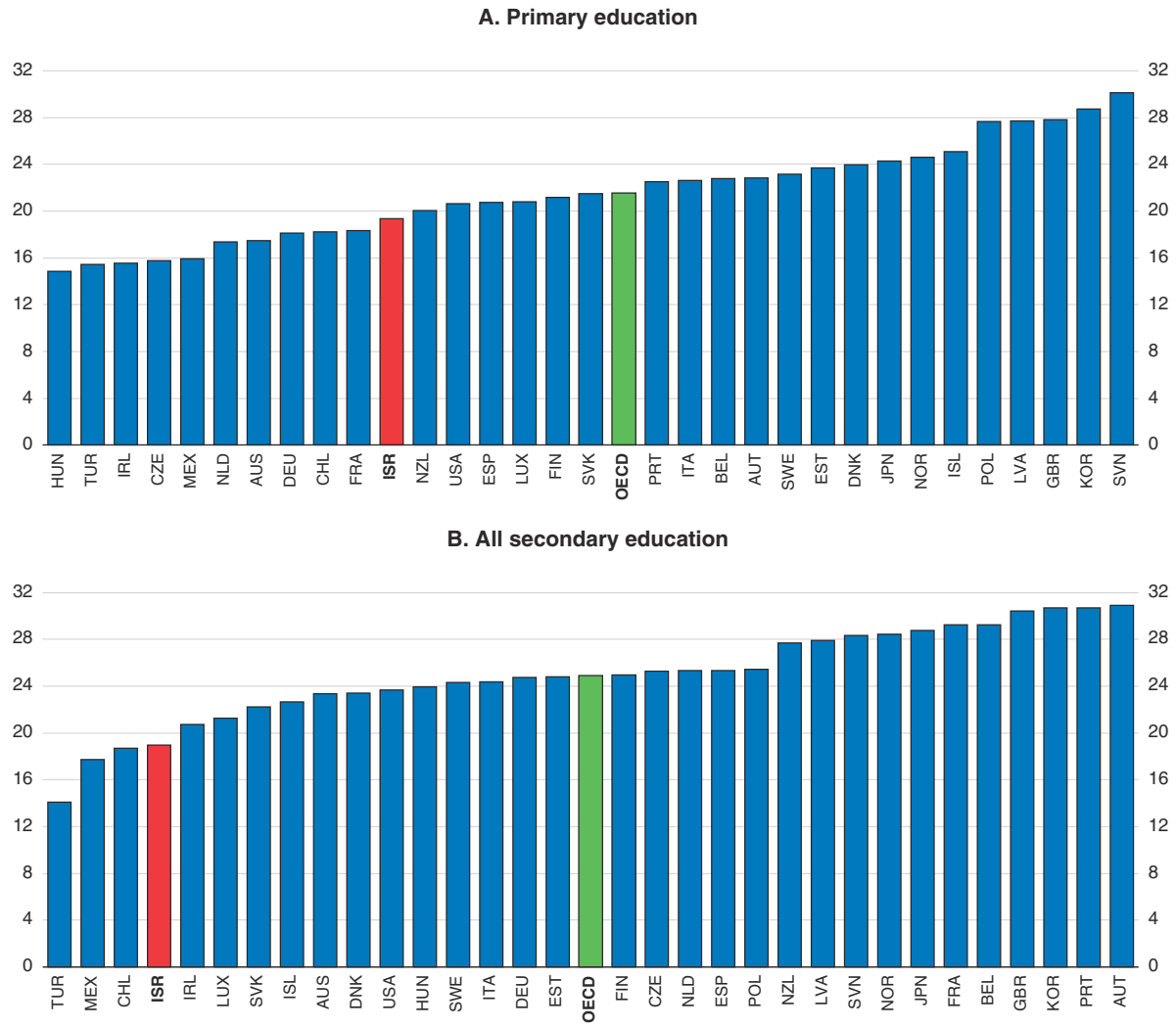
Overall spending on education relative to GDP is higher than the OECD average, but this reflects a higher proportion of young people in the population. Despite significant increases in recent years, expenditures per student in primary and secondary education remain low (Figure 1.6). OECD countries spent almost twice as much per secondary school student as Israel. Available resources and the way they are spent influence students' learning opportunities (OECD, 2012a). Poor educational outcomes accompanied by significant differences among individual streams and communities call for higher education spending, especially at secondary level. The government should continue to increase its spending on education in order to reduce the large differences between students' outcomes. Additional spending should be allocated effectively to promote bridges between different educational streams and improve the outcome at the bottom end (see below).

Budget allocations do not provide enough support for disadvantaged groups. School funding is provided by national and local governments, households, and non-profit educational organisations. The bulk of the funding (almost 90%) comes from the Ministry of Education, which provides schools with grants for teaching and infrastructure, with municipalities providing additional funding. The funds allocated to each class are comprised of two main parts. The first is a basic budget that is equally distributed to each school and class. The second comprises two supplements, one of which reflects the number of students and the other the school's socio-economic profile. However, the latter amount remains low: only around 6% of the total. At the same time, additional financing from the municipalities and parents favours schools in more affluent areas and lessens the effect of national affirmative action policies, but only to a small degree (Blass et al., 2016). Despite some effort in the recent years, the schools in Arab streams remain comparatively underfunded (Blass and Shavit, 2017). Also schools in Haredi streams receive lower funding because some depends on teaching of secular subjects (see below).

The government should aim for equitable and effective resource allocation to prevent school failure. Therefore, the current 6% share of budget allocation to reflect schools' socio-economic profiles seems insufficient and should increase. In many other OECD countries the financing of schools with weaker socio-economic indices is much higher. For example, in Chile, a weighted voucher system was adopted to provide more resources for students from low socio-economic backgrounds. The value of vouchers is 50% higher for these students than others (Elacqua, 2012). Higher budget financing can be complemented with programmes that allow governments to address specific needs. These targeted programmes are widely and effectively used in some OECD countries and represent a significant share of the budget

Figure 1.6. **Education financing remains low, especially at secondary level**

Annual expenditure per student relative to per capita GDP, 2014



Source: OECD (2017), *Education Finance Indicators Database*.

StatLink http://dx.doi.org/10.1787/888933673332

(OECD, 2012a). For example, UK schools receive additional discretionary resources for every disadvantaged student they enrol. The additional resources for disadvantaged schools are meant to provide help for pupils such as additional teaching time or specialised learning materials. The government has recently launched several programmes in this respect (see Box 1.2 below). However, education systems such as Israel's with large differences between schools and a concentration of poorly performing schools should expand funding further to reduce these differences.

In Israel, class sizes in primary and secondary education remain large in international comparison. The average is 27 at primary level and 28 at the secondary level, compared to 21 and 24, respectively, in the average OECD country. More than a third of all classes have more than 32 students, and these overcrowded classes are much more pronounced in the Arab stream. The government intend to reduce the class size to a maximum of 32 pupils in primary and secondary schools.

Box 1.2. **Economic Development Plan for the Arab Sector – Education**

On 30 December 2015 the Government launched a five-year plan to close gaps for Israel's Arab society called "Economic Development Plan for the Arab Sector" (the "Plan"). It calls for allocations of NIS 15 billion over five years to simultaneously address multiple barriers to economic development, including education. The Ministry of Education has plans in five major areas:

1) Increasing teaching hours and enhancing academic achievements

Budgeted at around NIS 1 billion over the five years to give preference to more teaching hours to junior high schools in weaker communities around Israel. Specialised programmes include enhancing Hebrew proficiency for Arab children from kindergarten to high school.

2) Quality of teaching

Budgeted at around NIS 40 million for 2016 and NIS 315 million over five years. This includes improving teacher education by setting higher college acceptance criteria, enhancing academic skills development in the first year of study and special preparatory courses for future teachers of Bedouin in the Negev.

3) Informal education

Budgeted at NIS 130 million per year for a five year total of approximately NIS 650 million. It includes incentives for non-governmental organisations to work in the Arab community.

4) Access to higher education

The Plan includes targets for increasing participation of Arab students in higher education without specified budgets. It includes measures to support higher education institutions in becoming more accessible to and retentive of Arab students.

5) New classrooms in Arab localities

This programme area has not yet been developed in detail.

However, merely decreasing class size is insufficient to guarantee improvement in outcomes and should be complemented with measures to improve the quality of teaching. Empirical research suggests that reducing class size in itself does not improve student achievement (Sharif et al., 2016). Therefore, making classes smaller should not be at the expense of teaching quality or salaries. However, smaller classes can still facilitate the adoption of other teaching methods and help with individualised or small group instruction, particularly with disadvantaged underperforming students (Zyngier, 2014). Hence, shrinking class size in disadvantaged schools needs to be accompanied by better classroom practices (Bascia, 2008) and learning conditions (Hanushek, 2002) and measures prioritising teaching quality (see below).

Promoting high-quality teaching should be a priority

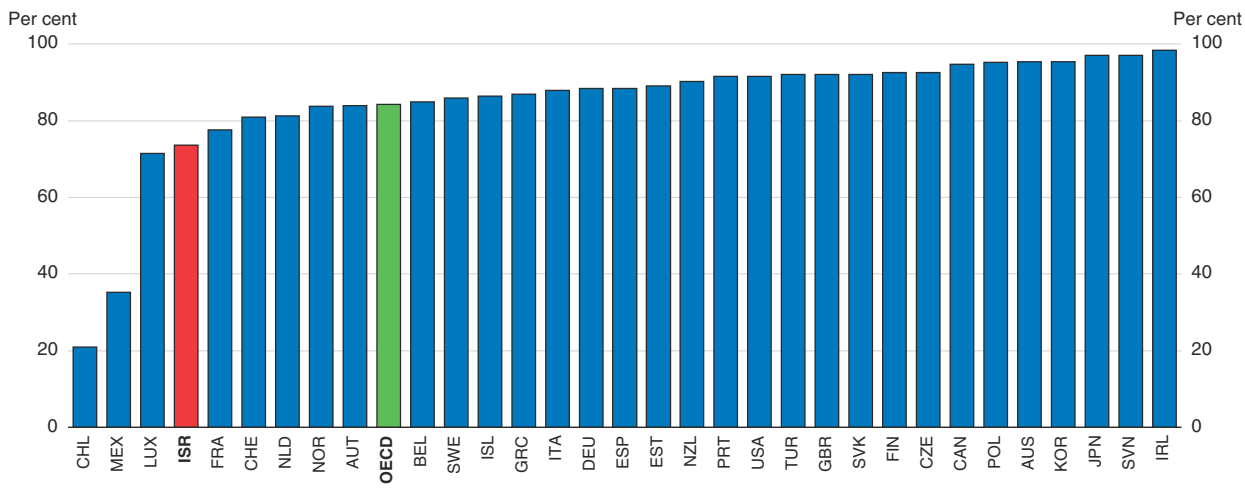
Highly qualified and motivated teachers have the largest effect on students' performance, strong enough to close the achievement gaps between advantaged and low performing students (Chetty et al., 2014; Schacter and Thum, 2004).

However, Israel's non-Haredi Jewish stream is increasingly lacking qualified teachers, and their shortage is already having a negative impact on teaching quality. The growing number of students automatically results in extra vacancies for teachers, which are difficult to fill, especially for those responsible for core curriculum subjects. Every year schools are

facing teacher shortages, and it is expected that 12 000 new teachers (almost 10% of the current level of teachers) will be needed by 2019 (CBS, 2014). As the schools are not able to fill vacant teachers' positions, they are forced to increase the workload of existing teachers or more worryingly to assign classes to teachers who lack formal qualifications in the corresponding subject. Indeed, school principals recently reported that approximately 40% of the recruited new teachers are unqualified and not trained to teach the subject for which they were hired (Donitsa-Schmidt and Zuzovsky, 2016). In Israel, only 70% of teachers are certified, which is one of the lowest in the OECD (Figure 1.7). Empirical research suggests that out-of-field teachers have a negative impact on the quality of education and can undermine students' ability to master the curriculum (Dee and Cohodes, 2008; McConney and Price, 2009). This is confirmed by analyses of the PISA results, which shows that the proportion of certified teachers is positively associated with student performance (OECD, 2016c).

Figure 1.7. **Shortages of teachers are prevalent in Israel**

Percentage of fully certified teachers teaching in schools, 2015



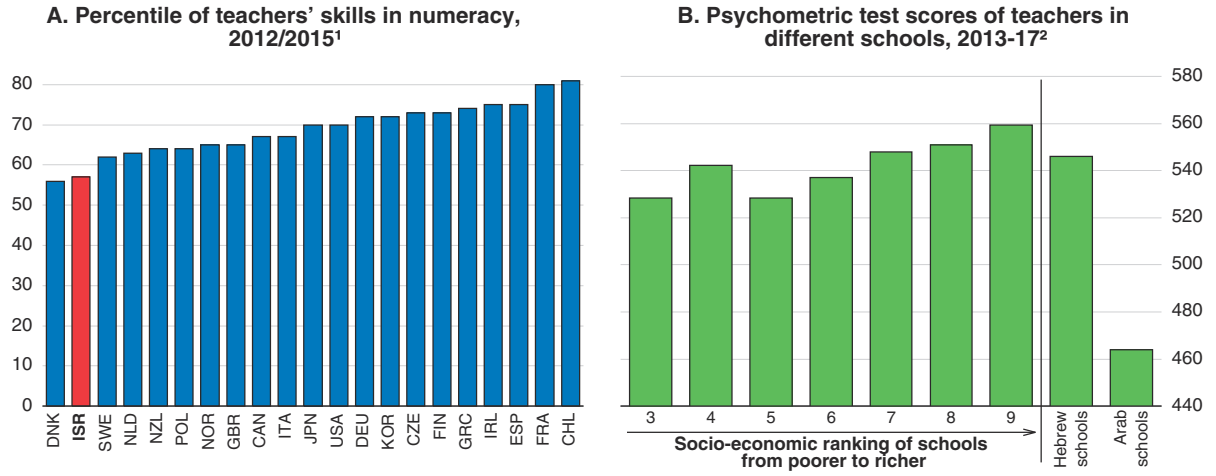
Source: OECD (2016), *PISA 2015 Results (Volume II): Policies and Practices for Successful Schools*, Figure II.6.9.

StatLink http://dx.doi.org/10.1787/888933673693

At the same time, current teachers' skills are much worse compared to other professions. Students applying for teacher education programmes have worse psychometric scores than other applicants, despite some improvements in recent years (Ritov and Kril, 2017). Overall skills of teachers are also worse compared to teachers in other OECD countries (Figure 1.8, Panel A). Moreover, teachers with better psychometric scores teach in more affluent schools (Panel B). Arab schools have teachers with weaker psychometric scores, but this reflects the overall weak performance of Israeli-Arabs in these tests.

One way to increase the attractiveness of a career in teaching is to continue with recent salary increases. Teachers' wages have already increased over the last decade by more than 30% in real terms and are now close to those of other tertiary educated workers (OECD, 2017a). This had led to an increase in their job satisfaction and a slight decrease in teacher attrition (Blass, 2016). However, this increase in salaries has affected young and other starting teachers less. The gap between young teachers and the senior teachers has been widening over time and is now one of the highest in the OECD (Figure 1.9). In order to attract more and better teachers, their salaries should continue to increase and be more linked to students' outcomes. One option would be a permanent individual bonus for teachers linked

Figure 1.8. **Quality of teachers is weak, particularly in disadvantaged schools**

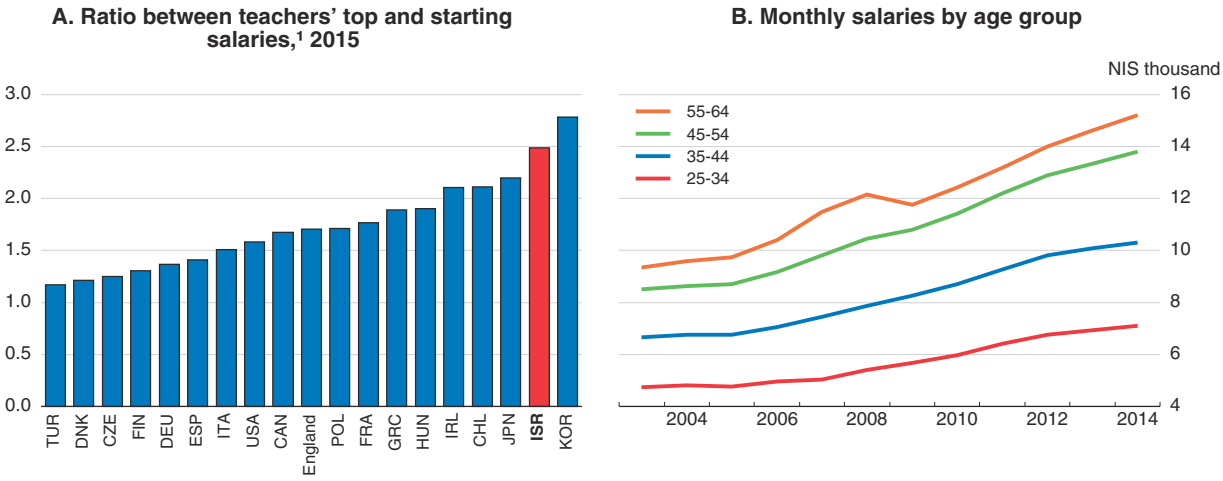


1. Score position of median cognitive skills of teachers in the cognitive skill distribution of all adults aged 25-65 excluding teachers, on PIAAC tests.
2. 2016 data for Arab and Hebrew schools.

Source: Hanushek, E., M. Piopiunik and S. Wiederhold (2014), "The Value of Smarter Teachers: International Evidence of Teacher Cognitive Skills and Student Performance", *NBER Working Paper series*, No. 20727, December 2014 (revised April 2017), Table 1; M. Ritov and Z. Kril (2017), "Teacher Skills", Ministry of Finance, *Chief Economist Department Working Paper*, *http://mof.gov.il/ChiefEcon/EconomyAndResearch/ArticlesSet/Article_08062017.pdf* (available only in Hebrew).

StatLink http://dx.doi.org/10.1787/888933673712

Figure 1.9. **Salaries are relatively low for young and starting teachers**



1. Calculated as a weighted average of the statutory salaries of primary teachers (weight of 0.5), lower-secondary teachers (0.2) and upper-secondary teachers (0.3).

Source: OECD (2017), *Education at a Glance 2017: OECD Indicators*, Table X2.4a; CBS, *Trends in Teacher Pay, 2003-14*.

StatLink http://dx.doi.org/10.1787/888933673731

to students' performance. Experimental evidence confirms that making Israeli teachers' pay a function of their performance has positive long-term outcomes (Lavy, 2015). A pilot programme led to improvement in the matriculation exams, a gradual increase in students' university attainment and better employment and earnings in the long run.

Generalised wage increases should be complemented by wage incentives targeted at teachers pursuing subjects where there are shortages and at those teaching in disadvantaged

and high-needs schools where effective teachers are particularly important. In many countries teachers are financially rewarded for teaching in disadvantaged schools. For example, Brazil increased teachers' salaries by 60% in real terms for those working in poorer areas, and in Estonia new teachers are offered an allowance for three years if they locate in rural areas (OECD, 2014). Financial incentives will be effective only when teachers have the capacity to succeed (OECD, 2012a). Therefore higher wages should be complemented with other incentives like smaller classes. For example, Korea offers multiple incentives to candidates working in high-needs schools, such as additional salary, smaller class sizes and additional credits towards future promotions.

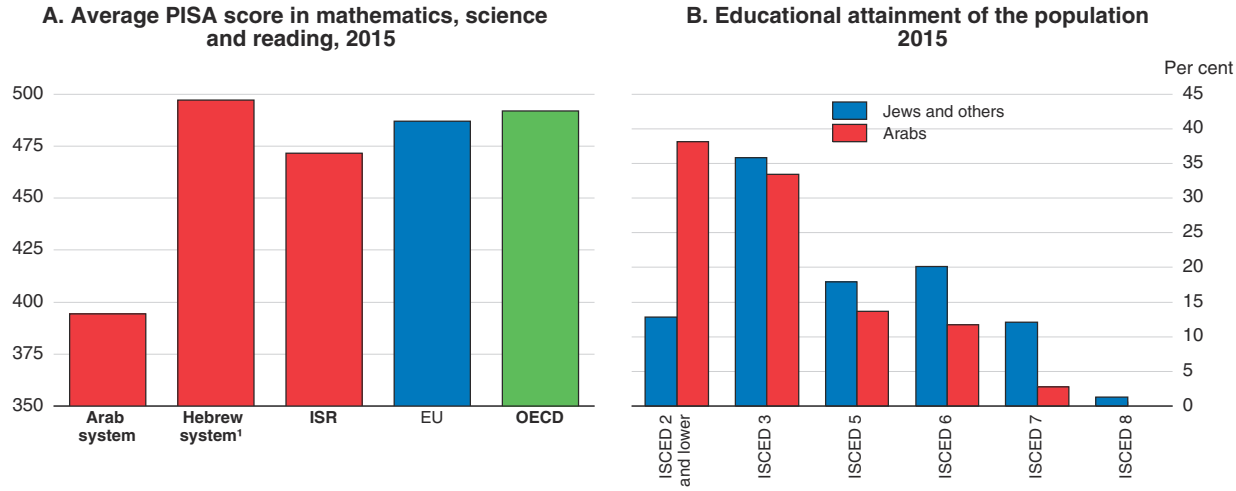
Financial incentives should be accompanied by measures improving the quality of teaching, particularly in disadvantaged areas. One way forward is to expand mentoring programmes, which can improve the effectiveness of teaching and increase the retention of novice teachers (Smith and Ingersoll, 2004). For example, in Switzerland all new teachers participate in collaborative practice groups led by trained, experienced teachers and have access to counselling, while in Finland, all teachers are trained in adapting their teaching to the varying learning needs and styles of their students (OECD, 2012a).

Building bridges between Israeli-Arab and Hebrew-speaking streams

Since student streaming and segregation can have a great impact on equity, there is a need to reduce the differences between Israeli-Arab and Jewish streams as much as possible. Public Arab schools enrol one-third of the students and serve the Muslim, Christian, Bedouin and Druze communities. While there is no legally instituted segregation and Arabs can attend Jewish schools and vice versa – the vast majority of Arabs attend Arabic schools and Jews attend Jewish schools. This is also related to the geographical dimension, as the Arab population is mostly concentrated in separated cities or neighbourhoods and children mostly attend schools near where they live. The language of instruction for the former is Arabic, and Hebrew is taught as a compulsory additional subject, while all teachers are Arabs. The curriculum, except for language, is nearly the same as that of Jewish schools. This separation of school systems leads to inefficient management and increased social segregation and indirectly to lower achievement for disadvantaged children (Wolff and Breit, 2012). There has been significant improvement in the achievements of Israeli-Arab students in recent years (Blass, 2017). However, the low level of students' educational attainment and weak technical and scientific skills of Israeli-Arabs compared to the rest of the population (Figure 1.10) harm their labour market outcomes. The performance difference in PISA score between Arab stream and Hebrew speaking stream is about 100 points, which corresponds to more than three years of schooling.

One of the negative features of the Arab stream is inefficient Hebrew-language teaching. Poor command of the Hebrew language prevents the Arab population from fully integrating into the Israeli job market and reduces their chances of completing tertiary education. The Arabs with a very good command of Hebrew have better chances on the labour market. Their employment rate is approximately 80%, while those who do not understand Hebrew have an employment rate of only 30% (Marom, 2015). Moreover, Arab secondary school graduates find it difficult to succeed in higher education, where the language of instruction is generally Hebrew. Surveys of sixth-grade students in the Arab community show that 93% of Arab students think knowledge of Hebrew will help them succeed in the labour market (Marom, 2015). Still, only 60% of Arabs have a good understanding of Hebrew.

Figure 1.10. **Arab students have worse PISA outcomes and lower educational attainment**[1]



1. Haredi boys did not participate in the PISA test, as they do not study the required material. Results are thus overestimated.
Source: OECD, *PISA Database*; Central Bureau of Statistics.

StatLink http://dx.doi.org/10.1787/888933673750

The government recognises the problem and is expanding the number of hours dedicated to Hebrew teaching in Arabic schools. Arab students in grades 3-9 now spend five hours a week on Hebrew lessons, up from four previously. Moreover, Hebrew language will now start to be taught in kindergarten, and some 120 Arab kindergartens will participate this year in a pilot programme that includes getting acquainted with Hebrew for two hours a week. The new Economic Development Plan for the Arab Sector includes programmes to enhance Hebrew in Arab schools (Box 1.2). These are steps in the right direction, but Hebrew studies should be further strengthened, and ensuring substantial teaching of practical Hebrew and teaching some core subjects in Hebrew should also be considered. A complementary approach would include expanding pre-school education to children between 0 and 3 (see above) and increasing their exposure to Hebrew. Many OECD countries expand early education services to help children build a strong foundation for life skills, especially for children from disadvantaged backgrounds (OECD, 2013). To this end, moving the responsibility for this sector to the Ministry of Education would be desirable.

In addition, the quality of teaching can be improved by increasing the small number of Jewish teachers teaching Hebrew in Arab schools, as at present Hebrew is mostly taught by Arab teachers in the Arab stream. Pilot programmes such as Cross-integrating teachers, which place Jewish teachers in Arab schools and Arab teachers in Jewish schools to teach their native language, have proved to be effective (Schneider, 2016). Further changes are required in language-teaching methods, as it remains focused on grammar and does not include everyday speech (Marom, 2015).

Another possible way to increase connectivity between Arab and Jewish schools may be to support bilingual schools. In Israel there are only five bilingual schools, which conduct lessons in both languages simultaneously by two teachers, one Jewish and one Arab. The schools are jointly run by Arab and Jewish principals. The demand for places at these schools is high. In general, many Arab parents prefer to send their children to mixed schools due to their higher quality and because it may help them better integrate in the Israeli labour market (Shwed et al., 2014). However, the number of places has not kept up with the growing demand

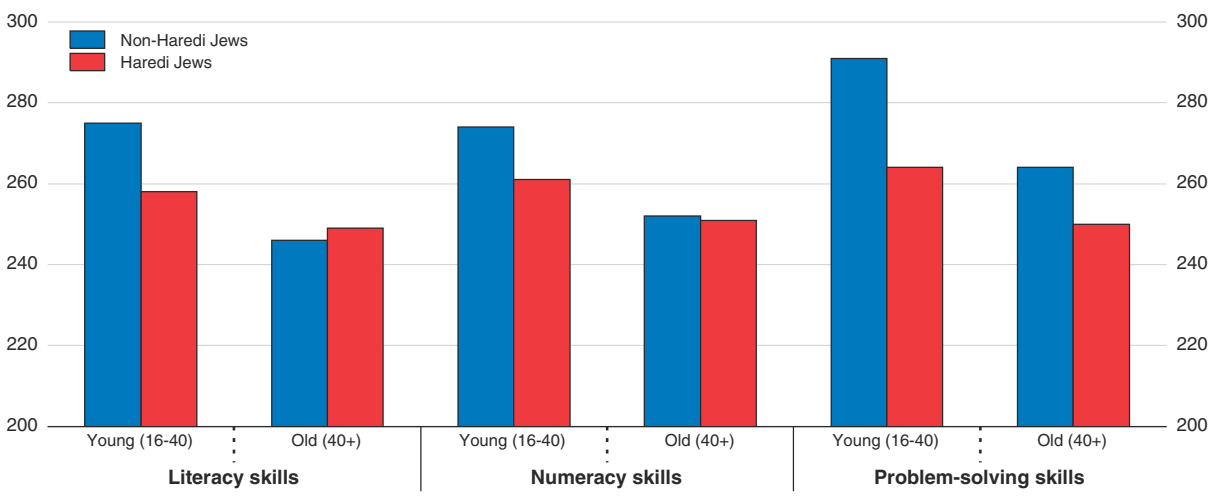
for bilingual schooling. One of the reasons is insufficient funding and the fact that such schools require bussing of children to schools. Bilingual schools require twice as much funding as regular schools due to the higher number of teachers. The government covers only the normal cost, and the bilingual schools are forced to get the additional funding through fees or private-sector sponsorship. Anecdotal evidence suggests that results in terms of performance and equity in these schools are strong. However, comprehensive and regular monitoring of their outcomes is lacking. The government should therefore analyse their educational and equity outcomes. Should they be positive, it should boost their funding.

Improving the Ultra-Orthodox stream

The Ultra-Orthodox Jewish community comprises about 11% of the total Israeli population. Their rejection of the modern secular culture combined with the paramount importance they attach to the study of the Torah is the reason for low labour force participation of Haredi men. However, Ultra-Orthodox communities outside Israel, for example in Canada, the United States or the United Kingdom, have comparable rates of labour participation to the rest of the population, suggesting that a different balance between work and worship is possible in Israel too. The average skills level of adult Haredis is similar to the rest of the population's, except for problem-solving skills. However, the younger generation of Haredi is doing much worse in terms of skills (Figure 1.11), because most Haredi men refuse to study secular subjects (see below). Therefore, significant social and economic differences are likely to prevail in the future, and their impact could even grow due to the foreseeable rise in the Haredi population share.

Figure 1.11. **Young Haredi adults' skills are weak**

PIAAC scores, 2015



Source: Bank of Israel (2016), "Basic Skills of Workers in Israel and Industrial Productivity", Research Department, based on *OECD Survey of Adult Skills (PIAAC) Database (2015)*.

StatLink http://dx.doi.org/10.1787/888933673769

Haredi education differs markedly from that in mainstream schools reflecting an explicit choice of studying religious rather than secular subjects. By entering the *yeshiva* (Talmudic academy) framework at age 13, boys usually continue full-time religious studies until their marriage so that they do not get any formal education in secular subjects beyond grade 8. As a result, they often lack basic skills, such as mathematics or English, which

hinders their future participation in tertiary education or the labour market. Most Haredi girls receive a secondary education with much more time dedicated to secular subjects and are better prepared for the final upper-secondary exams in all subjects. Altogether only a third of Haredi students complete formal upper-secondary education and take the matriculation exams. This is in stark contrast with the state-secular and state-religious streams, where more than 90% of the students complete upper-secondary education.

Public funding of Haredi education institutions is similar to mainstream schools. The Ministry of Education provides grants for teaching services and infrastructure. However, the funding allocation depends on teaching of secular subjects in different Haredi streams. The funding is organised as follows:

- Recognised schools that are affiliated with the main networks (Independent Education System and Ma'ayan Hahinuch Hatorani), which are expected to teach 100% of the core curriculum subjects, receive 100% of the per-pupil funding provided to state schools. About 57% of Haredi pupils study in such schools.
- Recognised but unofficial schools that are not part of those two networks are expected to teach 75% of the core curriculum subjects and receive 75% of the per-pupil funding provided to state schools. About 17% of Haredi pupils study there.
- Exempt schools are expected to teach 55% of the core curriculum subjects and receive 55% of the per-pupil funding provided to state schools. About 26% of Haredi pupils study there.

There is a lack of key statistical information on Ultra-Orthodox education, as Haredi students do not participate in standardised testing programmes, and other key information on outputs in education is scant. At the same time government enforcement of the subjects taught in Haredi schools is weak. Although the Ministry of Education increased the number of inspectors in the Haredi elementary educational institutions from 13 in 2010 to 70 in 2015, in practice, supervision of the implementation of the core curriculum remains largely ineffective. This is important as better supervision and higher compliance of teaching core curriculum subjects can bring large gains in terms of student outcomes for Haredi boys.

Teaching of core subjects in Haredi schools should be strengthened in order to improve the skills of the Haredi population. Most Haredi parents are in favour of more secular subjects in the curriculum. Surveys show that the majority find core subjects a necessary complement to Torah studies, with only one-third preferring that their children learn exclusively religious subjects (Gal, 2015). However, several attempts to increase the share of core subjects in the Haredi curriculum have failed. The latest attempt, which provided budgetary sanctions against Haredi schools that did not devote a certain minimum time for secular studies, was repealed by the new government in 2015 due to opposition by community leaders and insufficient numbers of Haredi teachers and textbooks for these subjects. The authorities should prepare the ground for a possible future situation where teaching core subjects in Haredi schools is politically accepted, provide additional funding for training Haredi teachers and developing core-subject textbooks for schools willing to teach secular subjects. Therefore, additional funding should be provided to schools that are willing to enhance secular studies in their curriculum. This means providing additional funding for training Haredi teachers and purchasing core subject textbooks. However, this additional funding should also impose more conditionality on commitments to teaching core skills. The conditions for state funding should be linked to a comprehensive system of monitoring and student testing in order to improve key statistical requirements for policy making.

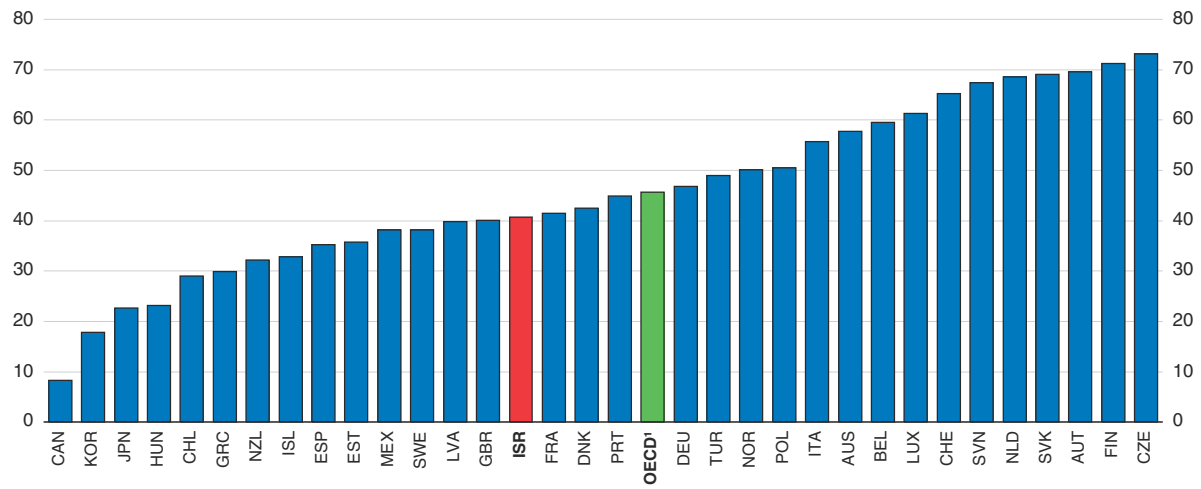
A complementary step would be to systematically subsidise the acquisition of formal knowledge by Haredi students after their religious studies. Several frameworks already operate in Israel to prepare for entrance to institutions of higher education for those students who otherwise lack the necessary academic qualifications. However, many families find it costly to take up courses to develop core skills after religious studies. Therefore, the government could introduce post-religious study courses leading to completion of formal upper-secondary education. These courses would have to be supervised by the Ministry of Education and should be free of charge.

Improving the VET system to help disadvantaged groups acquire skills for the labour market

There is slightly less vocational education and training in Israel than in other OECD countries. The majority of all students enrol in general academic upper-secondary education and the rest (40%) opt for technological programmes (Figure 1.12). Israeli vocational education consists of three different educational streams, in which the students are selected according to their abilities: i) engineering, considered as a higher technological track to prepare students for tertiary education in engineering or computer science; ii) the technological track to prepare students to be practical engineers or technicians; and iii) the vocational track, which is considered as a low technological track. While most of these students complete secondary education, only 66% obtain the *Bagrut* matriculation qualification, which are necessary for accessing tertiary education. The shares of students are almost equally distributed across the three vocational tracks.

Figure 1.12. **The share of students in VET is slightly below the OECD average**

Students in VET as a share of all students in upper-secondary education, 2015



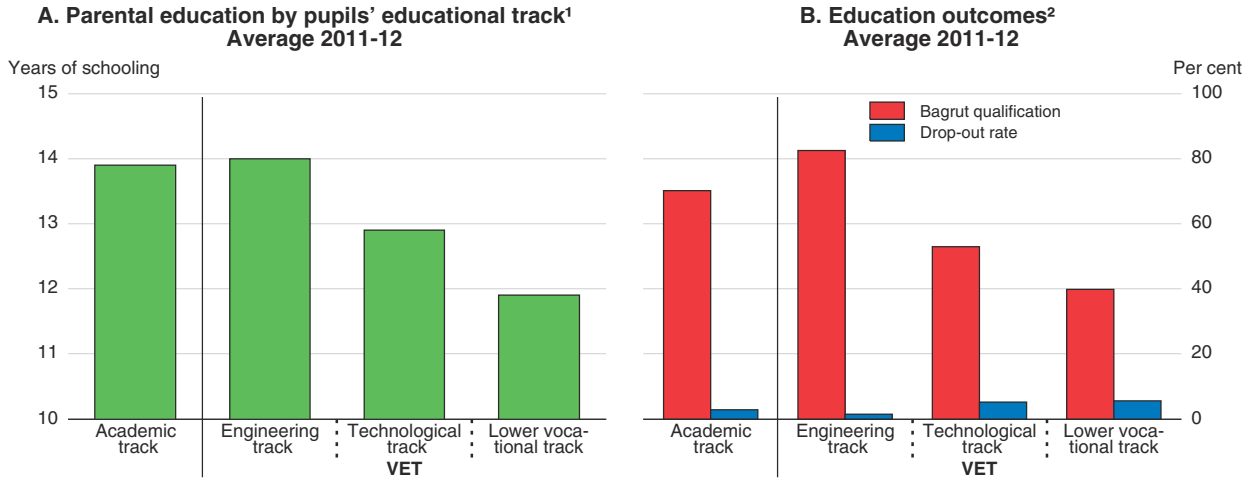
1. Average of countries with available data.

Source: OECD (2017), *Education at a Glance 2017: OECD Indicators*, Table C1.3.

StatLink http://dx.doi.org/10.1787/888933673788

The engineering track is very selective, and the best students often with the most educated parents usually opt for this track (Figure 1.13, Panel A). On the other hand, students with weak socio-economic backgrounds are mostly assigned to the lower vocational track. However, student selection and grouping can increase educational inequality, as less demanding tracks tend to provide less stimulating environments and weaker student

Figure 1.13. **Vocational tracks differ significantly**



1. Average number of years of schooling for parents of 10th-grade pupils with higher level of education.
2. Percentage of all pupils in that educational track.

Source: Blank, C., Y. Shavit and Y. Yaish (2015), "Tracking and Attainment in Israeli Secondary Education", *State of the Nation Report 2015*, Taub Center for Social Policy Studies.

StatLink http://dx.doi.org/10.1787/888933673807

outcomes (OECD, 2012a). Indeed, students in the lower track have much lower probabilities of qualifying for the *Bagrut* and higher dropout rates (Panel B), and these differences in educational outcomes remain substantial even after controlling for factors such as socio-economic background (Blank et al., 2015). Moreover, pursuing the lower VET track can worsen graduates' labour market outcomes compared to those following the academic track (Ministry of Finance, 2017a). The empirical research about the impact of the opening of new vocational schools in the 1990s did not find any positive long-term effect on the labour market outcomes of graduates (Demalach and Zussman, 2017).

Education reform should focus on eliminating the effects of streaming in order to reduce the education outcomes gap between the streams. All programmes should deliver benefits from both a learning and outcomes perspective. The two lower vocational tracks should merge in order to decrease number of streams. For example, in Austria the government merged the two lower-secondary education tracks and set out measures to improve the quality of education provided in the lower tracks (OECD, 2012a). At the same time, the share of students in the engineering stream should increase as the quality in this stream is much higher and the shortage of technicians on the labour market suggests that there is a need for qualified technically skilled graduates.

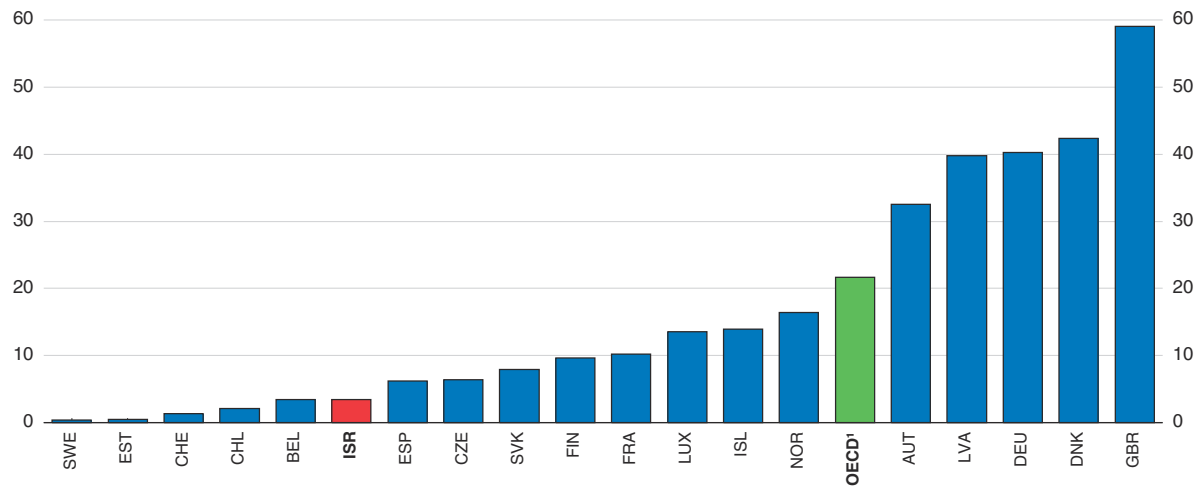
Nevertheless, the most important step should be to increase the quality of the two lower vocational tracks. Being in the lower track can fuel a vicious cycle in the expectations of teachers and students. Therefore, the government should ensure that all tracks give students a challenging curriculum and high-quality instruction with increased attention to basic numeracy and literacy skills (OECD, 2018). This can help not only to reduce achievement gaps between streams, but to facilitate changing tracks (OECD, 2012a; Burris et al., 2006). To improve classroom learning, schools and teachers should use diagnostic tools and assessments to monitor pupils' progress and ensure they are acquiring a good understanding and knowledge. High absenteeism and course failure are strong predictors of both student

disengagement and school failure, and they can be used to identify potential drop-outs early on (Kieffer et al., 2011) so as to provide them with targeted support.

Complaints about the low quality and lack of professional and technical skills of VET graduates have been regularly voiced by public and private companies (Musset et al., 2014). Particularly weak outcomes are found among students from the lower vocational track, which have much lower probabilities of qualifying for the *Bagrut* and higher dropout rates (Blank et al., 2015). One cause could be the low share of work-based learning in the VET system. Work-based learning strengthens the connection between schools and the labour market, as it provides real on-the-job experience and makes it easier to acquire practical skills with up-to-date equipment. In this regard substantial components of work-based learning can be beneficial (OECD, 2018), as it not only helps students to acquire practical skills, but also to develop key soft skills, such as work discipline, teamwork and problem-solving skills, which can be more effectively learnt in workplaces than in classrooms (OECD, 2010). However, only 4% of upper-secondary education students receive training with employers during their studies (Figure 1.14). This is much lower than in other OECD countries and contrasts with apprenticeship systems in countries such as Switzerland, Netherlands or Germany, where around half of all study takes place in the workplace.

Figure 1.14. **Participation in work-based vocational training is weak**

Students in combined school- and work-based programmes as a percentage of all students in upper-secondary education, 2015



1. Average of countries with available data.

Source: OECD (2017), *Education at a Glance 2017: OECD Indicators*, Table C1.3.

StatLink http://dx.doi.org/10.1787/888933673826

Work-based learning should be expanded in some vocational programmes and should be linked to expected learning outcomes. In Spain making workplace training mandatory in VET programmes has had a positive impact, as it improved the relationship between schools and companies and facilitated the transition of VET graduates to jobs (Homs, 2007). The work-based training may involve contractual arrangements defining the obligations of trainees and employers in order to achieve learning objectives, whose development should involve employers and schools. At the same time, quality standards should be established to avoid the allocation of students to tasks not involving any skills acquisition. For example, in Germany and Denmark there is strong quality control: firms need to meet quality standards to be licensed to take on apprentices, and the quality of training is regularly monitored.

The major challenge in this regard is to strengthen incentives for companies to introduce apprenticeships and work-based training. One of the reasons why companies may be interested in providing work-based training is to use it as an effective path to recruitment. However, in Israel this incentive among companies may be weaker, as students have to perform military service after secondary school of 3 years for men and 2 years for women, and are thus not immediately employable by firms after this training. Therefore, the government needs to strengthen other incentives for companies to engage them in work-based learning and apprenticeships and minimise the costs of their training provision. Many countries offer financial incentives in the form of direct subsidies, tax breaks, levies and in-kind arrangements to support initial vocational education and training.

A complementary option is to establish specific bodies that group and coordinate training activities. In Israel vocational training is subject to uncoordinated governance activities, which make it more difficult to engage employers and create long-term policies and planning (Pur and Littig, 2017). To encourage involvement of employers, a council for certified practical engineering and technicians was created, but a high level overarching body in the area of VET is currently missing. The VET system is fragmented, and responsibility is shared among the Ministries of Education and of Economy and, in part, the Israeli Defence Forces (IDF). Establishing a National VET Authority could help strengthen the co-operation between ministries, employers and IDF. Enhancing coordination can help some secondary school students in work-based training to continue with the similar training during the military service (see below), making the technological path more coherent. In addition, the VET Authority could also help companies handle the associated administrative tasks, match employers with students and ensure that training meets the required quality standards. For example, in Scotland and Australia publicly funded intermediary bodies manage apprenticeships on behalf of employers, handle administrative work and match candidates for apprenticeships with employers (Musset et al., 2014).

Military service also plays a role in developing vocational skills. Such service is compulsory at the age of 18 for three years for men and two years for women. It is not universal: Israeli-Arabs are exempt, and the Ultra-Orthodox stream is effectively exempt. Many of the recruits learn valuable skills, and almost one-fifth of soldiers often learn high-end technical skills, contributing to Israel's successful high-tech industry (Offenhauer, 2008; Musset et al., 2014). These skills learned in the military are certified upon completion. At the same time, the IDF operates a number of programmes targeted at integrating at-risk youth into the military and society. For example, the Centre for Promoting Special Populations provides professional training alongside a special labour market preparation programme. Empirical research confirms that these programmes have been successful in integrating youth (Rabinovich, 2009; ETF, 2015).

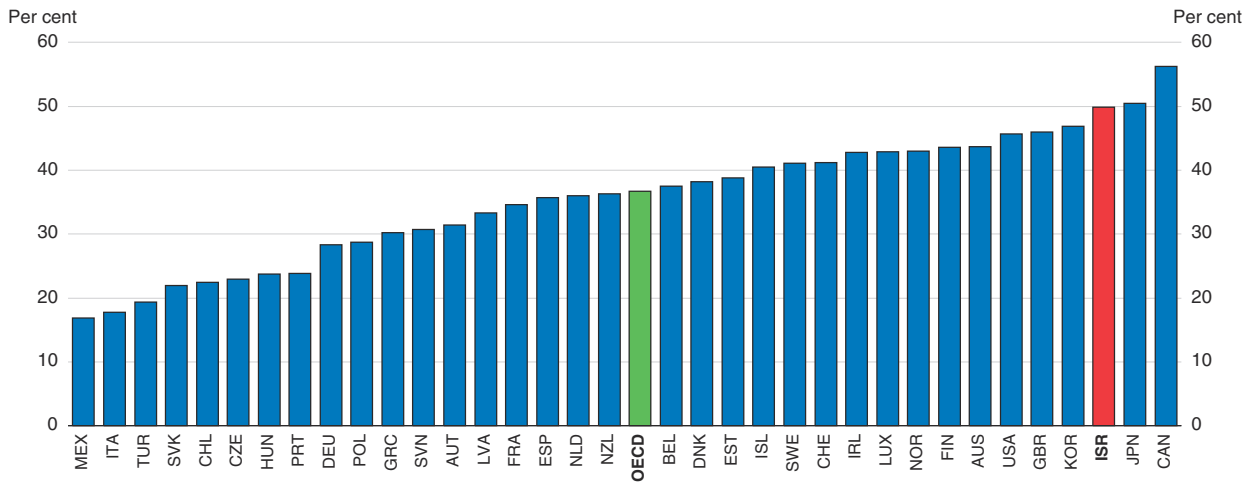
As Arabs and the Ultra-Orthodox are exempt from military service, they do not get skills that are sought in the labour market through the army or benefits from post-service grants. To promote inclusion the authorities should therefore consider alternatives in the form of voluntary national service, which would allow young people to work in schools, government offices, hospitals, geriatric services and with teens at risk, disadvantaged communities and many other non-profit organisations. This could provide participants with similar benefit entitlements as military service in the form of grants and expose participants to different aspects of Israeli society. Therefore, as was recommended in the 2016 *Survey*, the authorities should consider making this civilian service mandatory for those not doing military service. That would help to strengthen social cohesion and at the same time further improve their education and skills, as is the case for those serving in the army (OECD, 2016d).

Improving tertiary education to enhance social mobility

Tertiary education is essential to stimulate the take-up and improvement of technological innovations in an increasingly knowledge-driven global economy and also promotes social mobility. The tertiary education system in Israel is well developed, with impressive levels of academic achievements such as high citation rates, unsurpassed Nobel laureates per capita and large numbers of high-tech start-ups. The share of tertiary educated people in Israel is comparatively high as well (Figure 1.15). Unlike in some other OECD countries, high tertiary attainment is well established in the population, including among older cohorts, mostly due to the immigration of highly skilled people in recent decades. At the same time, intergenerational upward mobility is relatively high as the share of tertiary education graduates with non-tertiary educated parents is higher than in other OECD countries (OECD, 2017a).

Figure 1.15. **Share of tertiary graduates is high in Israel**

Percentage of 25-64 year-olds with tertiary education, 2016



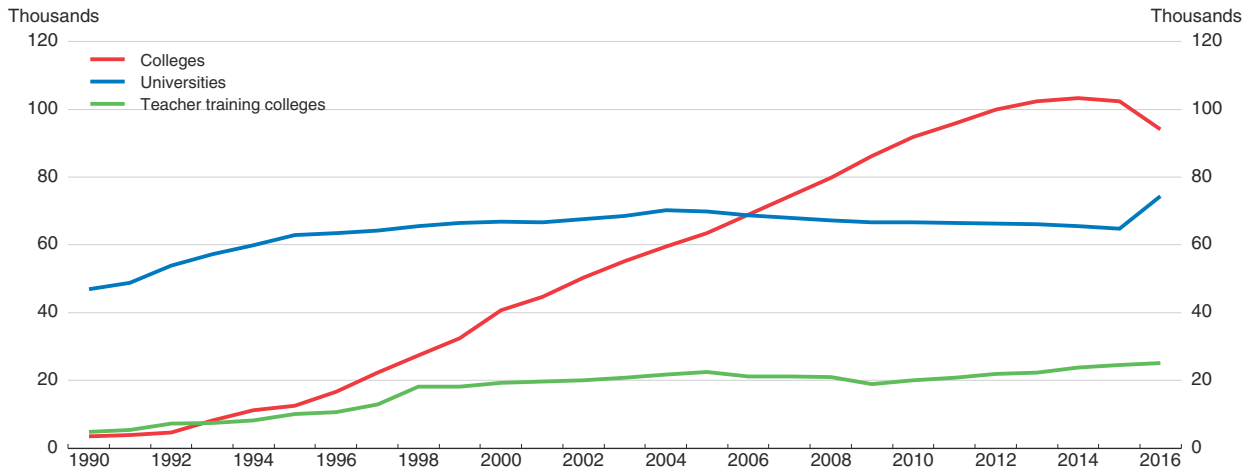
Source: OECD (2017), *Education at a Glance 2017: OECD Indicators*, Table A1.1.

StatLink http://dx.doi.org/10.1787/888933673845

In addition to migration as a source of highly educated people, tertiary enrolment has increased significantly. The share of 23-26 year-olds enrolled in tertiary education has almost doubled over the last two decades, and today every third young Israeli is predicted to complete tertiary studies. In 1993 the Council for Higher Education authorised the establishment of public and private colleges and entitled them to grant bachelor's and master's degrees. This contributed to rising student numbers in colleges, reaching half of all tertiary students (Figure 1.16). Despite the growing population, the number of students in universities has remained almost stable, though in 2015 one of the colleges received university status, causing the jump that appears that year in the chart.

Per-student funding has increased in the last decade, but remains close to the OECD average (Figure 1.17; Box 1.3). However, more funding will be needed to address the main challenges for tertiary education in Israel, which are: i) broadening the access to high-quality tertiary education; and ii) improving the matching of students' skills to changing labour market needs.

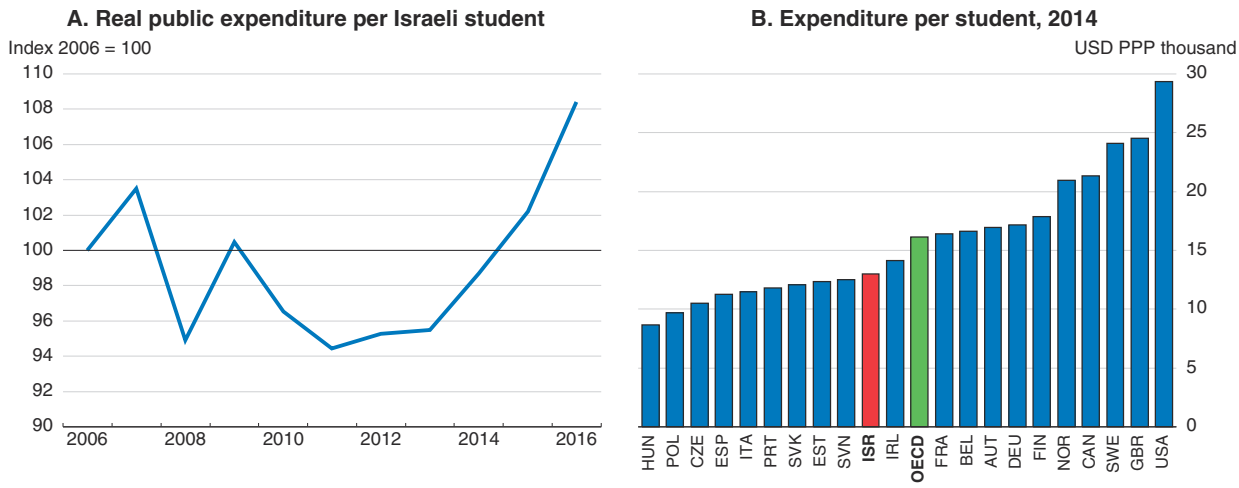
Figure 1.16. **Number of students enrolled in tertiary education**[1]



1. Ending schoolyear data.
Source: Central Bureau of Statistics.

StatLink http://dx.doi.org/10.1787/888933673864

Figure 1.17. **Annual expenditures per student in tertiary education**



Source: Central Bureau of Statistics; Open University, *Report of the President for 2016*; OECD (2017), *Education at a Glance 2017: OECD Indicators*, Table B1.1.

StatLink http://dx.doi.org/10.1787/888933673883

Box 1.3. **Funding of tertiary education in Israel**

The higher education system in Israel is regulated by the Council for Higher Education (CHE) and the Planning and Budgeting Committee (PBC). The CHE, the main regulator of higher education, provides accreditation of new degrees and programmes, approves the establishment of new institutions and licensing of branches of foreign institutions, and assesses the quality of existing programmes. It is composed of 25 members, among whom are the Chairman (the Minister of Education), the Chairman of the PBC and two representatives of the students' union. The PBC operates as a sub-committee of the CHE in charge of all matters relating to the budget for higher education. It prepares the regular

Box 1.3. **Funding of tertiary education in Israel** *(cont.)*

budget proposals for higher education at the national level, considering both academic, social and national needs. Budget proposals are negotiated with the Ministry of Finance.

Out of Israel's 63 academic institutions, 50 are state funded. These institutions include eight research universities, the Open University and 20 colleges that are financed through the PBC. Funding per student is at the OECD average and has increased moderately in the last three years.

Tertiary education funding is divided into three main categories:

i) Block grant allocations represent a major part of tertiary education financing (73% of the overall budget). They consist of teaching and research grants. Teaching grants are based on student numbers and costs of particular studies. Research grants are assigned only to research universities and are allocated on a competitive basis according to specific indicators (income from competitive research funds, income from other research funds, scientific publications, numbers of PhD or equivalent and of master's research-track degree students).

ii) Earmarked allocations represent 25% of the overall budget and promote specific activities in the higher education system such as the Maritime Biology Laboratory in Eilat or the National Library.

iii) Matching allocations represent only 2% of the budget. They encourage universities to obtain endowment funds from abroad.

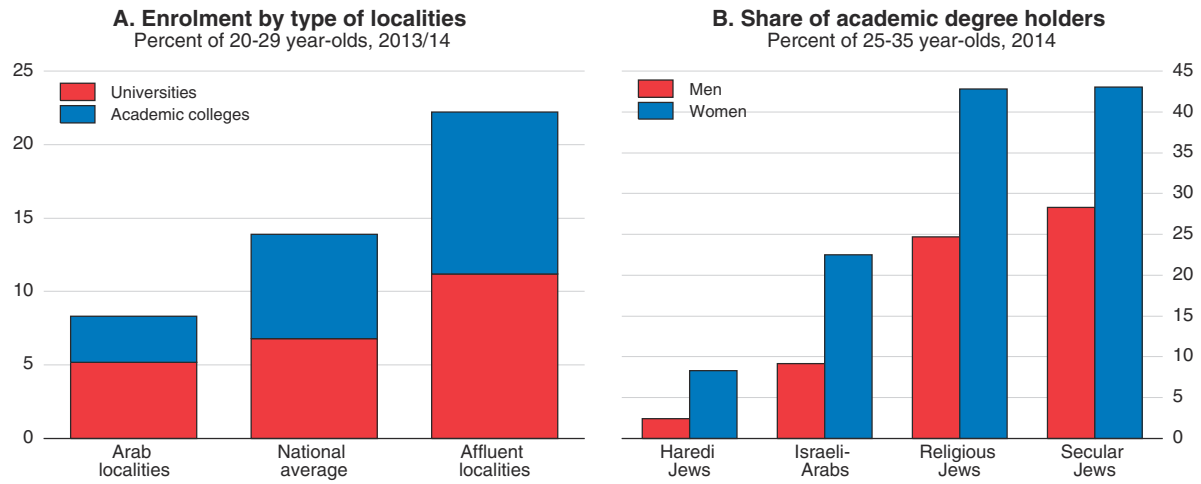
Widening access to the tertiary education

Broadening access to tertiary education is an important step in integrating different groups of population into the labour market. Empirical research confirms that increased educational attainment can narrow the gap in minority-majority job market success (Abu-Saad et al., 2007). In Israel, tertiary education plays an important role in improving social mobility. The chances of students from poorer families becoming richer improve considerably upon entering tertiary education (Ministry of Finance, 2017b). Israel has made significant progress in this regard over the last decade. The expansion of colleges has opened tertiary education to students from peripheral regions, from lower socio-economic status as well as from specific population groups, such as Ultra-Orthodox Jews, Ethiopian Jews and Israeli-Arabs. The enrolment rate of Arab students in the relevant age cohorts has increased significantly from 10% in 2000 to 15% in 2015. The number of Haredi students in tertiary education has tripled in the last five years, and the share of Haredi students enrolled in tertiary education has reached around 25%.

However, the differences between social and ethnic groups remain still large. The enrolment of young adults from affluent localities is twice as high as in Arab localities (Figure 1.18, Panel A) and four times higher than young adults from poorer socio-economic backgrounds (Knesset Research and Information Center, 2016). Despite improvement, the level of enrolment remains low and drop-out rates high among Arab and Haredi students. The share of young Haredim and Israeli-Arabs with a tertiary education degree is significantly lower than in the rest of the population (Panel B). This low share is mainly because of weaker secondary schools (see above), but there are still barriers at the tertiary level.

One of these barriers is psychometric testing, which is required for higher education entrance. In Israel most tertiary institutions select students according to the aggregate compilation of results from matriculation exams and this psychometric test. It is a

Figure 1.18. **Poorer students, Haredi and Israeli-Arab students are less likely to enrol in tertiary education**



Source: Swirski, S., E. Konor-Attias and R. Zelingher (2015), *Israel: A Social Report 2015*, Adva Center; E. Regev (2016), "The Challenges of Integrating Haredim into Academic Studies", in *State of the Nation Report 2016*, Taub Center for Social Policy Studies.

StatLink http://dx.doi.org/10.1787/888933673351

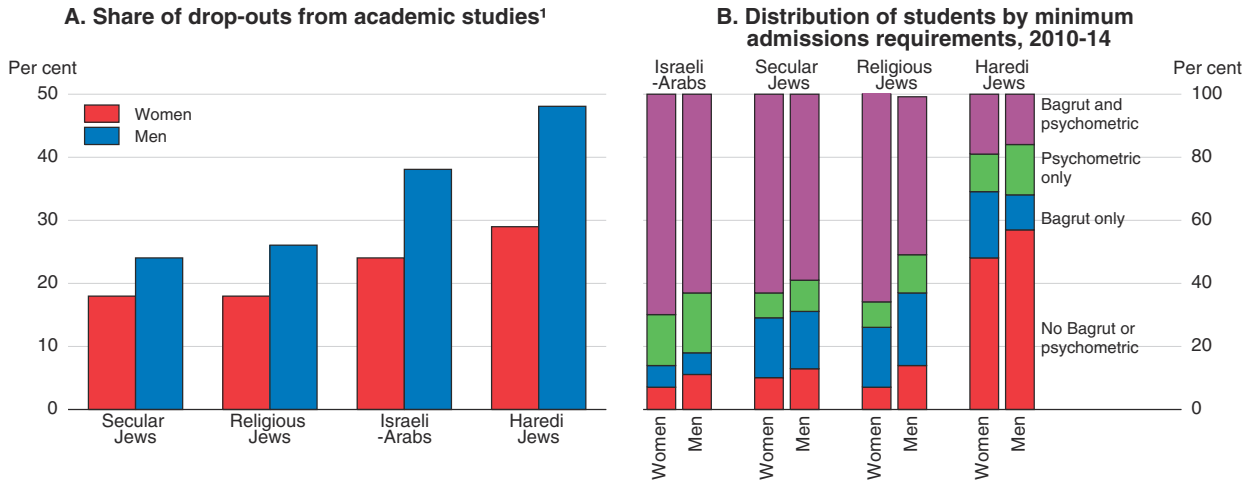
standardised national test to predict academic performance and covers three main areas: mathematics, verbal reasoning and English. The test may be taken in Hebrew or in Arabic. A high psychometric score can lead to higher education admission, especially to prestigious universities. However, empirical research argues that psychometric tests discriminate against students from minority or underprivileged socio-economic backgrounds (Arar et al., 2016; Abu-Saad, 2006). This is partially due to the linguistic barriers, which discriminate against Arab applicants since it is written in literary Arabic, which they do not know as well as Jewish students know Hebrew (CHE, 2013). Nearly half of all Arab students who passed their matriculation exams failed to win a place in higher education because they performed poorly in the psychometric test, compared to 20% of Jewish applicants. Thus, the psychometric test can be a factor of social selection, since preparatory courses are expensive and deter the students from socially disadvantaged backgrounds. Recently, the Council for Higher Education has been considering whether to base university entrance only on matriculation exams.

However, psychometric tests together with matriculation exams are important tools in predicting academic performance. Some private colleges have lenient admission requirements, particularly some Haredi campuses, where students can enrol in the tertiary programmes without matriculation and psychometric tests (Regev, 2016). Those students were, however, most likely to drop out: more than 60% of such students did not complete their studies. In the case of Ultra-Orthodox students, around half of them enter tertiary studies without matriculation or psychometric tests, which exacerbates their risk of dropping out (Figure 1.19; Regev, 2016). Therefore, easing the entry conditions with cancelation of psychometric tests does not necessarily improve education attainment among disadvantaged groups.

A more effective way to widen access to tertiary education and reduce the drop-out rate would be to expand preparatory courses for the disadvantaged groups. Such courses can help alleviate the weaknesses stemming from secondary school weaknesses. In Israel there is already a one-year pre-academic educational programme (*Mechina*) that prepares

high-school graduates for serving in the Israeli army or for studying at an institution of higher learning. The programme helps students complete or improve matriculation certificates and provides coaching for the psychometric entrance exam. However, these courses are less attended by the Arab community due to their high costs and less awareness. Fewer than 10% of Arab students attend pre-academic courses compared to almost a quarter of Jewish students. Grants to pre-academic studies for disadvantaged students should therefore be expanded in order to increase disadvantaged students' participation.

Figure 1.19. **Haredim and Israeli-Arabs are most likely to drop out from tertiary studies**



1. Students who began their academic studies before 2010 and ended them before 2014 without earning a degree.
Source: Regev. E. (2016), "The Challenges of Integrating Haredim into Academic Studies", in *State of the Nation Report 2015*, Taub Center for Social Policy Studies.

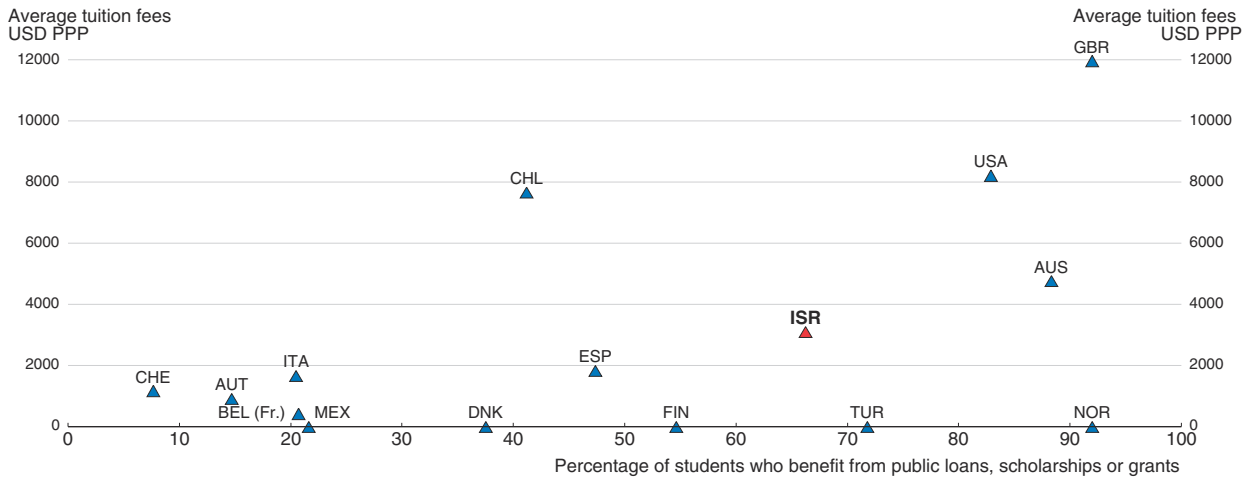
StatLink http://dx.doi.org/10.1787/888933673902

Several government programs try to address these challenges by providing financial assistance. In 2014 the Council for Higher Education launched a campaign to improve the inclusion of Arab students in tertiary education institutions by requiring to be provided with general academic orientation and guidance, personal support and a summer workshop to help them improve their Hebrew and study skills. Each institution must prepare a long-term plan to promote Arab students' integration by encouraging them to pursue advanced degrees and reducing dropouts.

The share of students benefitting from public loans, scholarships or grants broadly reflects the level of tuition fees (Figure 1.20). In terms of scholarships (38% vs 27%) and loans (17% vs 11%) support is more prevalent for the Arab population than among Jews (CBS, 2016). Yet, many public and private sources of funds require military and civil service, effectively ruling out Arabs, and more Israeli-Arabs rely on financial support from their families to finance their studies compared to the rest of the population (CBS, 2016). At the same time, most students from poorer families live on Israel's periphery and lack or have only inadequate public transportation, making travel long and expensive. At the same time, the rental market is not very developed, and renting is relatively costly (Chapter 2). This makes it difficult for students from poorer families to enter tertiary education. Therefore, a more robust loan scheme with income-contingent repayments could be envisaged. OECD research suggests that student financial-support systems that provide both loans with

Figure 1.20. **Tuition fees charged by public institutions and share of students with financial subsidies**

Full-time national students at bachelor's or equivalent level, 2015/16[1]



1. For more details, see note in *Source*.

Source: OECD (2017), *Education at a Glance 2017: OECD Indicators*, Tables B5.1 & B5.4.

StatLink http://dx.doi.org/10.1787/888933673921

income-contingent repayments and means-tested grants improve access to higher education and lead to better outcomes for weak students (OECD, 2012b). For example, Australia and New Zealand have used this approach to mitigate the impact of high tuition fees and to encourage disadvantaged students to enrol in higher education. Building dormitories for students where they are lacking (around 20 000 places are needed) would also help alleviate burdensome housing costs.

Another obstacle to tertiary access is a minimum age limit. Some tertiary institutions do not accept students under the age of 20, while most Jewish men and women complete military service and enrol at the later stage around the age of 21. However, this age requirement prevents Israeli-Arab and Ultra-Orthodox students from entering tertiary education studies just after high school and increases the probability that students will start families without entering higher education (Arar and Mustafa, 2011). Therefore, the minimum age rule should be lowered or eliminated. At the same time, most Haredi students are already parents, which makes it more difficult to finish their studies. Although, Israel already subsidises the cost of childcare if the parents are working or studying, the scholarships for students with children should expand to ease their access to tertiary education and to combine studies with their family responsibilities (Regev, 2016).

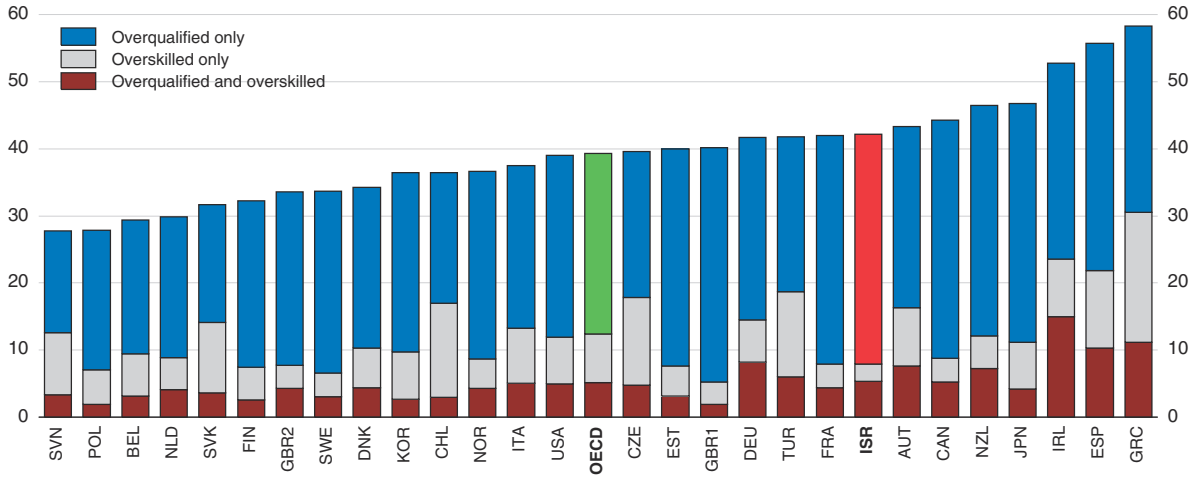
Improving the responsiveness of the tertiary education system to the labour market

As in other OECD countries the demand for highly skilled workers is increasing, but besides having to invest in *more* skills, it is equally important to invest in the *right* type of skills (OECD, 2017b). Tertiary education must therefore ensure that graduates develop the skills needed in the labour market to make the most out of their human capital investments. However, evidence suggests that many Israeli tertiary graduates are employed in jobs not matching their field of studies (Said, 2015) and lack basic skills compared to their counterparts in other OECD countries. One in three Israeli adults seems to be overqualified, and almost 40% of adults are employed in a different field from that in which they have

specialised (Figure 1.21; OECD, 2016g), although that is affected by the high rate of immigration in Israel. At the same time, Israel is witnessing severe labour shortages of science and engineering graduates (see above).

Figure 1.21. **Mismatched workers are higher in Israel**

Percentage of field-of-study mismatched workers by type, 2012 and 2015[1]



1. Chile, Greece, Israel, New Zealand, Slovenia and Turkey: Year of reference 2015. All other countries: Year of reference 2012. Data indicated as Belgium correspond to Flanders; GBR1 = England and GBR2 = Northern Ireland.

Source: OECD (2016), *Skills Matter: Further Results from the Survey of Adult Skills*, Table A3.5; *OECD Survey of Adult Skills (PIAAC) Database (2012 and 2015)*.

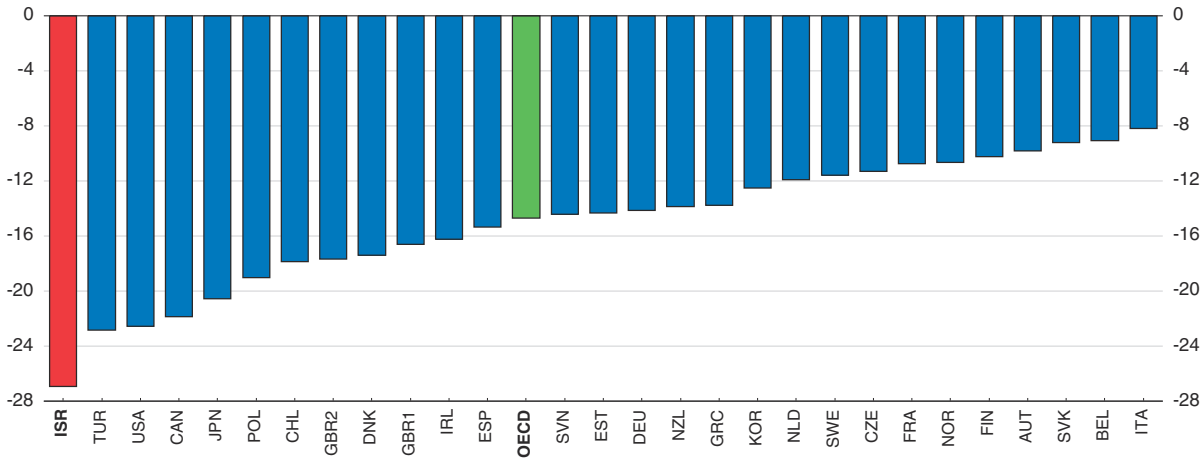
StatLink http://dx.doi.org/10.1787/888933673940

A mismatch between graduates' skills and the demands of their job has significant economic implications. At the firm level it increases the rate of turnover and can negatively affect productivity (Adalet McGowan and Andrews, 2015). At the individual level it affects job satisfaction and wages. Wage penalties for mismatched workers in Israel are the highest in the OECD. Overqualified workers in Israel earn about 27% less than well matched workers with the same qualification (Figure 1.22).

A poor choice of field of studies can lead to lower wages and thus contribute to income inequality. Students from less affluent backgrounds tend to choose fields where graduates report lower wages. For example, Arab tertiary students are over-represented in education (whose graduates earn 32% less than the average), social sciences, and professions that lead to self-employment opportunities. At the same time, they are under-represented in science and engineering whose graduates earn well above average levels. Also, women are under-represented in science and engineering, as only 20% to 30% decide to study in these fields. These wage differences between fields of studies in Israel are one of the highest in the OECD (OECD, 2016e). Empirical research confirms that choice of field explains about 20% of the variance in wages among tertiary graduates in Israel (Zeev et al., 2017), and part of the gender wage gap can be thus explained as well (Fuchs, 2016). Entering tertiary education on average improves poor students' chances to get to the richest decile by almost 25%. However, if these students decide to study computer sciences their chances to get to the richest decile increase to almost 70% (Ministry of Finance, 2017b). Despite high wage premia, the share of STEM (Science, Technology, Engineering and Mathematics) tertiary graduates is decreasing (Ministry of Finance, 2016). However, poor choice of study can also partly reflect other difficulties and barriers including transportation issues (Yashiv and Kasir, 2015). The government is

Figure 1.22. **Workers who are mismatched suffer a large wage penalty in Israel**

Percentage difference in wages between over-qualified workers and their well-matched counterparts[1]



1. Chile, Greece, Israel, New Zealand, Slovenia and Turkey: Year of reference 2015. All other countries: Year of reference 2012. Data indicated as Belgium correspond to Flanders; GBR1 = England and GBR2 = Northern Ireland.

Source: OECD (2016), *Skills Matter: Further Results from the Survey of Adult Skills*, Table A5.12; *OECD Survey of Adult Skills (PIAAC) Database (2012 and 2015)*.

StatLink http://dx.doi.org/10.1787/888933673959

rightly trying to increase the number of engineering graduates to meet labour market demands. To do so at the secondary level it is increasing the number of students completing high-level mathematics studies, and, at the tertiary level, it is planning to increase the number of college and university students with technology-oriented majors by 40% within five years (Israel Innovation Authority, 2017).

However, more needs to be done to better align student's choices with labour market demands. To affect students' field of study choice the authorities should make available high-quality data and analysis about graduate labour market outcomes. Providing individuals with information on market returns of various career paths would help them to better respond to labour market signals. Collecting and publishing information about skills needs is considered as good practice (OECD, 2016f). In 2013 the Ministry of Economy established a new Jobs Rated website that provides information on the current demand for various professions in different geographical areas (ETF, 2015). However, this website does not provide information about short- and long-term graduate labour market outcomes of graduates from various tertiary programmes. Therefore, it should be complemented with graduate tracking, including wage and job mismatch. For example, College Scorecard or Unistats are websites in the United States and United Kingdom, respectively, which provide information to potential students on the cost, graduation rate and average wage for each higher education institution (OECD, 2017b). The information not only helps students make informed choices, but it can also put pressure on tertiary institutions. In addition, occupational surveys among employers should be undertaken to provide information about skills needs in the labour market, as in Italy.

Students' choice of field of studies should be further shaped through career counselling. The current counselling system should be strengthened and scaled up. Public counselling centres have opened in Israeli-Arab towns, supplying information about academic institutions and fields of study to high school students, offering them pre-academic workshops and providing scholarship information. These are steps in the right direction, but they provide only customised guidance at the local level. A general system of

career guidance is lacking in Israel and needs to be integrated into higher and secondary education (OECD, 2015b). Secondary schools also need to work more closely with the public employment services and employers to provide relevant information about different career paths. For, example, careers guidance in Austrian and Canadian schools contains lessons provided by specialist guidance teachers, and individual advice is also given by student advisors. In the United Kingdom careers guidance to students is provided by external services or independent career development professionals.

Financial incentives such as scholarships and grants can also steer students into fields of studies where labour market shortages are prevalent. Many countries have scholarships for students to take up certain courses (OECD, 2017b), the vast majority of which focus on science, technology, engineering and mathematics. Israel has the Programme for Integrating Arab, Druze and Circassian Academics into the Hi-tech Industry. More such scholarships should be targeted at courses with high labour market demand and prevalent shortages and combined with extra support for poorer families or disadvantaged communities.

The measures affecting students' choices should be complemented with incentives for tertiary education institutions to offer courses that are more in line with labour market needs. However, the current tertiary funding system does not sufficiently reflect labour market needs (See Box 1.3). Several options are available. One would be to base some funding on institutions' graduate labour market outcomes. For example, in Estonia, 20% of funds are based on labour market outcomes, and in Korea the government provides special funding to universities with the best graduate employment rates, shares of teachers with industry experience and shares of students in internships and fieldwork (OECD, 2017b). Another approach is to provide one-off capital funding to support needed skills creation. In Italy technical institutes receive funds to promote collaboration with the regions in response to skills shortages.

Improving the effectiveness of life-long learning

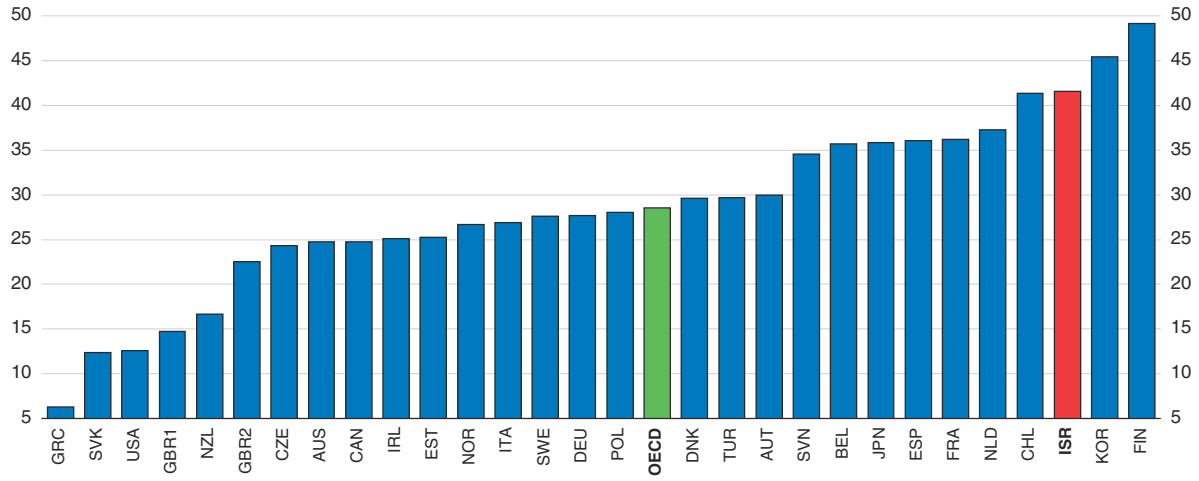
The skills levels of Israeli adults are significantly lower for older cohorts. This is in line with general evidence suggesting that cognitive abilities tend to peak in the mid-20s to early 30s and then decline gradually (OECD, 2016g; Paccagnella, 2016). However, the gap between younger and older adults in Israel is one of the highest in the OECD (Figure 1.23), and skills are particularly low for adults over 55 (OECD, 2016g). This means that many adults are not investing in their skills sufficiently as they age.

However, ongoing technological changes, digitalisation in particular, require workers to keep up with constantly evolving skills requirements. Older workers are exposed to a depreciation of their qualifications in the absence of continuing investment in education and training. They are already in a position of relative disadvantage compared to young adults due to the rapidly growing use of ICT. Age-related differences are more pronounced when it comes to problem-solving skills in the digital working environment (OECD, 2016g). Some 33% of Israeli adults (29% in the OECD) do not have sufficient skills to solve problems in a technology-rich environment, which harms their wages and job quality.

These findings suggest that much more needs to be done for adults to build on their initial education through high-quality adult training. Life-long learning can preserve worker skills and increase employability. Although Israeli workers' participation in life-long learning is close to the OECD average (OECD, 2016e), weak skills of the older population and large differences in skills between communities (see above) require strengthening policies that encourage skills upgrading and informal in-firm learning.

Figure 1.23. **Differences in skills between younger and older age cohorts are substantial**

Score point difference in literacy proficiency, 25-34 year-olds minus 55-65 year-olds[1]



1. Chile, Greece, Israel, New Zealand, Slovenia and Turkey: Year of reference 2015. All other countries: Year of reference 2012. Data indicated as Belgium correspond to Flanders; GBR1 = England and GBR2 = Northern Ireland.

Source: OECD (2016), *Skills Matter: Further Results from the Survey of Adult Skills*, Table A3.5; *OECD Survey of Adult Skills (PIAAC) Database (2012 and 2015)*.

StatLink http://dx.doi.org/10.1787/888933673978

Improving skills for the unemployed and inactive

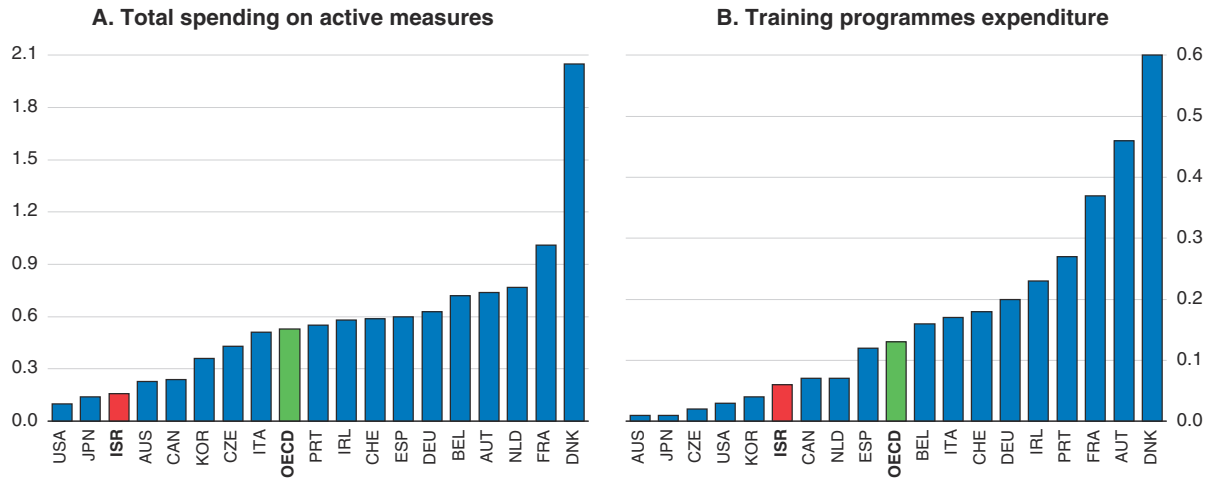
A particularly vulnerable group are the unemployed and discouraged workers. These groups can see their skills erode to the point of losing attachment with the labour market with negative effects on their well-being. While Israel's unemployment rate is low in international comparison, labour force participation for certain communities is weak, particularly for Arab women and Haredi men. Lifelong learning can be a significant tool to provide a second chance for those who did not get very far with their initial education.

In Israel training measures for unemployed and inactive adults are implemented by several institutions with priority given to disadvantaged groups. The Manpower Training and Development Bureau at the Ministry of Economy manages the training system for jobseekers. It provides vocational courses and encourages training participation through vouchers, which are available to around 1 500 recipients annually and enable jobseekers to approach a training institution of their choice and to receive partial funding for the selected course. In parallel, the Authority for the Economic Development of the Arab Sector within the Prime Minister's Office manages a programme targeted at the Israeli-Arab population. It also offers a voucher programme and direct employment subsidies (OECD, 2015b). In addition, 21 special Employment Orientation Centres providing one-stop services including vocational guidance, soft skills coaching, work placements, training and retraining services for Israeli-Arabs were opened in 2014.

However, overall public spending on training measures for the unemployed and inactive is low. Israel, in general, spends much less on active labour market programmes including training than other OECD countries (Figure 1.24). Experience from other OECD countries shows that well designed training can be one of the most efficient activation measures, by keeping skills up to date and improving labour market matching (Card et al., 2015). This is particularly important for Israel with its large share of people lacking skills in Hebrew, ICT and English. Therefore, government training support should be increased.

Figure 1.24. **Spending on ALMPs,[1] especially training programmes, is low**

As a percentage of GDP, 2015 or latest year available



1. Active labour market programmes.

Source: OECD, *Labour Market Programmes Database*.

StatLink http://dx.doi.org/10.1787/888933673199

However, such an increase should take place only after careful evaluation of existing programmes. While there are a plethora of local training provisions in Israel, the impact of many of them remains unclear due to a dearth of evaluations undertaken (OECD, 2015b). Because of the lack of monitoring, inefficient programmes may continue to operate. An agency should be set up to track and assess the net effect of programmes on employment and income of programme participants, for instance by matching benefit, tax and social insurance databases (OECD, 2012a) along the lines of the What Works Centre for Local Economic Growth established by the UK government to promote evidence-based policy-making and evaluation (OECD, 2015b).

Another important challenge for life-long learning in Israel is to place stronger emphasis on job quality. The primary focus of public intervention is on getting people into jobs, but limited attention is paid to overall job quality, the sustainability of the job placement and overall pay (OECD, 2015b). Only few public employment services offer basic skills and literacy training before placing the unemployed directly in jobs. However, in some cases, individuals need appropriate skills training to ensure that they can maintain employment over time.

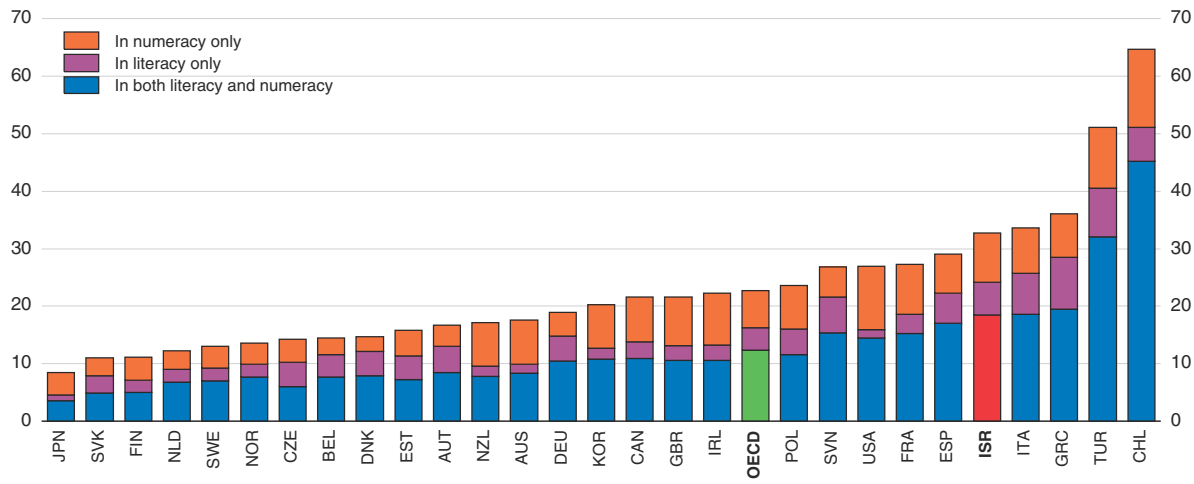
One way forward is greater use of profiling to determine the needs of the unemployed and provide training in high-demand fields so as to offer higher-quality job placement. For example, the US Work Advance programme offers formal training geared toward current job openings in specific sectors and results in industry-recognised certification. Applicants are screened before enrolment in the programme to ensure that participants can take advantage of the skills training in the sector. An evaluation of this programme showed higher earnings and more rewarding jobs for the participants (Hendra et al., 2016). In Italy profiling is used to determine the amount of training vouchers provided. Profiling the unemployed is also performed in many European countries, with individual action plans offering tailored programmes mixing training, counselling and mentoring to upskill the unemployed (EC, 2015).

Improving the skills of current workers

Another key challenge is to improve the skills of those who already work. Almost one-third of Israeli workers have low skill levels (Figure 1.25). Many adults are working in low paid jobs with low productivity and few chances to improve their skills. Moreover, it is mostly disadvantaged groups that are concentrated in these jobs, as many of them are working in occupations and industries situated at the bottom of the wage distribution (Yashiv and Kasir, 2015). The probability of individuals with little education moving into an industry with high productivity and better wages has decreased over time (Brand and Regev, 2015), meaning that the wage penalty for lower education has increased over time.

Figure 1.25. **There is a high share of workers with low levels of skills**

Proportion of low performers in literacy and/or numeracy[1]



1. Low-performers are defined as those who score at or below Level 1 in in either literacy or numeracy according to the Survey of Adult Skills. Chile, Greece, Israel, New Zealand, Slovenia and Turkey: Year of reference 2015. All other countries: Year of reference 2012. Data for Belgium refer only to Flanders and data for the United Kingdom refer to England and Northern Ireland.

Source: OECD (2017), *Skills Outlook 2017: Skills and Global Value Chains*, Figure 1.7; *OECD Survey of Adult Skills (PIAAC) Database (2012 and 2015)*.

StatLink *http://dx.doi.org/10.1787/888933673997*

Life-long learning can play an important role in fostering mobility across occupations and sectors, but Israel lacks strategic focus on the better utilisation of existing skills (OECD, 2015b). Despite several policies targeting the disadvantaged unemployed, there is little policy support for training the existing workforce, particularly in Arab-owned companies and enterprises (OECD, 2016h). Targeting training on poorly paid workers would help them to boost their chances of moving to higher-quality positions.

There are many programmes and schemes in OECD countries that incentivise work-based training for employees. One approach is to provide incentives in the form of subsidies or tax breaks for employers to provide training. This implies that the additional training is more likely to meet specific labour market needs, but it cannot target disadvantaged workers.

Therefore, a more viable approach in Israel's case would be to focus the support on individuals, allowing the targeting of disadvantaged groups who are less likely to receive training. Measures increasing training incentives for individuals exist in many OECD countries and are referred to as "retention and advancement" services (OECD, 2017b). In Germany workers without qualifications and those who have worked in positions unrelated to their initial training for at least four years may receive grants to be retrained in areas with

good labour market prospects. Israeli training voucher schemes should be expanded and their eligibility widened towards low skilled workers and disadvantaged groups in low paying jobs. In addition, support programmes for Israeli-Arab and Ultra-Orthodox entrepreneurs should be introduced (OECD, 2016h).

An important accompaniment to these measures targeted at individuals would be a personal account scheme allowing individuals to save up time for training purposes. Through such a mechanism individuals are credited with a certain amount of time per year worked, which they can use for training purposes. This can help overcome time constraints, which are one of the barriers to employees wishing to engage in training. For example, France has been using such accounts for a long time, so employees there can use training hours to acquire recognised qualifications or basic skills (OECD, 2017b).

Recommendations to improve the education and training system to boost productivity and equity

(Key recommendations included in the Executive Summary are in bold italics)

Reduce socio-economic effects on student outcomes

- ***Increase funding for disadvantaged schools.***
- Increase salaries of young teachers, those teaching subjects where there are labour market shortages and those who teach in disadvantaged schools.

Moderate the differences between individual educational streams

- ***Further expand Hebrew courses, especially teaching of "practical Hebrew", in the Arab stream. Expand childcare and education for children under 3, and put it under the responsibility of the Ministry of Education.***
- Analyse the educational and equity outcomes of bilingual schools and should they be positive, expand funding for bilingual schools.
- ***Make funding to the Haredi stream conditional on an increase in core subjects in the curriculum and strengthened monitoring and testing.***
- Expand post-religious courses leading to completion of formal upper-secondary education in Haredi streams.

Improve vocational education outcomes

- Merge and integrate the two lower streams in the vocational education system.
- ***Expand work-based learning in some vocational programmes.***
- Establish a National Vocational Education and Training Authority that would group and coordinate training activities.
- Make the civilian service mandatory for those who do not serve in the military.

Widen access to tertiary education

- Expand means-tested support for disadvantaged students, particularly for those with children.
- Provide financial incentives to the take-up of bridge courses for disadvantaged groups.

Link tertiary education more closely with labour market needs

- ***Introduce a graduate tracking system and publish high-quality data and analysis of graduate labour market outcomes.***
- Introduce a general system of careers guidance.

Recommendations to improve the education and training system to boost productivity and equity *(cont.)*

(Key recommendations included in the Executive Summary are in bold italics)

- Shift funding towards tertiary institutions whose graduates have better labour market outcomes.

Strengthen lifelong learning

- ***Evaluate systematically the effectiveness of existing active labour market policies, raising funding for effective programmes, above all for training.*** Extend the eligibility for training vouchers to workers, particularly to those in low paid jobs.
- Introduce a personal account mechanism for employees to accumulate the rights to training.

Bibliography

Abu-Saad, I. (2006), "State-controlled education and identity formation among the Palestinian Arab minority in Israel", *American Behavioural Scientist*, Vol. 49, No. 8, *http://journals.sagepub.com/doi/abs/10.1177/0002764205284720*.

Abu-Saad, K., T. Horowitz and I. Abu-Saad (2007), *Weaving Tradition and Modernity: Bedouin Arab Women in Higher Education*, Ben-Gurion University of the Negev Press.

Adalet McGowan, M. and D. Andrews (2015), "Skill Mismatch and Public Policy in OECD Countries", *OECD Economics Department Working Papers*, No. 1210, OECD Publishing, Paris, *http://dx.doi.org/10.1787/5js1pzw9lnwk-en*.

Arar, K. and M. Mustafa (2011), "Access to higher education for Palestinians in Israel", *Education, Business and Society: Contemporary Middle Eastern Issues*, Vol. 4, No. 3, pp. 207-28, *https://doi.org/10.1108/17537981111159975*.

Arar, K., K. Hajyehia and A. Badarneh (2016), "Barriers impending access to higher education: The effects of government education policy for disadvantage Palestinian Arab and Jewish Citizens" in *Widening Higher Education Participation: A Global Perspective*, Elsevier, pp. 81-98.

Bascia, N. (2008), *Ontario's Primary Class Size Reduction Initiative: Report on Early Implementation*, Canadian Education Association, Toronto.

Blank, C., Y. Shavit and M. Yaish (2015), "Tracking and attainment in Israeli secondary education", in *State of the Nation Report 2015*, Taub Center for Social Policy Studies in Israel, Jerusalem.

Blass, N., N. Zussman and S. Tsur (2016), "Municipal Involvement in the Funding of Weekly Teaching Hours in Primary School Education and Its Effect on Affirmative Action in Jewish State Education", Taub Center for Social Policy Studies in Israel, *http://taubcenter.org.il/wp-content/files_mf/engabstractlocalauthorities25.02.16ibupdated.pdf*.

Blass, N. (2016), "Developments in the education system in the last decade", in State of the Nation Report 2016, Taub Center for Social Policy Studies in Israel, Jerusalem.

Blass, N. (2017), "The Scholastic Achievements of Arab Israeli Pupils", Taub Center for Social Policy Studies in Israel, *http://taubcenter.org.il/the-scholastic-achievements-of-arab-israeli-pupils/*, *http://taubcenter.org.il/the-scholastic-achievements-of-arab-israeli-pupils/*.

Blass, N. and Y. Shavit (2017), "Israel's Education System in Recent Years: An Overview", Taub Center for Social Policy Studies in Israel, *http://taubcenter.org.il/wp-content/files_mf/educationinrecentyears67.pdf*.

BoI (2016), "Fiscal Survey and Selected Research Analyses", Bank of Israel, Research Department, Jerusalem, *www.boi.org.il/en/NewsAndPublications/RegularPublications/Research%20Department%20Publications/RecentEconomicDevelopments/red141e.pdf*.

Brand, G. and E. Regev (2015), "The Dual Labor Market: Trends in Productivity, Wages and Human Capital in the Economy, 2015", in *State of the Nation Report 2015*, Taub Center for Social Policy Studies in Israel, Jerusalem.

Burris, C., J. Heubert and H. Levin (2006), "Accelerating mathematics achievement using heterogeneous grouping", *American Educational Research Journal*, Vol. 43, No. 1, pp. 105-36.

Card, D., J. Kluve and J. Weber (2015), "What Works? A Meta Analysis of Recent Active Labour Market Program Evaluations", *NBER Working Papers*, No. 21431.

Central Bureau of Statistics (2014), *Statistical almanac for Israel*, No. 65, Jerusalem.

Central Bureau of Statistics (2016), "Financial Sources for Tuition and Living Expenses and the Types of Work of Students in their Second Year of First Degree Study – Findings from the Higher Education Survey 2014", Media release, 6 May, *www.cbs.gov.il/reader/newhodaot/hodaa_template.html?hodaa=201606166*.

Central Bureau of Statistics (2017), "Projections of Israel Population until 2065", Population projection statistics, *www.cbs.gov.il/reader/newhodaot/tables_template_eng.html?hodaa=201701138*.

Chetty, R., J. Friedman and J. Rockoff (2014), "Measuring the Impacts of Teachers I: Evaluating Bias in Teacher Value-Added Estimates", *American Economic Review*, Vol. 104, No. 9.

Dee, T. and S. Cohodes (2008), "Out-of-field teachers and student achievement: Evidence from matched-pairs comparisons", *Public Finance Review*, Vol. 36, No. 1, pp. 7-32.

Demalach, E. and N. Zussman (2017), "The Effect of Vocational Education on Short- and Long-Term Outcomes of Students: Evidence from the Arab Education System in Israel", *Discussion Paper Series* 2017.11, *www.boi.org.il/en/Research/DiscussionPapers1/dp201711e.pdf*.

Donitsa-Schmidt, S. and R. Zuzovsky (2016), "Quantitative and qualitative teacher shortage and the turnover phenomenon", *International Journal of Educational Research*, Vol. 77, No. 1, pp. 83-91.

Elacqua, G. (2012), "The impact of school choice and public policy on segregation: Evidence from Chile", *International Journal of Educational Development,* Vol. 32, No. 3, pp. 444-53, *https://doi.org/10.1016/j.ijedudev.2011.08.003*.

ETF (European Training Foundation) (2014), *Mapping Vocational Education and Training Governance in Israel,* European Training Foundation Working Paper, *www.etf.europa.eu/web.nsf/pages/GEMM_Mapping_VET_governance_Israel*.

ETF (2015), "Labour market and employment policy in Israel", The European Training Foundation, *www.etf.europa.eu/webatt.nsf/0/C42F878FF524B3C4C1257DEA00558C22/$file/Employment%20policies_Israel.pdf*.

European Commission (2015), *Cost-benefit analysis of remedial intervention for the long-term unemployed*, Directorate-General for Employment Social Affairs and Inclusion European Network of Public Employment Services, Brussels.

Fuchs, H. (2016), "Gender Gaps in the Labour Market: Wage and Occupational Segregation", in *State of the Nation Report 2015*, Taub Center for Social Policy Studies in Israel, Jerusalem.

Gal, R. (2015), "How to bring Haredim to science and technology?", Samuel Neaman Institute for National Policy Research, June, (in Hebrew) *www.neaman.org.il/Neaman2011/Templates/ShowPage.asp?DBID=1&LNGID=1&TMID=581&FID=646&IID=10800*.

Hanushek, E. (2002), "Evidence, politics, and the class size debate", in L. Mishel and R. Rothstein (eds.), *The Class Size Debate, Economic Policy Institute*, Washington, DC, pp. 37-65.

Hanushek, E., G. Schwerdt, L. Woessmann and L. Zhang (2015) "General education, vocational education, and labor-market outcomes over the lifecycle", *Journal of Human Resources*, Vol. 52, No. 1.

Hendra, R., D. Greenberg, G. Hamilton, A. Oppenheim, A. Pennington, K. Schaberg and B. Tessler (2016), "Encouraging Evidence on a Sector-focused Advancement Strategy: Two-year Impacts from the WorkAdvance Demonstration", MDRC, New York, *www.mdrc.org/publication/encouraging-evidence-sector-focused-advancement-strategy*.

Homs, O. (2007), "La Formación Profesional en España, Hacia la Sociedad del Conocimiento", Colección Estudios Sociales, Vol. 25, Obra Social, Fundación Caixa, *www.nber.org/papers/w21431*.

Israel Innovation Authority (2017), "Israel Innovation Authority Report – 2017", October, Jerusalem, *http://economy.gov.il/English/NewsRoom/PressReleases/Documents/2017IsraelInnovationAuthorityReport.pdf*.

Kieffer, M., W. Marinell and N. Stephenson (2011), "The Middle Grades Student Transitions Study: Navigating the Middle and Preparing Students for High School Graduation", *Working Brief*, New York University, New York.

Knesset Research and Information Center (2016), "Poor students less likely to study in higher education", Jerusalem, *https://knesset.gov.il/mmm/eng/MMM_about_eng.htm*.

Lavy, V. (2015), "Teachers' pay for performance in the long-run: Effects on students' educational and labour market outcomes in adulthood", *NBER Working* Papers, No. 20983.

Manpower Group (2017), "2016-2017 Talent Shortage Survey", Manpower Group, Milwaukee, *www.manpowergroup.com/talent-shortage-explorer/#.WTVKmE2we70*.

Marom, S. (2015), "The Importance of Learning Hebrew for Integrating and Promoting the Arab Population in the Israeli Job Market", *Adult Education in Israel*, Vol. 14.

McConney, A. and A. Price (2009), "Teaching out-of-field in Western Australia", *Australian Journal of Teacher Education*, Vol. 34, No. 6, *http://dx.doi.org/10.14221/ajte.2009v34n6.6*.

Ministry of Economy (2016), "Israel innovation authority report", Ministry of Economy, Jerusalem, *http://innovationisrael-en.mag.calltext.co.il/?article=0*.

Ministry of Finance (2016), "Development in high tech sector in Israel", Ministry of Finance, Jerusalem, *www.mof.gov.il/chiefecon/economyandresearch/doclib/skiracalcalit_140216.pdf*.

Ministry of Finance (2017a), Weekly Economic Review, 19 November, (in Hebrew) *http://mof.gov.il/chiefecon/economyandresearch/doclib/skiracalcalit_20171119.pdf*.

Ministry of Finance (2017b), The Chief Economist Weekly Review, 16/7/2017, *http://mof.gov.il/chiefecon/economyandresearch/doclib/skiracalcalit_20170717.pdf*.

Musset, P., M. Kuczera and S. Field (2014), *A Skills Beyond School Review of Israel*, OECD Reviews of Vocational Education and Training, OECD Publishing, *http://dx.doi.org/10.1787/9789264210769-en*.

National Insurance Institute Israel (2016), "Poverty and Social Gaps Report – Poverty and Social Gaps in 2014", Jerusalem, *www.btl.gov.il/English%20Homepage/Publications/Poverty_Report/Documents/oni2014-e.pdf*.

OECD (2010), *Learning for Jobs*. Reviews of Vocational Education and Training, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264221840-en*.

OECD (2012a), *Equity and Quality in Education: Supporting Disadvantaged Students and Schools*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264130852-en*.

OECD (2012b), "How Are Countries Around the World Supporting Students in Higher Education?", *Education Indicators in Focus*, No. 2, OECD Publishing, Paris, *http://dx.doi.org/10.1787/5k9fd0kd59f4-en*.

OECD (2013), "How Do Early Childhood Education and Care (ECEC) Policies, Systems and Quality Vary Across OECD Countries?", *Education Indicators in Focus*, No. 11, OECD Publishing, Paris, *http://dx.doi.org/10.1787/5k49czkz4bq2-en*.

OECD (2014), "How Much Are Teachers Paid and How Much Does it Matter?", *Education Indicators in Focus*, No. 21, OECD Publishing, Paris, *http://dx.doi.org/10.1787/5jz6wn8xjvvh-en*.

OECD (2015a), *OECD Employment Outlook 2015*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/empl_outlook-2015-en*.

OECD (2015b), *Employment and Skills Strategies in Israel*, OECD Reviews on Local Job Creation, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264232969-en*.

OECD (2016a), *PISA 2015 Results (Volume I): Excellence and Equity in Education*, PISA, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264266490-en*.

OECD (2016b), *Education Policy Outlook – Israel*, OECD Publishing, Paris, *www.oecd.org/israel/Education-Policy-Outlook-Country-Profile-Israel.pdf*.

OECD (2016c), *PISA 2015 Results (Volume II): Policies and Practices for Successful Schools*, PISA, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264267510-en*.

OECD (2016d), *OECD Economic Surveys: Israel 2016*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/eco_surveys-isr-2016-en*.

OECD (2016e), *Education at a Glance 2016: OECD Indicators*, OECD Publishing, Paris, *http://dx.doi.org/10.187/eag-2016-en*.

OECD (2016f), *Getting Skills Right: Assessing and Anticipating Changing Skill Needs*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264252073-en*.

OECD (2016g), *Skills Matter: Further Results from the Survey of Adult Skills*, OECD Skills Studies, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264258051-en*.

OECD (2016h), *SME and Entrepreneurship Policy in Israel 2016*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264262324-en*.

OECD (2017a), *Education at a Glance 2017: OECD Indicators*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/eag-2017-en*.

OECD (2017b), "Financial Incentives for Steering Education and Training", *Getting Skills Right*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264272415-en*.

OECD (2018), "Apprenticeship in Israel", OECD Reviews of Vocational Education and Training, forthcoming.

Offenhauer, P. (2008), *Israel's Technology Sector*, Report Prepared by the Federal Research Division, Library of Congress under an Interagency Agreement with the Director of Defense Research and Engineering, Office of the Secretary of Defense, Federal Research Division, Library of Congress.

Paccagnella, M. (2016), "Age, Ageing and Skills: Results from the Survey of Adult Skills", *OECD Education Working Papers*, No. 132, OECD Publishing, Paris, *http://dx.doi.org/10.1787/5jm0q1n38lvc-en*.

Pur, S. and P. Littig (2017), "Promoting Research and Innovation in Vocational Education and Training (VET) in Israel", Germany Israeli program, Jerusalem, *www.nabibb.de/fileadmin/user_upload/nabibb.de/Dokumente/06_Metanavigation/01_Ueber_uns/05_Deutsch-Israelisches_Programm/VET_report_15.01.2017_FINAL.pdf*.

Rabinovich, M. (2009), *Army Service of Youth at Risk*, The Knesset Research Department, Jerusalem, *www.knesset.gov.il/mmm/data/pdf/m02395.pdf*.

Regev, E. (2016), "The challenges of integrating Haredim into academic studies", in *State of the Nation Report 2015*, Taub Center for Social Policy Studies in Israel, Jerusalem.

Ritov, M. and Z. Kril (2017), "Teacher Skills", Ministry of Finance, *Chief Economist Department working paper*, *http://mof.gov.il/ChiefEcon/EconomyAndResearch/ArticlesSet/Article_08062017.pdf*.

Said, I. (2015), "A Work-Plan to Redirect Unemployed Members of the Arab Community with Higher Education to High-Tech Employment", Bank of Israel, April.

Schacter, J. and Y.M. Thum (2004), "Paying for high- and low-quality teaching", *Economics of Education Review,* Vol. 23, No. 4, pp. 411-30.

Schneider, A. (2016), "Shared Life Education in Israel's Public Education System", Inter Agency Task Force, *www.iataskforce.org/sites/default/files/resource/resource-1426.pdf*.

Sharif, R., Y. Shavit and C. Blank (2016), "Is less really more? On the relationship between class size and educational achievement in Israel", in *State of the Nation Report 2016*, Taub Center for Social Policy Studies in Israel, Jerusalem.

Shwed, U., Y. Shavit, M. Dellashi and M. Ofek (2014), "Integration of Arab Israelis and Jews in Schools in Israel", *Policy Paper*, No. 2014.12, Taub Center for Social Policy Studies in Israel, Jerusalem.

Smith, T. and R. Ingersoll (2004), "What are the effects of induction and mentoring on beginning teacher turnover?", *American Educational Research Journal*, Vol. 41, No. 3, pp. 681-714.

TIMMS (2016), *TIMSS 2015 International Results in Mathematics, http://timss2015.org/timss-2015/mathematics/student-achievement/*.

Wolff, L. and E. Breit (2012), "Education in Israel: The Challenges Ahead", Institute for Israeli Studies, *Research Paper*, No. 8, Washington, DC.

Yashiv, E. and N. Kasir (2015), "The labour market of Israeli Arabs: Key features and policy solutions", *Policy Insights*, No. 7, Centre for Economic Policy Research.

Zeev, K., A. Geva and Z. Aloni (2017), "Not all degrees are equal – Examination of the premium in wages from the acquisition of higher education, as a function of the field of study", Ministry of Finance, Chief Economist Department's analysis, *http://mof.gov.il/ChiefEcon/EconomyAndResearch/ArticlesSet/Article_27122016.pdf*.

Zyngier, D. (2014), "Class size and academic results, with a focus on children from culturally, linguistically and economically disenfranchised communities", *Evidence Base*, Vol. 1, pp. 1-23.

© OECD 2018

Chapter 2

Improving infrastructure to boost productivity and well-being

Suitable and well-functioning infrastructure is a key requirement for growth and well-being. The benefits to activity of efficient spending in energy, water, transport, communication and social sectors go well beyond their contributions to capital accumulation. Good infrastructure facilitates trade, bolsters market integration and competition, fosters the dissemination of ideas and innovations and enhances access to resources and public services. These benefits are particularly important for Israel because of its high population density and relative remoteness from other markets. Nevertheless, Israel has an important infrastructure deficit. To ease these shortages the authorities have put bolstering infrastructure at the top of their economic policy agenda. This entails greater expenditure in this area, but also structural reforms to optimise public and private investment choices and the use of existing facilities with better regulation. This chapter reviews the state of Israel's infrastructure and the government's related action programme.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

The capacity and quality of current infrastructure need to be enhanced

Adequate infrastructure capacity and its efficient operation both matter to the economic performance and well-being of the population. A reliable, low-cost supply of water and energy, good transport and telecommunication networks, and appropriate social infrastructure all improve the quality of life of households. Good infrastructure helps people enter the labour market and also strengthens business competitiveness, trade, competition and the dissemination of ideas and innovations, which in turn stimulate private investment, productivity and wages. Infrastructure therefore generates benefits that go far beyond its direct contribution to the accumulation of capital in the economy. But infrastructure development often calls for heavy investment, and its positive externalities are not always recognised by markets. Governments must therefore either create the conditions for its deployment by the private sector or build it themselves.

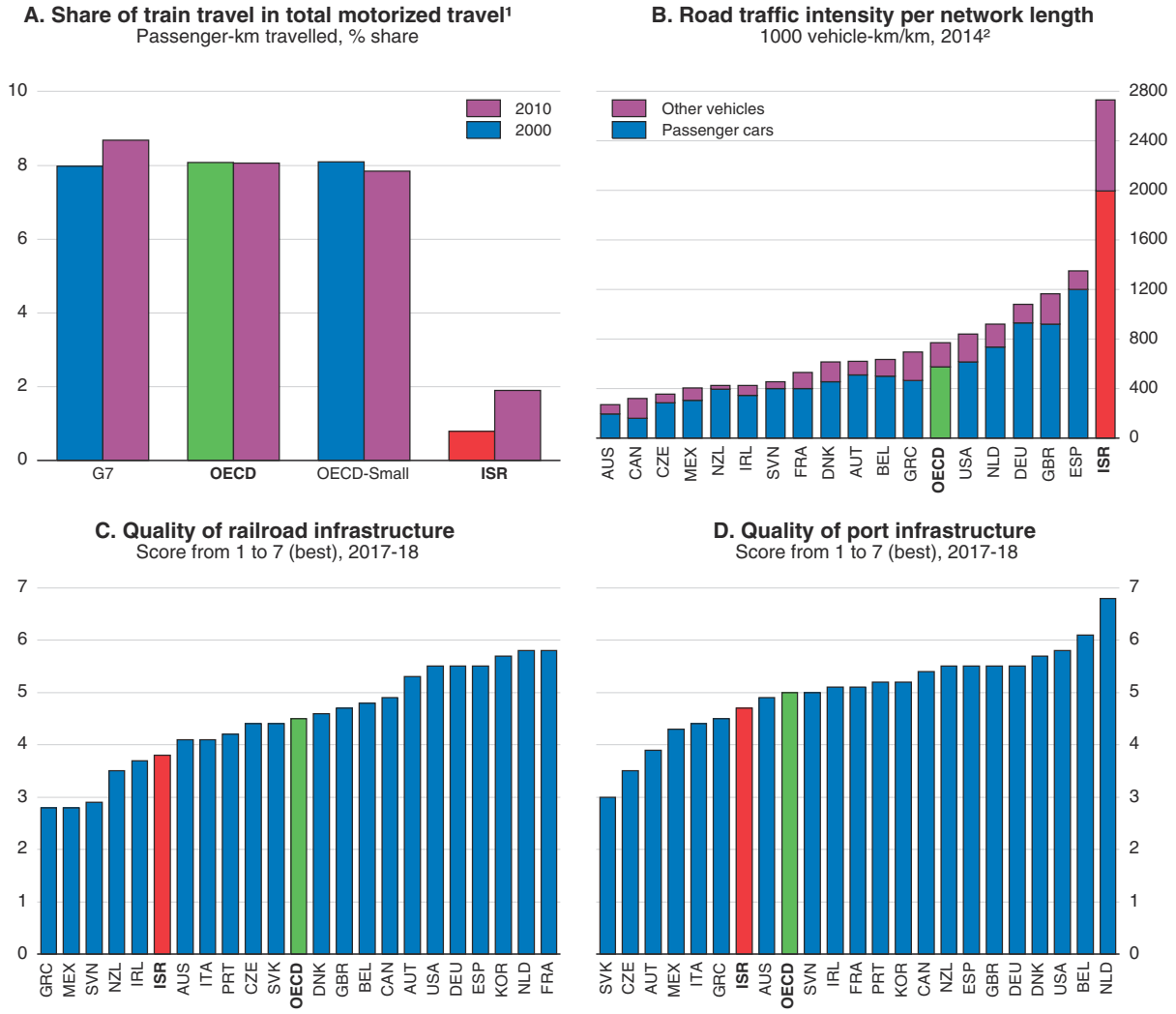
Infrastructure needs concern many sectors

The authorities have pledged to strengthen Israel's infrastructure. This is needed because it lags significantly behind in this area. Infrastructure capacity and quality fail to meet the needs of the economy and the population, both of which have grown over recent decades, driven by strong economic and demographic growth, technological progress and the need to confront environmental challenges.

The biggest infrastructure gap concerns the transport sector (BoI, 2015). Urban and intercity public transport, especially, fail to meet the needs of a growing population that is concentrated in the urban areas of central Israel. Services are slow, since they rely mainly on coach and bus networks that have few reserved lanes (State of Israel, 2012a), while the railways, which account for just 2% of land-based passenger transport compared to the OECD average of 8%, remain underdeveloped (Figure 2.1, Panel A). Moreover, public transport services do not operate during weekends and religious holidays. Due to the high population density of the country, private vehicles are intensively used for travel (Panel B), thereby causing serious road congestion. Goods transport is also beset with difficulties, even as needs are rising (BoI, 2014). The quality of maritime and rail freight services is particularly low by international standards (Panels C and D).

Energy infrastructure is also inadequate in many areas. The electricity sector is inefficiently organised – dominated by a vertically integrated public enterprise (PUA, 2016a; OECD, 2016a). The economy could derive a greater benefit from production from the offshore natural gas fields discovered in 2009-10 by lifting the barriers to the development of local demand for this kind of energy, which is less polluting than oil or coal. The production of electricity from renewable sources is also very low in the light of the country's potential capacity, especially for solar energy (Figure 2.2, Panel A). Yet this sector needs to be strengthened to meet the commitment made by the Israeli government in Paris in 2015 to cut greenhouse gas emissions and reduce pollution, which is a serious concern, as evidenced by the high concentration of fine particles in the air compared to other

Figure 2.1. **Snapshot of Israel's transport infrastructure**



1. Israeli data are estimates based on census data.
2. Or latest available year.

Source: OECD-ITF (2017), *Transport Database*; CBS (2016), Transportation Statistics; OECD (2015), *Environment at a Glance 2015: OECD Indicators*, Figure 2.11; World Economic Forum (2017), *The Global Competitiveness Report 2017-18*.

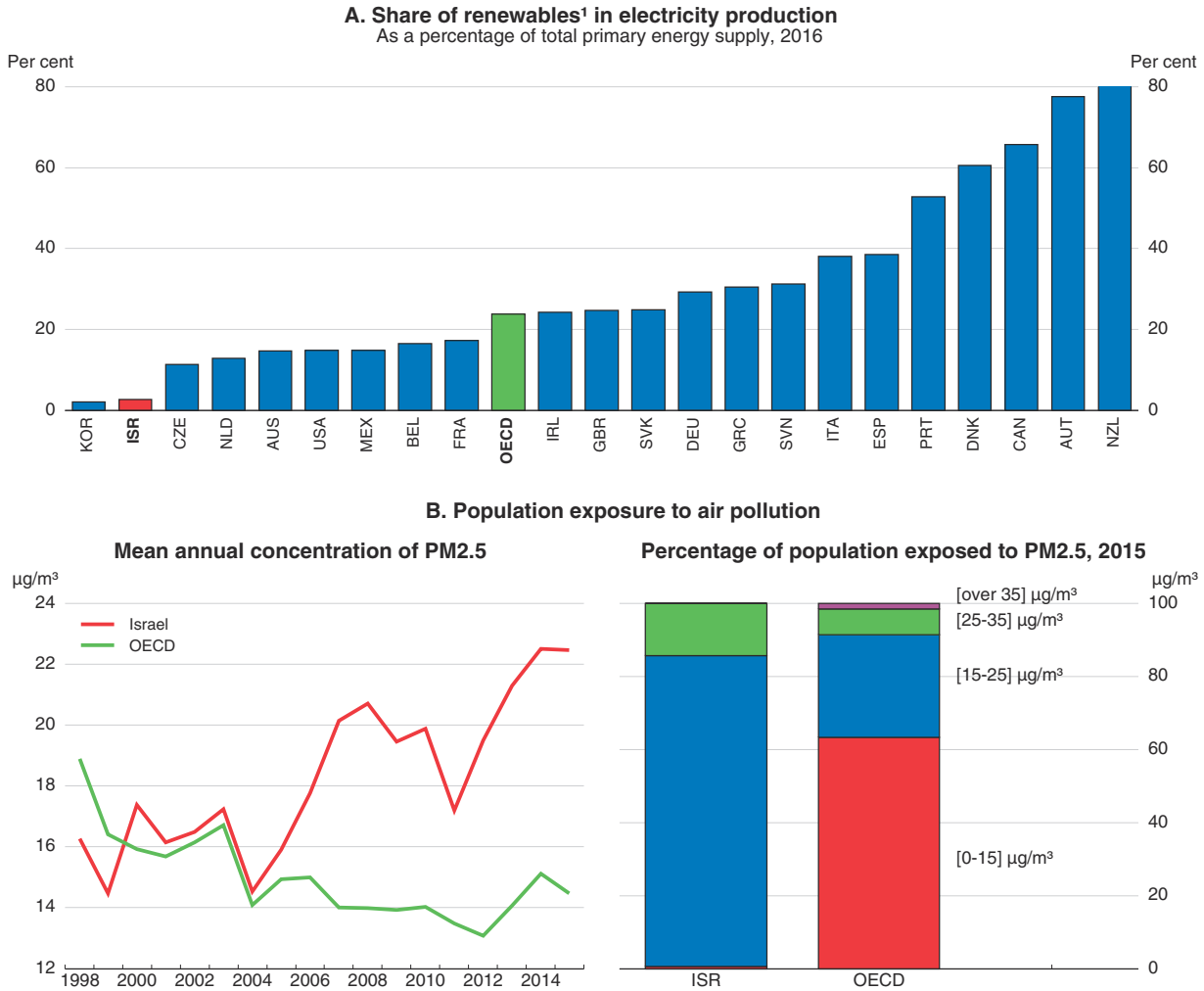
StatLink http://dx.doi.org/10.1787/888933674016

countries (Panel B). Moreover, expanding the renewable electricity production will likely require additional infrastructure investment in the electricity grid (BoI, 2017a).

Several other sectors also need improvement, such as wired Internet broadband telecommunication services, which are relatively undersubscribed, and where competition is relatively weak due to the duopolistic market structure (Figure 2.3). Sub-standard regulation hampers the cost-quality ratio of airport services. The country's management of its water needs may be exemplary (Annex A.2.1), but nevertheless requires constant attention to ensure that its limited natural resources are better protected from the real threat of overexploitation in light of declining precipitation rates (Figure 2.4).

Moreover, some social infrastructure is undersized. Israeli hospitals are overcrowded: the number of beds per head of population is low and their occupancy rate is extremely high (Figure 2.5). There is also insufficient childcare for children aged under three from

Figure 2.2. **Electricity production from renewables and air pollution**



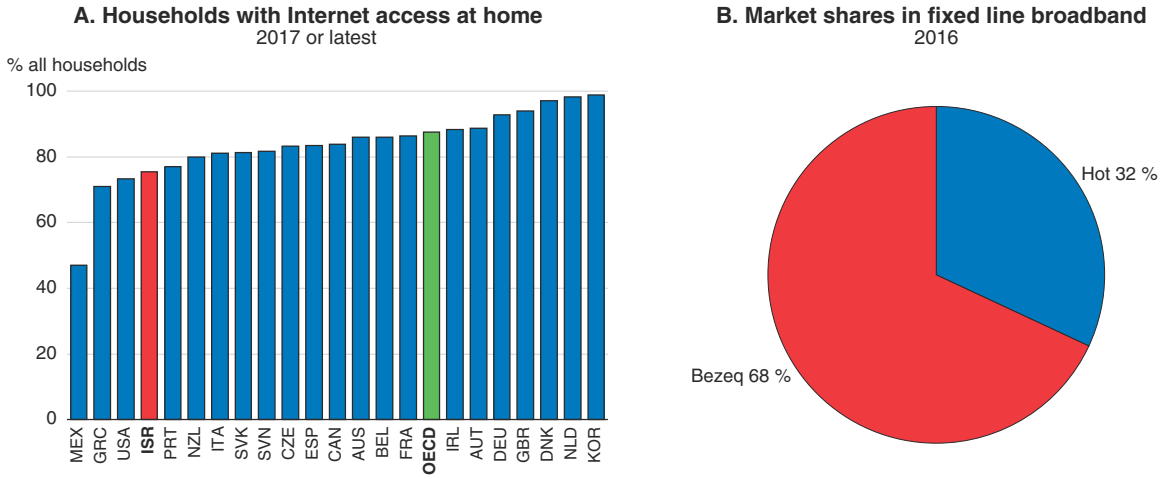
1. Renewables include hydro, geothermal, solar, wind, tide/wave/ocean energy, as well as biofuels and renewable waste.
Source: IEA (2017), *Energy – Renewables Information database*; OECD (2018), *Environment – Air Quality and Health Database*.

StatLink http://dx.doi.org/10.1787/888933674035

low-income families, with the number of places available in *crèches* in 2015 sufficient to accommodate just a quarter of the children of families entitled to this support (BoI, 2016).

Another major issue for the authorities is ensuring a fairer balance between regions and communities in terms of access to infrastructure services. Prior to 2009, a significant number of Arab towns had, for instance, no bus connection to the rest of the country (Knesset, 2014). Although the situation has since improved, and work is currently underway to guarantee greater fairness between communities, Arab towns remain relatively poorly served by public transport (Sikkuy, 2016a and 2016b), which penalises their residents and creates barriers to employment, especially for women, who are less likely to be licensed to drive and/or own a car. Moreover, Arab towns often lack adequate public facilities provided by local authorities, which generates high level of dissatisfaction (Figure 2.6, Panel A). The use of broadband Internet services is also unequal across regions (Panel B), although this may partly reflect divergent community preferences (for example, a low rate of use of high-speed Internet services in the Haredi community) rather than access problems.

Figure 2.3. **Telecommunications indicators**

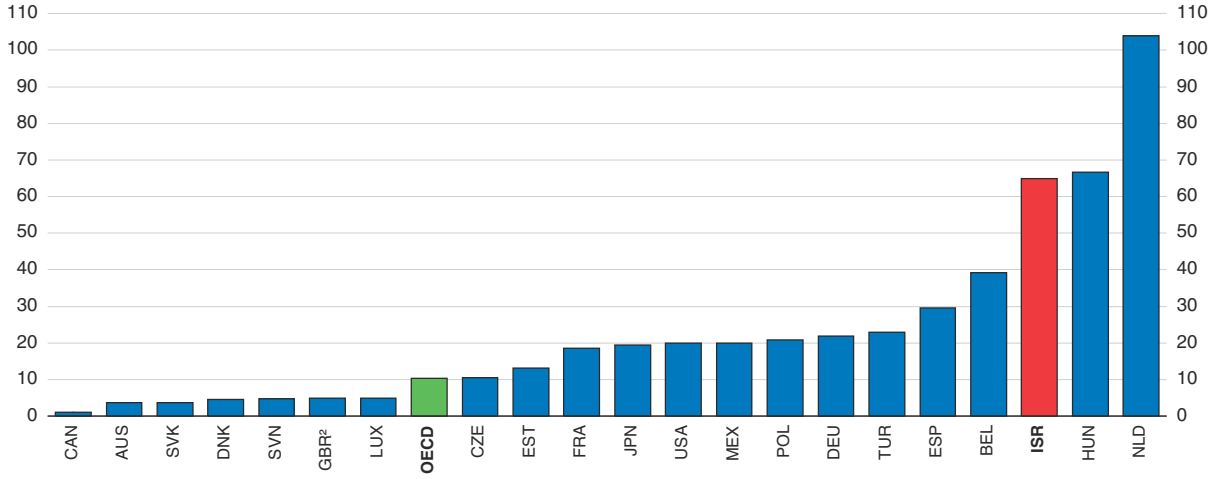


Source: OECD, *ICT Access & Usage Database*; Ministry of Finance.

StatLink http://dx.doi.org/10.1787/888933674054

Figure 2.4. **Intensity of freshwater use**[1]

2015 or latest year available

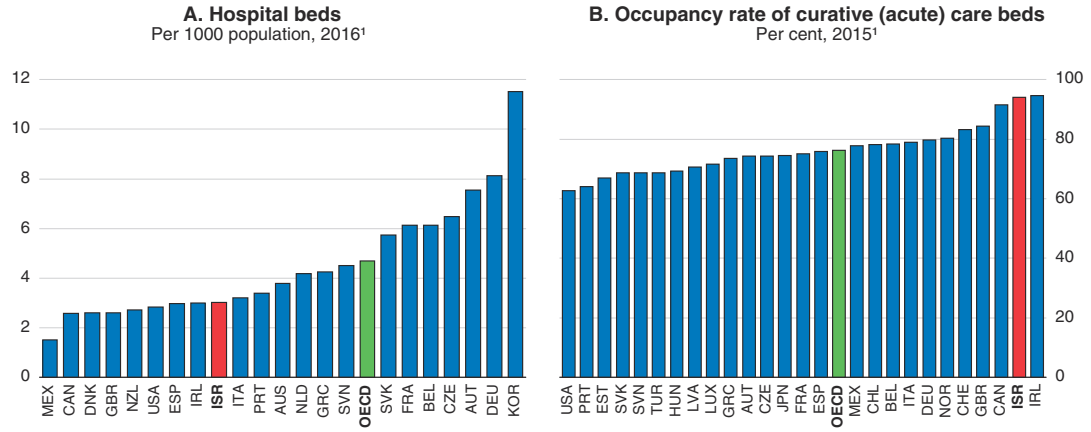


1. Water abstraction as a percentage of internal resources.
2. England and Wales only.

Source: OECD, *Environment – Water Abstractions Database*.

StatLink http://dx.doi.org/10.1787/888933674073

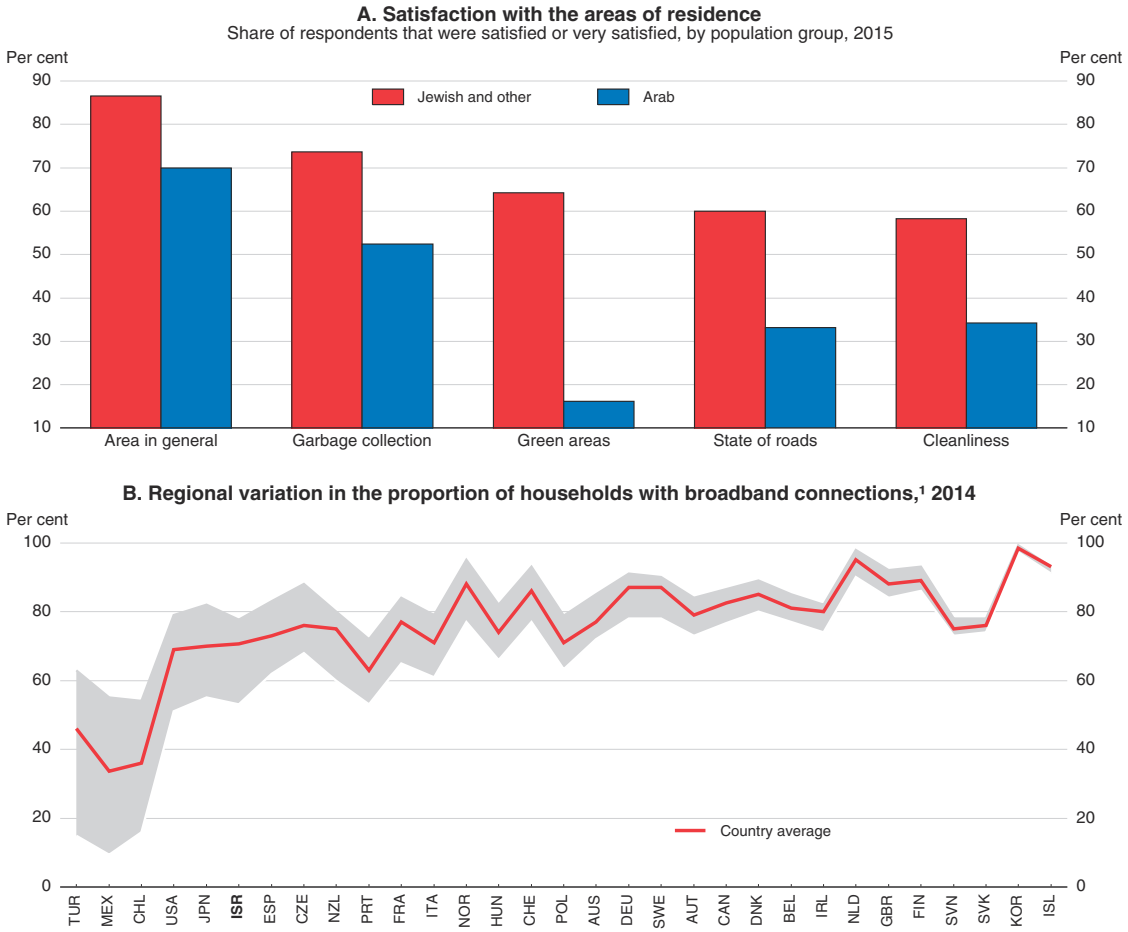
Figure 2.5. **Medical beds**



1. Or latest year available.
Source: OECD (2018), *Health Care Resources/Utilisation Database*.

StatLink http://dx.doi.org/10.1787/888933674092

Figure 2.6. **Indicators of regional variation in well-being**



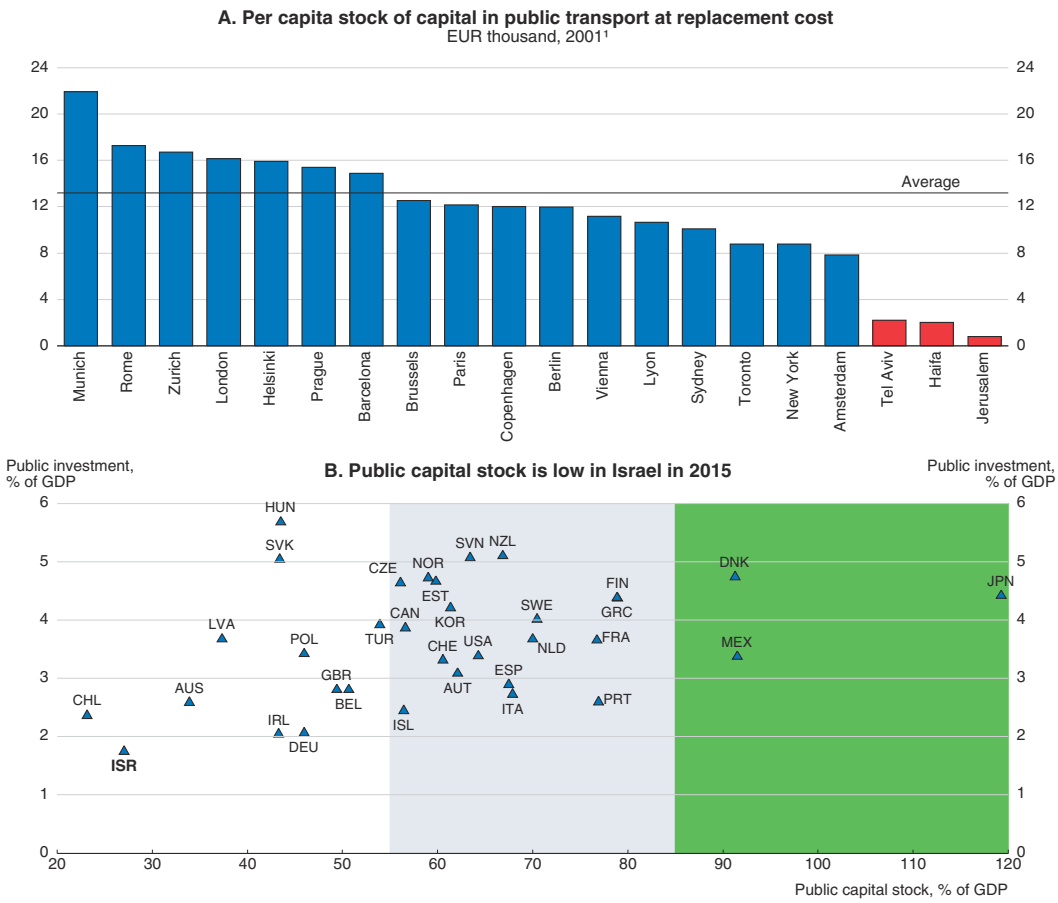
1. The shaded areas represent, within each country, the regions with minimum and maximum household broadband connections.
Source: CBS, 2015 Social Survey Table Generator, *http://surveys.cbs.gov.il/survey/surveyE.htm;* OECD (2016), *OECD Regions at a Glance 2016*, Figure 1.14.

StatLink http://dx.doi.org/10.1787/888933674111

The infrastructure sector's shortcomings are caused by a mix of factors

There are a number of reasons for the deficiencies in infrastructure development, which are linked to the country's history, the management of public accounts (including at local level), issues with land registries in Arab towns and the regulation of network industries. The state of Israel was created less than 70 years ago, and in terms of investment in public transport therefore lags behind most OECD countries, which began developing rail networks and mass transport systems much earlier. Compared to major cities in other countries, the shortfall in public transport infrastructure in Israel's three main cities was judged at the beginning of the current decade to represent the equivalent of around NIS 250 billion or 25% of GDP (State of Israel, 2012a). The estimated amount of cumulated investment in urban public transport in the agglomerations of Jerusalem, Tel Aviv and Haifa, calculated on the basis of 2008 prices, came to between EUR 1000 and EUR 2000 per capita compared to an average of EUR 13 000 in the major cities in the OECD area (Figure 2.7, Panel A). This reflects the fact that urban public transportation relies mainly on buses, which need much less investment than subway or light rail infrastructure. More generally, both public investment and the estimated stock of public capital are lower than in most other OECD economies (Panel B).

Figure 2.7. **Stock of capital and investment in public transport**



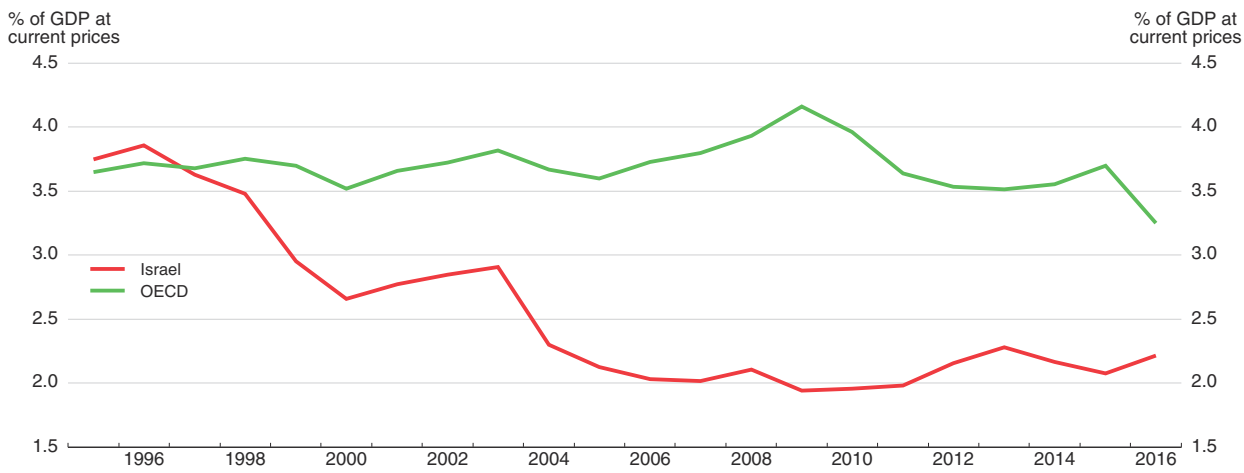
1. 2015 for Israeli cities and 2001 data for the others.

Source: Sharaby, N. and Y. Shiftan (2012), "The Impact of Fare Integration on Travel Behaviour and Transit Ridership", *Transport Policy*, Vol. 21, pp.63-70; International Association of Public Transport (UITP), *Mobility in Cities database* (2001); Ministry of Transport (2016), Budget data; IMF, *Investment and Capital Stock Dataset*, *www.imf.org/external/np/fad/publicinvestment/*.

StatLink http://dx.doi.org/10.1787/888933674130

Closing the investment gap has not been made easier by the far-reaching budgetary consolidation Israel has been pursuing for the last 20 years. Public debt has been brought down from almost 100% of GDP in the late 1990s to a little over 60%. During that period, however, this adjustment led to a sharp fall in public investment, which also weakened against the average for OECD countries (Figure 2.8). This kind of spending is relatively easy to reduce or defer and therefore made a greater contribution to budgetary consolidation than current spending on wages, social transfers and interest payments. Moreover, the decline in public investment has partly reflected the expanding role of state-owned enterprises that invest in infrastructure, which are not part of the government sector, but have benefited from public capital transfers. Consequently, the reduction in the public deficit of more than six percentage points of GDP between 1998 and the onset of the financial crisis in 2007 led to a concomitant fall of over 42% in public investment, measured as a share of GDP, while other spending fell by around 16% (Table 2.1). Spending on public infrastructure, which recovered after 2007, was then cut again between 2013 and 2015 to bring the public deficit back under control after the slippage in 2012 (BoI, 2017b). But these sorts of fluctuations in investment financing complicate the task of implementing most infrastructure programmes, which are long-term projects that require strict scheduling.

Figure 2.8. **Public investment**[1]



1. Excluding capital transfers to state-owned enterprises for infrastructure development, which have been significant in Israel.
Source: OECD, *Economic Outlook 102 Database*.

StatLink http://dx.doi.org/10.1787/888933674149

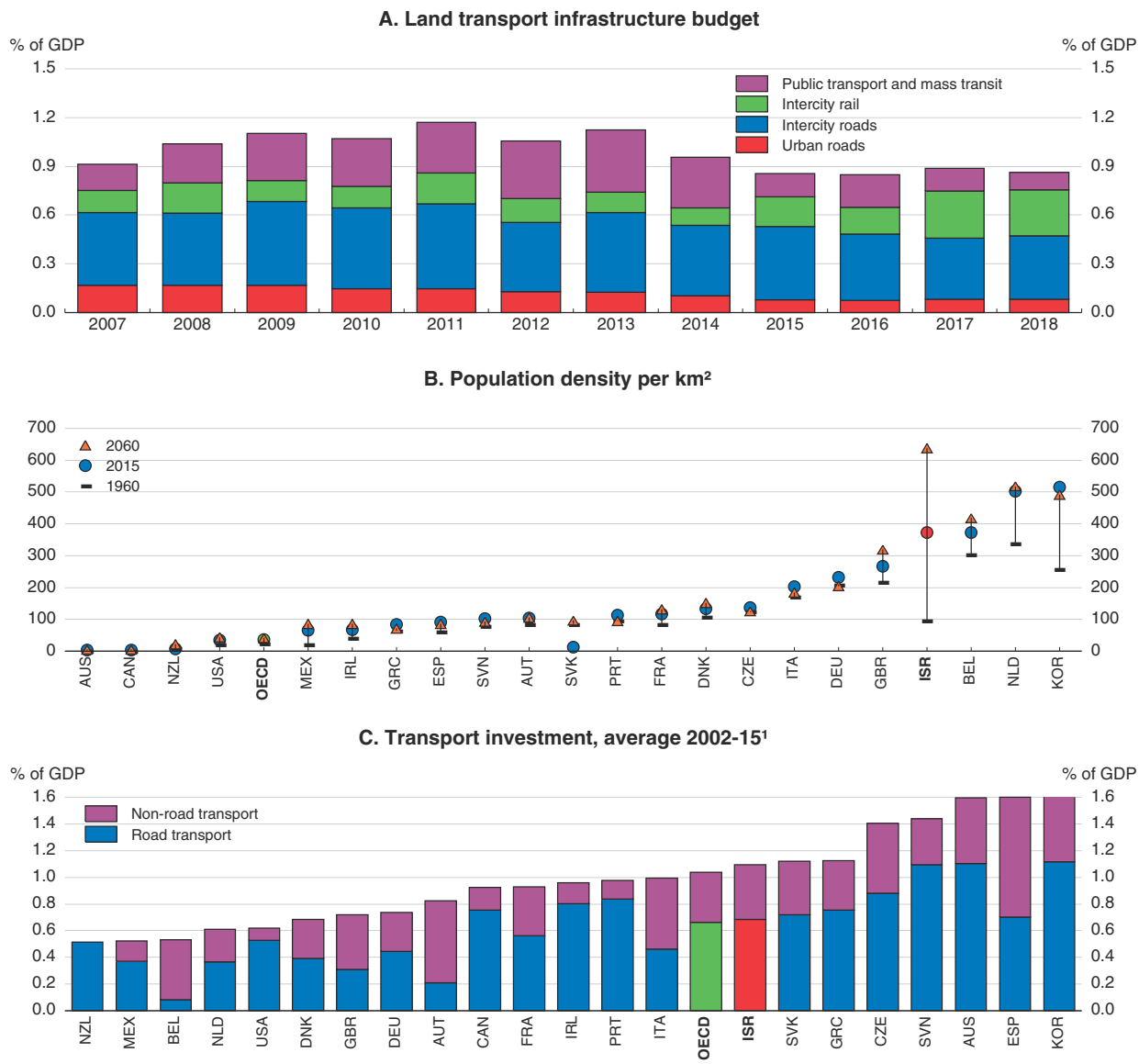
Table 2.1. **Fiscal consolidation during 1998-2007**

	General government, per cent of GDP				
	Net lending	Total receipts	Total disbursements	Investment[1]	Total disbursements, excl. investment
1998	-6.8	44.9	51.7	3.5	48.2
2007	-0.7	41.9	42.6	2.0	40.6
Difference	6.1	-3.0	-9.1	-1.5	-7.6
% changes		-6.7	-17.6	-42.4	-15.8

1. Excluding capital transfers to state-owned enterprises for infrastructure development, which have been significant in Israel.
Source: National Accounts and OECD calculations.

Up until the first years of the millennium, the development of public transport infrastructure had been increasingly focused on extension and improvement of the road network, to the detriment of the railways, which require heavy investment, especially in urban areas (Figure 2.9, Panel A). The country's rapid population growth, however, and the spectacular rise in population density over the last few decades (Panel B) have fuelled a dramatic increase in the need for urban mass transit. Non-road transport investment has been rising for several years; as a proportion of GDP, however, it remains relatively modest and has therefore failed to catch up, lingering around the OECD average since 2002 (Panel C).

Figure 2.9. **Investment in transport infrastructure and population pressure**



1. 2015 or nearest available data. In the case of Israel transport data are directly based on national statistics and may not be fully comparable with OECD-ITF data used for the other OECD countries.

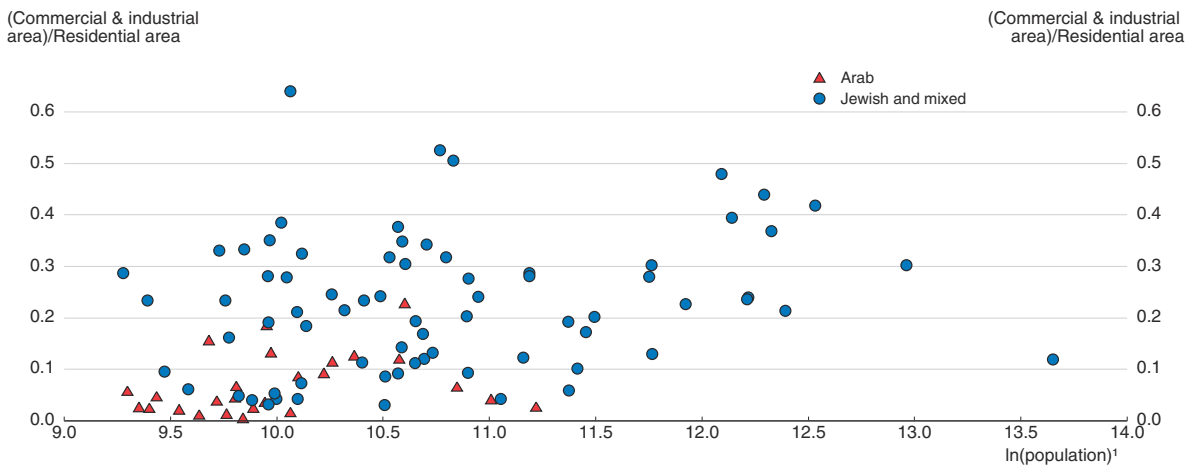
Source: Ministry of Transport, Budget data; OECD, *Economic Outlook 101 Database*; UN-Department of Economic and Social Affairs, Population Division (2015), *World Population Prospects: The 2015 Revision*; OECD-ITF (2018), *Transport Statistics Database*; CBS, *Gross Domestic Capital Formation Statistics*.

StatLink http://dx.doi.org/10.1787/888933674168

With more than half of public investment undertaken by local government, the financial disparities between municipal councils also contribute to unequal access to infrastructure services between regions and communities, despite the higher central government transfers received by poor municipalities. Average municipal spending per resident in 2014 ranged between NIS 3 232 and NIS 23 316, according to councils' ability to levy taxes, especially by attracting businesses (OECD, 2017a). Taxes on commercial and industrial property are higher in Israel than those on housing, which are generally insufficient to cover the costs of the infrastructure services required in residential areas (Fitoussi et al., 2016). Local authorities' financial capacity therefore partly depends on the extent to which they can allocate a greater share of land to businesses than to housing. Even though businesses setting up operations in towns with less financial capacity receive state subsidies to mitigate this disparity, Arab towns are generally in a weaker position than Jewish or mixed towns (Figure 2.10).

Figure 2.10. **Commercial and industrial area in relation to residential area in Israeli cities**

Municipalities/local councils with more than 10 000 inhabitants, 2014



1. The horizontal axis is displayed in log scale.

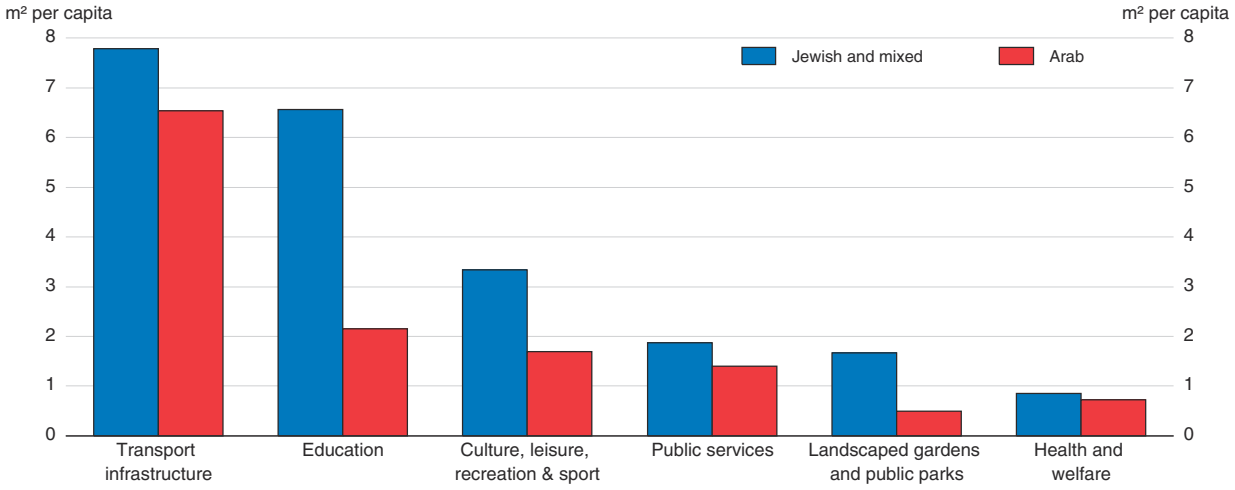
Source: OECD (2017), *Spatial Planning and Policy in Israel: The Cases of Netanya and Umm-al-Fahm*, Figure 4.4.

StatLink http://dx.doi.org/10.1787/888933674187

Infrastructure development in Arab towns is also hampered by a lack of available public land (OECD, 2017a). This may seem paradoxical for a country in which almost all (93%) land is publicly controlled, but for historical reasons most of the land in Arab towns is held by private individuals who are usually reluctant to sell it for cultural and/or political reasons. Moreover, a large proportion of this land is not correctly recorded in the land registry, and the development of Arab towns in the last few decades has not been guided by any consistent overarching plan, because the rigid, centralised Israeli urban-planning procedures are not adapted to the specific nature of Arab communities. To absorb a growing population these towns have developed by building extensions to existing homes and properties to accommodate and allow the cohabitation of several generations of a single family. In the absence of a detailed urban development plan, these constructions have often been carried out on the private plots of their owners without planning permission and without any regard for the need to cater for public services. Obstacles to the operation of public transport lines include excessively narrow alleys and a lack of adequate space for bus stopping bays. In all, this trend has led to the development of dysfunctional urban areas that lack space and public infrastructure, as is apparent from a comparison with Jewish or mixed towns (Figure 2.11).

Figure 2.11. **Areas for public amenities**[1]

Median[2] of municipalities/local councils with more than 10 000 inhabitants, 2014



1. For more detail on land for different types of usages, see the note to Figure 4.3 of *Source*.
2. Median is weighted by city population.

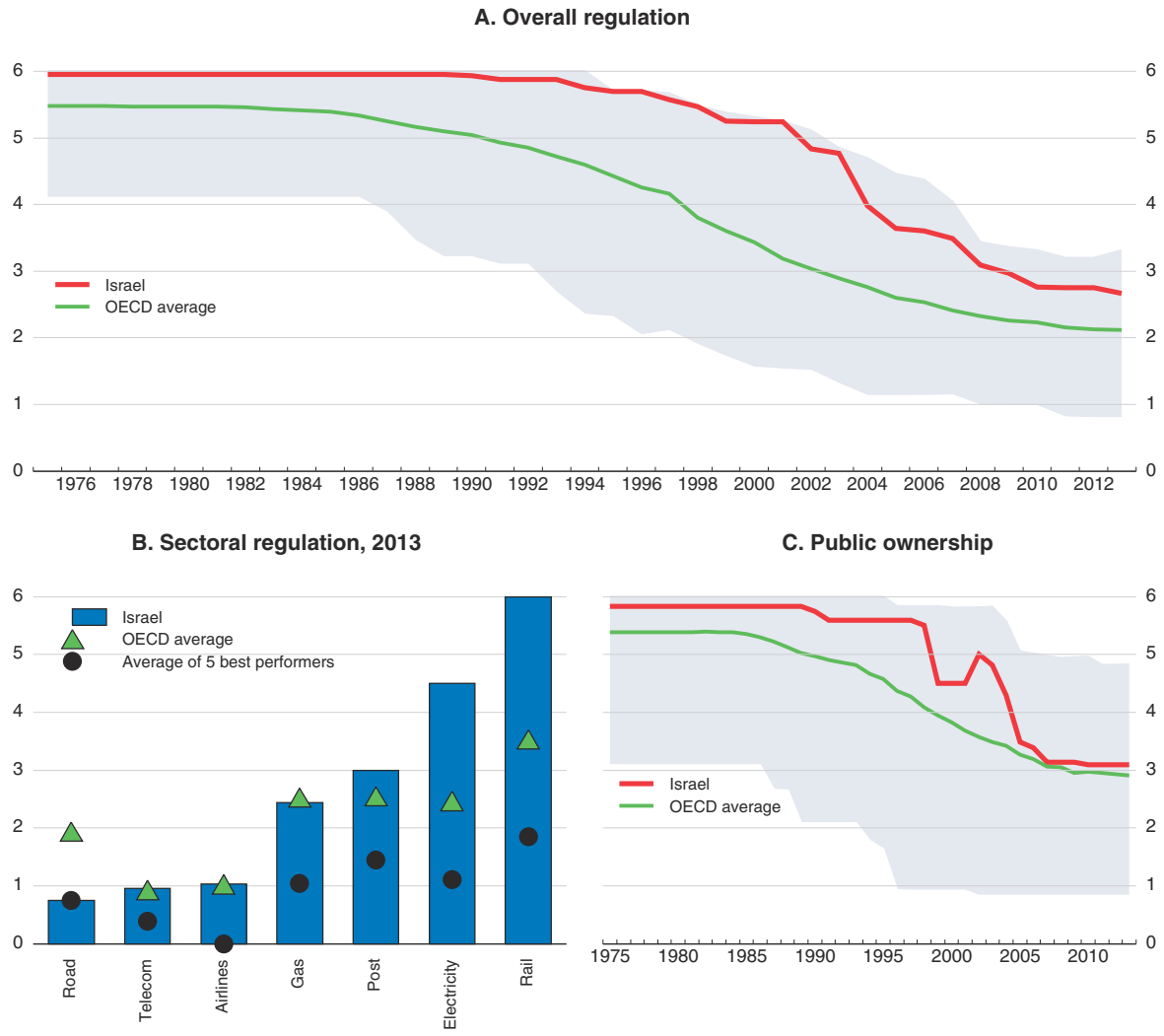
Source: OECD (2017), *Spatial Planning and Policy in Israel: The Cases of Metanya and Umm-al-Fahm*, Figure 4.3.

StatLink http://dx.doi.org/10.1787/888933674206

It has taken longer to reform the regulation of network industries in Israel than in many OECD countries (Figure 2.12, Panel A), and this has also thwarted the development and effectiveness of some sectors. Regulation remains some way from best practice in several fields, held back by insufficient competition (Panel B). The railways, the two Mediterranean ports of Haifa and Ashdod, and airports are still managed by public firms with national or local monopolies, which provides poor incentives for efficiency. The electricity sector remains dominated by a vertically integrated public enterprise, which is politically powerful but inefficient, hampering efforts to reform it (OECD, 2016a). It should also be noted that reducing the presence of public firms in network industries (Panel C) has not fostered the emergence of effective competition in some sectors, such as wired broadband telecommunications (see below).

Figure 2.12. **Product market regulation in the network industries**[1]

Index scale from 0 (least restrictive) to 6 (most restrictive)



1. Network sectors include energy, transport and communication. The shaded areas represent the minimum and the maximum in the range of outcomes among OECD countries.

Source: OECD, *Product Market Regulation Database*.

StatLink http://dx.doi.org/10.1787/888933674225

Improved infrastructure would boost growth and promote well-being

A body of empirical research highlights the economic and social advantages of adequate, well managed infrastructure. According to the IMF (2014), an increase of 1% of GDP in infrastructure investments in developed countries adds an average of 0.4% to output in the short term and 1.5% after four years, if the projects are carefully selected and executed. Using a panel of OECD countries, Égert (2016) also shows that the competition-friendly regulation of network industries generates statistically significant productivity gains. High-quality public investment (broadly defined to encompass health, education and R&D spending) also boosts growth and productivity (Mourougane et al., 2016). By improving training, personal mobility and day-care provision for young children, this investment helps to curb inequality in market revenues, which reduces the need for redistribution through taxes and transfers (OECD, 2017b). A greater number of subsidised

crèche places for children aged under three would, for example, help Israeli women, especially those from the Arab community (Schlosser, 2011), to increase their participation in the labour market and their wage income (BoI, 2016). This would in turn help to combat gender inequality, which is more marked in Israel than the OECD average.

According to recent OECD research, an increase in public investment could be especially beneficial in Israel. All other things being equal, the return from this spending is higher when the stock of public capital is low, which is the case of the Israeli economy (Fournier, 2016). An increase in high-quality public investment could therefore have a favourable long-term impact on household incomes (Fournier and Johansson, 2016). Empirical research also suggests that the positive fall-out for long-term growth of such spending might be higher for investment in transport and telecommunications than for other sectors (Barbiero and Cournède, 2013; Bom and Ligthart, 2009). Sharabany (2008), for example, demonstrated the advantages that the development of telecommunications and transport in Israel between 1990 and 2003 delivered in terms of manufacturing-sector production in the form of productivity gains and improved infrastructure services, which support private businesses in this sector.

Improved public transport networks would offer many advantages to Israel's major urban agglomerations, starting with road decongestion. Six years ago, traffic congestion caused every road user to lose an estimated 60 minutes per day, and this figure would in all probability be even higher today (State of Israel, 2012a). Reducing the cost of this congestion to the economy – thought to amount to NIS 15 billion (1.5% of GDP) for 2012, a figure which could reach NIS 25 billion by 2030 in the light of the current trend in population density – would improve well-being and productivity. Better urban transport, including further development of the rail network, would also be beneficial for the environment, since it would bring down GHG emissions and pollution. Furthermore, reliable, high-quality public transport would help to reduce the housing shortfall, improve conditions in areas where

Figure 2.13. **Socio-economic index – Arab vs Jewish municipalities**

Aggregated information of municipalities and local councils with 10 000 inhabitants and more,[1] 2013 or latest available

1. The figure shows aggregates of the standardised values for municipalities and local councils with a population of 10 000 inhabitants and more. The national average based on all local authorities in the respective category is 0.
2. This category was multiplied by (-1) to obtain a positive correlation with the index.
3. Data refer to 2008.

Source: OECD (2017), *Spatial Planning and Policy in Israel: The Cases of Metanya and Umm-al-Fahm*, Figure 4.6.

StatLink http://dx.doi.org/10.1787/888933674244

property is more affordable and help bring people living in remoter regions into the labour market. More generally, better infrastructure, including social infrastructure, especially in peripheral areas and Arab towns, would stimulate growth in the economy and local employment and enhance living standards and quality of life for inhabitants in those locations, which would in turn help to level out inequalities (Figure 2.13).

The government is aware of these problems and has taken steps to improve the situation

Developing and improving access to operational and efficient infrastructure nationwide, while maintaining healthy public finances, is a priority for the Israeli government. Reforms have been adopted in recent years, with remarkable progress being achieved in the water sector (Annex A.2.1). More recently, measures have also been taken in maritime freight and renewable energies. Faced with problems in stimulating the efficiency of existing ports through the introduction of regulatory changes, in early 2013 the authorities launched the construction of two new ports in Ashdod and Haifa, to be managed by two private operators, one Dutch and one Chinese. These projects will open the market and allow the ports to accommodate the growth in container traffic that the current infrastructure can absorb only until 2019 (BoI, 2014). In order to reduce greenhouse gas emissions, there is also a plan to increase the share of electricity generated from renewable sources to 17% by 2030, by encouraging increased private investment amounting to a total of around NIS 38 billion or 3.1% of GDP. In order to expand the use of natural gas by local businesses, the government also included tax incentives in the 2017-18 budget to stimulate investment in the expansion of the gas network and the adaptation of business premises to this energy source. There has been significant underinvestment in the natural gas distribution sector, which requires around NIS 350 million for connecting SMEs, hospitals and shopping centres to the network.

Israeli-Arab communities' access to different infrastructure services is also being improved. Since the beginning of 2016 a five-year economic programme worth NIS 15 billion, or 1.2% of GDP, has been rolled out to support the development of Arab towns in terms of the economy, transport, education, social services and housing. This programme adapts the mechanisms of budgetary allocation in order to ensure that the resources earmarked for the Arab sector under various items of expenditure reflect its demographic weight of 20%. In several areas, the proportion of budgetary resources granted will be even higher than this percentage in order to ensure fairer access to public services between all communities. For example, the Ministry for the Economy will assign over 40% of all funds allocated to the various ministries for new industrial developments to Arab communities and regional industrial areas that contain at least one Arab town. The Ministry for Social Affairs will allocate 25% of the financing dedicated to the creation of new *crèches* to Arab towns. The Ministry for Transport will allocate 40% of its development budget, out of that amounts to only about NIS 100 million per year, to improving public transport in Arab communities in order to ensure equal coverage of all communities by 2022 (Knesset, 2015; Iataskforce, 2016a).

The most intense investment efforts have been aimed at public transport, however, beginning a few years ago with the construction of a rail line between Ben Gurion airport and Tel Aviv in 2005, a rapid bus system (Metronit) in Haifa in 2007 and the Jerusalem Light Rail system in 2011. The development of transport systems in peripheral parts of Galilee and Negev was launched in 2010 under the Netivey Israel plan, which includes rail connections, electrification of the entire rail network by 2021 and the replacement of diesel locomotives. In the last two years, over 50% of transport investment concerned public transport. The

building of a high-speed rail link between Jerusalem and Tel Aviv should be operational by in the course of 2018. The government also plans to provide funding for the construction of light rail systems in the country's three main cities between 2019 and 2023 at a total cost of NIS 60 billion (4.9% of GDP), in part through public-private partnerships. The same budget includes funding for the Mahir ba'ir programme, which will improve bus transport in Tel Aviv by financing 330 km of special bus lanes and introducing provisions designed to ensure compliance by private vehicles through agreements between the Ministry for Transport and municipalities in this area that agree to give priority to public transport in return for financial compensation. Moreover, in mid-2017 an inter-ministerial committee was also set up to improve infrastructure planning and advance, monitor and coordinate these projects (Flug, 2017).

In a longer-term perspective the Ministries for Transport and Finance have produced a new strategic plan for the development of mass transport systems in Israel's three main agglomerations that is more ambitious than the plan currently being implemented. This plan, which is worth a total of around NIS 250 billion (20.4% of GDP) over 25 years, is currently the subject of a feasibility study and has not yet been approved by the government. It would create a denser network of urban rail transport, including underground lines in Tel Aviv. The national programme for transport investment also provides for the building of two new airports in the north and south of the country and the construction of a high-speed rail link between Tel Aviv and Eilat, although this latter project seems questionable from an economic point of view (see below).

Building more infrastructure and improving its efficiency will require reforms in several areas

The measures taken and announced by the government to respond to the country's infrastructure requirements are a step in the right direction. Nevertheless, it is important that their funding be secured while minimising the pressure on the public finances. Reforms would be beneficial in improving the selection, management and execution of these projects through better governance. In several areas progress in regulation would improve the provision and efficiency of, and access to, infrastructure services for all Israeli citizens.

The planned increase in infrastructure funding must not erode public finances

The use of private-public partnerships is welcome but could be improved

Since the mid-2000s the private sector has played an increasingly important role in infrastructure financing in Israel, as in many other OECD countries. This trend is partially attributable to privatisation in certain sectors, such as telecommunications, as well as, to a lesser extent, being the reflection of the increased use of new financing models, such as public-private partnerships (PPPs). In fact, PPPs have been used for over 10 years in Israel for infrastructure projects in the water, energy and public transport sectors (MoF, 2017). In addition, they are set to be used extensively in coming years to finance the development of public transport in the metropolitan areas of Jerusalem, Tel Aviv and Haifa, where investments are set to represent NIS 43 billion (3.5% of GDP), i.e. over 70% of total planed expenditure on ground transportation over the 2019-23 period (BoI, 2017b). Moreover, the authorities have approved the creation of an official database of potential PPP projects in several other sectors, including renewable energy, electricity and water that could be carried out over the 2017-21 period (Globes, 2017a).

PPPs can help improve infrastructure investment without increasing public debt and also limit the negative impact of budget cycles on development programmes (Lavee et al., 2011). When used properly, they can help the government make the most of private-sector know-how in the development of public services involving both the construction and long-term maintenance of complex infrastructure requiring specific technical knowledge and expertise. Through this type of agreement the planning, construction, management and maintenance of an infrastructure project are associated with and mandated to a sole private company, which therefore has a strong incentive to maximise the cost efficiency of its services (Arezki et al., 2017). In Israel the benefits of these contracts are clearly visible, for example in the water sector, with the construction of very energy-efficient desalination plants. PPPs have also helped reduce the costs of new electricity production facilities based on renewable resources by introducing competitive mechanisms to reduce their feed-in tariffs, which were previously established by the authorities (PUA, 2016b).

Nonetheless, PPPs are difficult tools to use and are not without risk for government finances, in that failure to manage them properly can lead to contingent public debt, as has been for instance the case in Portugal (Araújo and Sutherland, 2010; Jaeger, 2014). In order to limit these risks, the Israeli authorities have introduced a selection system for projects financed by these contracts (MoF, 2017). First, a feasibility study based on pre-defined criteria assesses the possibilities for effectively distributing the risks, the size and complexity of management and maintenance tasks, and the private sector's capacity to bring its know-how to the project in question. The shortlisted projects are then allocated to private operators using competitive tenders. These can include concession agreements, which set out the quality, quantity and price of the services to be provided, along with the process for the financial closing of the project. The system for monitoring both the construction and the undertakings stipulated in the concession agreement is then put in place.

However, this system has not prevented certain management problems with recent projects, such as the light rail systems in Jerusalem and Tel Aviv, and Route 531, which crosses the country. The PPP-based projects significantly overshot their construction costs and schedules, by as much as five years in the case of the Jerusalem light rail system. There were also disputes and contract renegotiations, with projects being nationalised in two cases (BoI, 2015 and 2017b). As the Bank of Israel observed, these issues could be avoided by aligning the management procedures for PPPs more closely with best practices based on international experience (Araújo and Sutherland, 2010). In the first place, this will involve greater centralisation of public-sector expertise and experience in PPPs by entrusting the supervision and management of these contracts to a single public agency, contrary to the provisions of recent transport plans for large agglomerations (BoI, 2017b). Such a change, which has recently been adopted by the authorities, will also be preferable to better leverage the expertise of private operators by involving them in the planning stage of infrastructure projects, even if it is important that the government itself has previously taken the necessary legal steps for obtaining work permits and other administrative authorisations. Nonetheless, it appears that the government is still in charge of planning development projects prior to the bidding phase, which leaves little room for interaction with private companies at that moment (BoI, 2017b).

Institutional investors could play a larger role in financing infrastructure

Moreover, infrastructure development could benefit from closer ties with institutional investors. In Israel, as elsewhere, pension funds, life insurers and sovereign wealth funds

have been looking into diversifying their portfolios into the infrastructure sector, whose long-term returns are often attractive and generally protected from inflation (OECD, 2014a). Inflows from these funds would also help lower the funding cost of such projects. That said, these investors have already allocated a small proportion of their assets to infrastructure, often in the form of indirect investments through listed companies and fixed-income instruments. Investments by institutional investors in the infrastructure sector accounted for about 4% of their total portfolio in 2015, with direct investments in PPP projects representing less than 0.5% of the said portfolio. Greater involvement and more substantial direct financing is hampered by a lack of information and transparency on PPPs, which stems from the complexity and heterogeneity of these projects, and the lack of risk-assessment expertise among these investors (OECD, 2015a). To remove such obstacles, the authorities could therefore encourage the development of an intermediary body with the technical knowledge required to resolve these information-related issues and promote infrastructure as a specific asset-class (Arezki et al., 2017, OECD, 2016b; Inderst and Della Croce, 2013).

PPPs are not, however, the ideal solution for all projects. Their high transaction costs, which are largely unrelated to the size of the work, mean that the model is inappropriate for small projects (Araújo and Sutherland, 2010). The same applies to projects with relatively simple management and maintenance requirements, which would therefore not benefit from the input of private companies. The cost of financing infrastructure via the private sector through PPP contracts is also higher at first glance than if it were covered by government borrowing at low interest rate and a regular tender process. In addition, it is important to make sure that the sole reason for choosing PPPs is not just to be free from budget constraints.

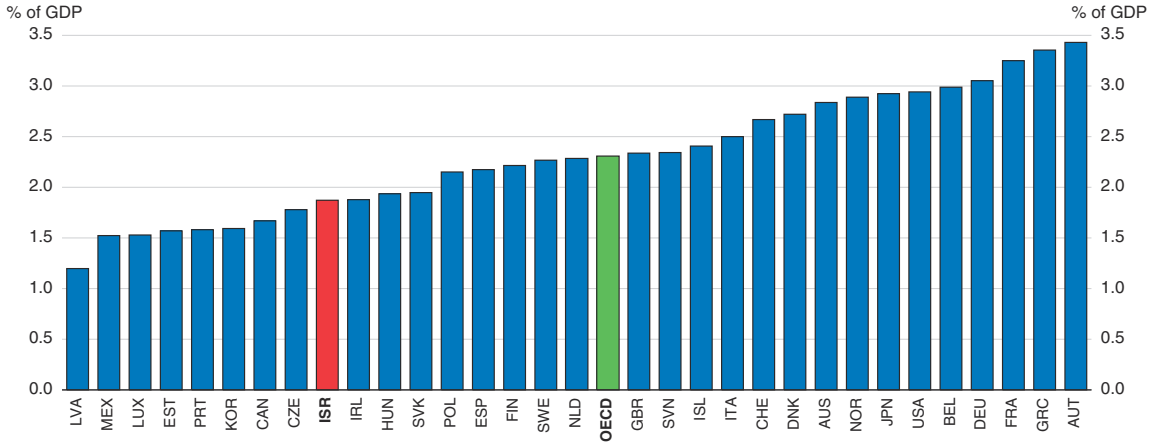
Budgetary funding for social infrastructure, including hospitals, should be increased

In many sectors budgetary financing of infrastructure investment is the best solution, and the Israeli authorities could make the most of the current low-interest-rate environment to finance their deployment, in the social field for example. The redistribution effect entailed by the collective financing of this type of infrastructure under the budget is appropriate, given the solidarity objective underpinning their development. And insofar as new infrastructure also benefits future generations, it might also be acceptable to use debt-financing solutions on a temporary basis, if that is compatible with maintaining fiscal prudence and the downward trajectory of public indebtedness. Alternatively, the Israeli authorities could finance this expenditure with a slight increase in relatively low tax rates. This would be a suitable approach if the taxes increased were those creating the least distortion and if the projects were carefully selected and generated significant long-term economic and social benefits. This is the case, for example, for social infrastructure projects, such as increasing the number of places in childcare centres and expanding the number of hospital facilities.

Although Israel's health system is known for its efficiency, broad coverage and good results, the pressures weighing on current capacity for this kind of care are such that hospital facilities need to be extended (OECD, 2013; OECD, 2016c). The low number of hospital beds and their average occupancy rate of over 94% between 2010 and 2014 (Figure 2.5, above) testifies to this tension. Services are under even greater pressure in remote regions, such as the south of the country, where waiting times for non-urgent operations are almost 45% longer than the national average because of the scarcity of beds (Taub, 2016). The low level of hospital spending by international standards (Figure 2.14), even though it may partly reflect the Israel's younger population than most other OECD countries, contributes to this lack of

Figure 2.14. **Total hospital inpatient spending**

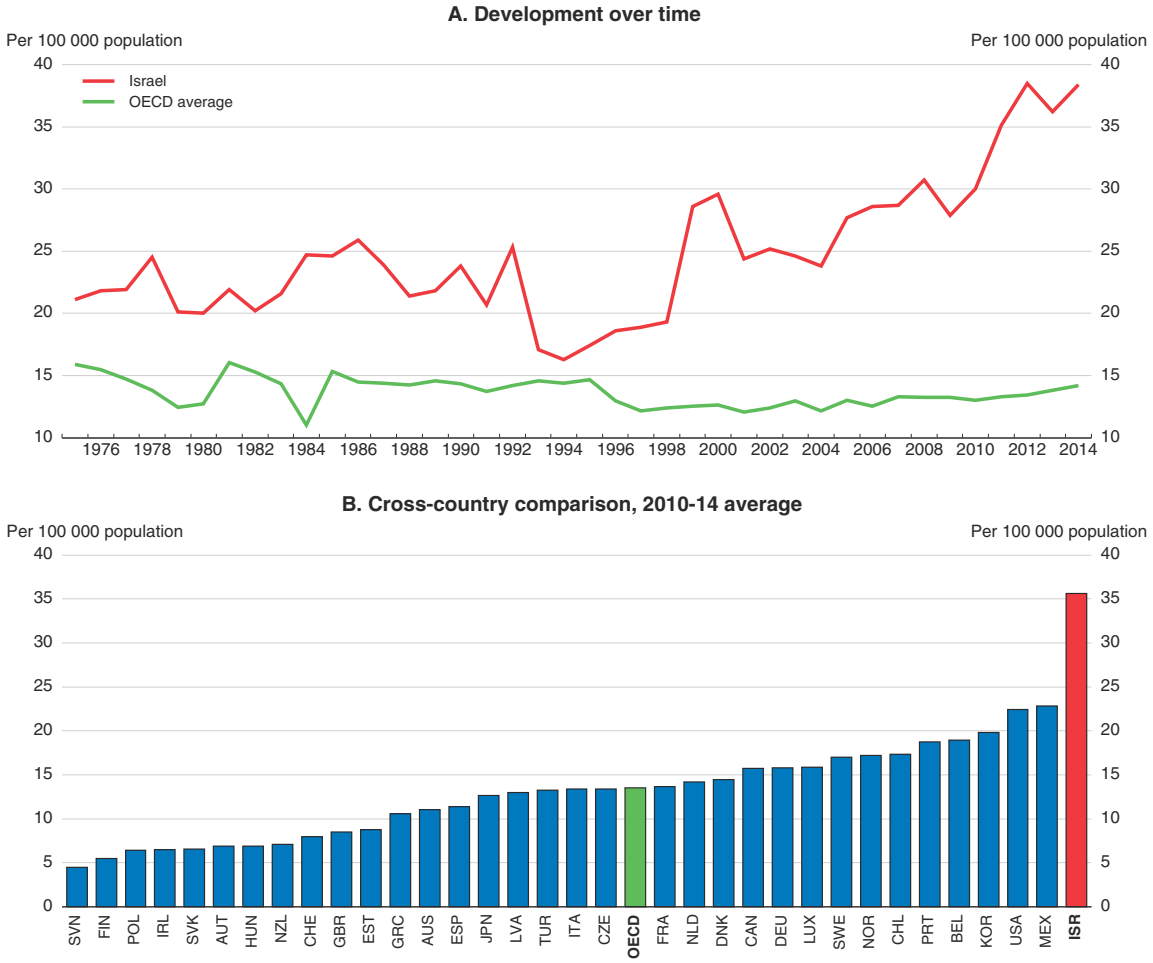
As a percentage of GDP, 2015 or latest year available



Source: OECD, *Health Database*.

StatLink http://dx.doi.org/10.1787/888933674263

Figure 2.15. **Deaths from infectious and parasitic diseases**



Source: OECD, *Health Database*.

StatLink http://dx.doi.org/10.1787/888933674282

capacity and, crucially, makes hospitalisation conditions difficult during certain times of the year in which epidemics tend to peak. When patients outnumber beds, they are often left in corridors or eating areas (Ben-David, 2017). Combined with the lack of medical staff, especially nursing staff, this lack of capacity causes frustration and distress for both patients and their families, leading to tensions with, occasionally, violence against medical staff (Ben-David, 2017). In addition, these problems undermine care quality because they also promote the development of hospital-acquired infections, which have contributed to an upsurge in the infectious and parasitic disease mortality rate in Israel in the last 20 years to a rate far higher than in other OECD countries (Figure 2.15). To prevent recurrent hospital overcrowding at particular times, facilities should be extended at the cost of increasing slack during the rest of the year.

Improve price signals to encourage a proper adjustment of supply and demand

In order to encourage good management of infrastructure outside the social sector, it is preferable to ensure that the services they provide are user-financed. This is already the case in water management, with positive results. Indeed, an efficient pricing mechanism helps to identify the extent of needs and encourage adjustments to services demand based on available capacity. Charging users directly for the choice of services they receive ensures a more disciplined approach when selecting investment projects that need to pay for themselves and encourages innovation as a means of reducing prices for users (Glaeser, 2016). Under-pricing on the other hand leads to overutilization of existing capacities, increases environmental and congestion costs, and reduces the resources available for, and the incentive to invest in, modernisation. The authorities should therefore pursue efforts to reform the charging systems for the use of public infrastructures so as to ensure that costs, including externalities, are completely recovered by users over the long term.

From this viewpoint, the budgetary financing of road infrastructures by central and local governments in Israel is inefficient. Most levies and taxes related to road transport have no direct link with the use of infrastructures. Very high vehicle taxation is related to ownership rather than usage (OECD, 2013). The various fees paid by owners either annually or upon registration are also fixed costs. While it is true that fuel taxes are linked to the use of private cars, the lack of differentiation in the impact of these various levies for all car journeys, regardless of the section of the road transport network used and the degree of congestion, significantly reduces their utility as an instrument for managing travel demand (Alberta and Mahalel, 2006).

Road tolls are generally considered to be powerful traffic regulation systems (Alberta and Mahalel, 2006), and although there are only two such systems in Israel, they have proved to be effective in reducing congestion. The launch in 2011 of a toll lane at the entrance of Tel Aviv on the road from Jerusalem with a variable price system dependent on lane occupancy has had positive results. This system, which includes free usage for vehicles with three or more passengers, and which provides a dedicated parking facility at the entrance of Tel Aviv and free shuttle rides to the city centre, has led to many private car users changing their habits. According to available survey data, the shuttle service is used by 20 to 25% of vehicle owners working in close proximity of the shuttle rides in Tel Aviv, thereby lessening congestion (Rafiah and Cohen, 2016). Government plans to develop this type of infrastructure in other high-density traffic zones are therefore welcome.

It would nevertheless be worth examining the possibility of a more ambitious overhaul of the framework for managing and financing road transportation. Advances in

mobile communication and computer technology now make it possible to price the use of road networks through the creation of metering systems. This would pave the way for users, rather than taxpayers, financing road transport network services by introducing an efficient pricing system similar to those found in other network industries (Cramton and Geddes, 2017). The authorities could transfer the management and maintenance of road transport to public companies, as they have done for water. This would then be financed by revenues generated from the use of the road transport network and overseen by a regulator responsible for defining the pricing system while taking into consideration the cost of maintaining and modernising the infrastructure, as well as environmental and congestion costs. This would also prevent cross-subsidisation of budgetary financing for road infrastructure, which undermines fairness (Glaeser, 2016).

The implementation of this type of reform, which would strengthen the coherence of decision making on expenditure and income in road transport and would foster more effective use of infrastructure, is under discussion in other OECD countries. A toll system for transport services already exists in Germany and Poland for goods vehicles (Queiroz et al., 2016). Australia also plans to introduce a similar system for freight transport within the next five years and for all vehicles within the next ten years (Infrastructure Australia, 2016).

However, the realisation of this kind of reform requires time and significant public consultation in order to ensure its acceptability, so it would be preferable to launch discussions soon (Infrastructure Victoria, 2016). In the absence of an adequate public transport system, it could be difficult to introduce financing for road transport based on use of the network, and improving the Israeli public transport system will take time.

In the shorter term, however, consideration should be given to adopting a less ambitious approach aimed at diversifying car taxation by transferring at least part of the burden to vehicle use rather than ownership. A recent experiment called *Naim Leyarok* ("Going Green") found that relatively modest financial incentives in relation to private car use reduced rush-hour travel in congested areas (Bar-Eli, 2016). According to the results of the experiment, which was launched in 2012 in the agglomerations of Jerusalem, Tel Aviv and Haifa, 16.5% of motorists who took part made significant changes to their travel practices in order to avoid urban congestion (Hazut and Cohen, 2016). Many drivers, therefore, have some leeway to change their behaviour by deferring non-urgent travel, taking public transport, adapting their working hours or working from home if they have an incentive to do so. It is important to pursue these experiments to confirm the results, because such a significant reduction in rush-hour traffic in congested areas would lead to a sharp fall in traffic problems at a cost far less than that which would be required to develop public transport.

The need to improve the management of demand using better price signals does not apply solely to transport. Better price signals in the electricity sector also help leverage the use of available facilities. A more responsive pricing approach as far as electricity consumption is concerned removes the need to construct expensive production capacities just to meet peak demands. In these areas technology can also be of valuable assistance. The use of smart meters, as in the water sector, enables users to better adapt their consumption to the different prices during the day. Smart meters have already been installed for big consumers, who account for 62% of total electricity consumption, and the authorities are considering extending their use, but the plan will be subject to a cost-benefit analysis after a pilot project has been implemented. The authorities should encourage the installation of these smart meters everywhere it would make economic sense. Contracts providing for interruptions to, or restrictions on, electricity consumption during short periods of high

demand in exchange for lower prices outside peak periods could also be offered to consumers, as is already the case in a number of other OECD countries.

The infrastructure sector needs better governance

The selection of infrastructure projects should be more rigorous and transparent

To meet the country's infrastructure needs, it is vital that investment in this area is carefully selected, planned, co-ordinated and executed by means of a good governance system. Reliable *ex ante* evaluations of infrastructure projects' rates of return are especially important to ensure good investment quality. The Israeli authorities have developed a robust evaluation method for this purpose, particularly in transport (Shiftan et al., 2008). These cost-benefit analyses draw on a common approach set out in a regularly updated guide, which aims to integrate the best practices applied internationally, which allows all projects to be compared on the same basis. The last edition of this guide was published in 2012 and includes surveys of environmental impact and safety, and takes account of induced demand phenomena related to the development of new infrastructure when road congestion problems are important (State of Israel, 2012b). The estimates of projects' overall costs and benefits are, moreover, backed by a separate assessment of their distribution among various population groups. These analyses must be made before any decision is taken concerning a central or local government project. But current procedures do not require the systematic publication of the detailed results of this work, which runs counter to good practice for promoting transparency and accountability in administrative decision-making (OECD, 2016d).

There also exists a consensus recognising that, in practice, cost-benefit evaluations are not always up to the task of assessing what they aim to measure and that project choice does not depend solely on the estimated value of returns on investment (OECD, 2011a). While positive cost-benefit analyses give the go-ahead to investment decisions, negative conclusions do not necessarily block them. A decision to approve an infrastructure project can be legitimate and justified despite a negative evaluation, if that evaluation has not properly measured the benefits from the investments that the authorities want to prioritise in order to promote, say, regional development or other strategic objectives. It is important, however, to ensure that these decisions are taken according to a rigorous and transparent process, and this would be helped by reforms that increased decision-makers' accountability for their choices after the project evaluations have been carried out. Using infrastructure investment to reach objectives related to equality, for example, can be costly, since the economic advantages to the beneficiaries are often modest compared to the costs of the projects put in place. Society as a whole and the populations targeted can draw greater benefit from monetary transfers as an alternative mechanism for redistribution (Persson and Song, 2010).

This situation is illustrated in Israel by the project to build a freight and high-speed passenger rail line between Tel Aviv and Eilat, adopted by the government at the beginning of 2012. A report commissioned after this decision points out that the cost of the project, which could amount to NIS 40 billion (3¼ per cent of GDP), would greatly exceed the expected benefits. The link between the Red Sea port of Eilat and that of Ashdod on the Mediterranean will not be able to rival freight services transiting through the Suez Canal. It is hard to justify the outlay represented by the improvement of passenger services to Eilat with a high-speed rail link in the light of the essentially tourism-related nature of journeys made on this route. It is also likely that the benefits delivered by the project for the development of the south of the country, especially the Negev, including the reduction in

road accidents in this area, will be limited, whereas its execution will take a significant toll on the environment (Feitelson et al., 2013).

To avoid these problems, it would be advisable to entrust responsibility for conducting the cost-benefit analyses of projects under consideration to an independent agency, along the lines of Infrastructure Australia, and to publish them systematically before the government's decision in order to more widely test reaction to the proposal. Another positive step would be to ensure that decision-makers were then obliged to explain and publish the reasons for their choices, especially those that rejected technical assessments. Such a reform would increase the transparency of the decision-making process and increase its resistance to the risk of interference based on subjective reasons, which can undermine investment quality. Creating a specialised, independent entity in charge of evaluating infrastructure projects would also present the following advantages:

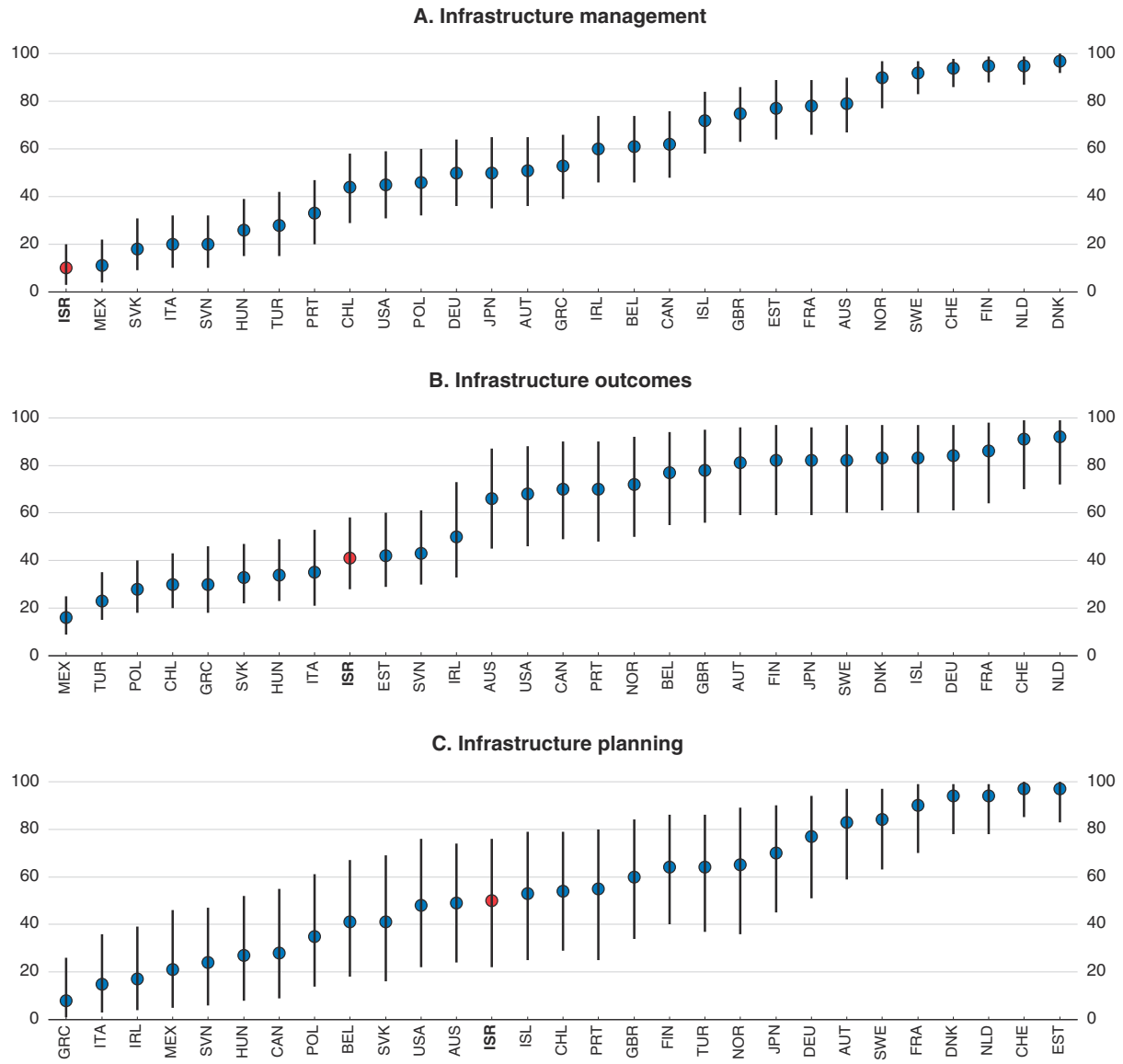
- As the body responsible for conducting and disseminating the cost-benefit analyses, it could also compile them automatically in order to carry out regular *ex post* audits, which would be useful in helping to improve the quality of analysis and evaluating the consequences of public decisions (Terril, 2016). This new body could also supplement project-by-project analyses by a more strategic approach taking on board the possible complementarities between projects.
- This institution could also be useful in evaluating the trend in supply and demand for services in different sectors and regions. Recent research into the demand for electricity is a useful example of this kind of contribution (Gallo, 2016). This would help the authorities to better establish the country's most urgent infrastructure needs.
- It could examine the impact on the need for infrastructure services of current and future technological changes, such as the expansion of wireless communications, driverless cars and the fall in the production cost of photovoltaic electricity. The possibilities represented by these changes could have a big impact on investment profitability and choices by reducing the opportunity cost of the time lost in transport, for example (Thomopoulos and Givoni, 2015; Bruun and Givoni, 2015).

The management and execution of infrastructure projects can be enhanced

An international comparison of infrastructure governance systems, produced from the results of a detailed survey (Hertie School of Governance, 2016), suggests that there is some leeway for improvement in terms of Israel's project management (Figure 2.16). An examination of transport spending between 1998 and 2009, for example, reveals that almost 65% of investments carried out cost more than initial estimates and 82% were finalised with a delay of, on average, 64% of the time that had initially been planned for the project (BoI, 2010). Although these kinds of problems are frequently encountered in most countries, they seem to be more significant in Israel. Cost overruns came to an average of 31% in real terms and 45% for projects of over NIS 100 million, whereas in other countries they tend to fall between 21% and 28% (Flyvvberg et al., 2004; Frontier Economics, 2009). These implementation problems, which recently hit the *Netivey Israel* plan and the construction of the first light-rail line in Tel Aviv, are hampering the development of the infrastructure that the country needs, because the projects in the pipeline are often completed only partially or with delays (BoI, 2015). In 2012, for example, there was a plan to increase public investment in transport to NIS 23 billion by 2015, but the actual amount spent was only NIS 10 billion (Figure 2.17).

Figure 2.16. **Infrastructure governance indicators,[1] 2016**

Index scale from 0 (least performant) to 100 (most performant)



1. These governance indicators measure countries' performance on each of the three dimensions of infrastructure planning, management and outcomes. The circles show the countries' scores while the vertical lines represent the statistical uncertainty around the scores.

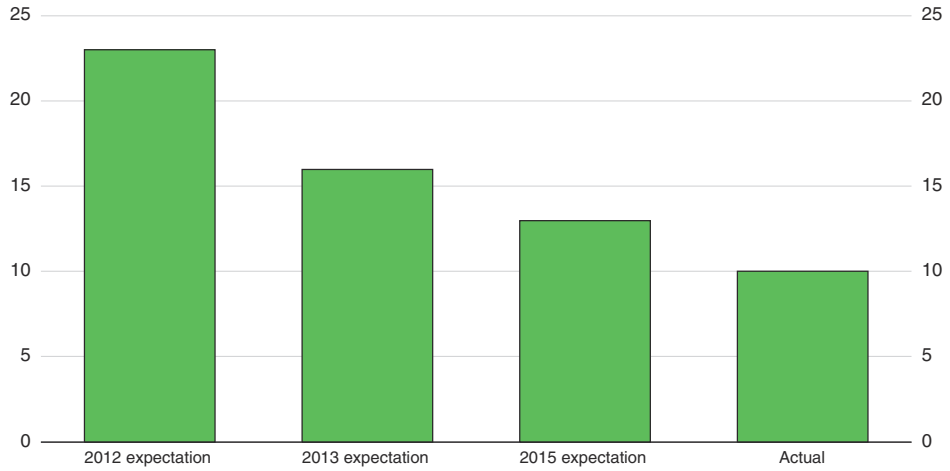
Source: Hertie School of Governance (2016), *The Governance Report 2016: Infrastructure Governance Indicators*.

StatLink http://dx.doi.org/10.1787/888933674301

These problems with infrastructure execution have a number of features. It often takes a long time to publish calls for tender and select the contractors, and changes to the project specifications are frequent because of evolving priorities at government level, disagreements between agencies and poor planning. Initial estimates of cost and the capacity of the companies in charge of carrying out the projects are sometimes too high, occasionally leading to their being replaced, and hence to further delays as in the case in the construction of the light-rail systems in Jerusalem and Tel Aviv (BoI, 2017b). The lengthy bureaucratic procedures to unblock budget lines and obtain planning permission, in addition to the

Figure 2.17. **Change over time in transport investment plans for 2015**

NIS billion, 2014 prices



Source: Data based on government budget and Ministry of Finance provided by the Bank of Israel.

StatLink http://dx.doi.org/10.1787/888933674320

difficulty in finding available sites, especially in Arab towns, also contribute to delays in developing infrastructure. This is the case, for example, with subsidised *crèches* for children aged under three; the government had pledged to build 400 new *crèches* between 2013 and 2017 (i.e. an increase of 20%), but by the end of 2015, only 10% of these new *crèches* had been built (BoI, 2016). Recent improvement in the administrative processing of these projects, including a simplification of land registration, helped speed up the construction of *crèches* to 115 by July 2017, i.e. to almost 30% of the government's objective. This is a good example of the how planning problems and administrative difficulties afflicting infrastructure can be overcome. In general, projects would benefit from greater resources at the planning stage, and those being managed by PPPs would also profit from better liaison with the private operators selected for the construction phase.

Co-ordination failures between ministries or between central and local government are not infrequent, moreover, and they hamper the development of public transport services that meet the needs of the population. This was the case, for example, during the reorganisation of Tel Aviv's bus network, launched in 2009 to cut passenger transit times, and is more generally typical of all proceedings concerning the town of Modiin, which was created in the mid-1990s to satisfy the need for housing linked to the wave of immigration from the former Soviet Union (State Comptroller, 2013; Feitelson and Gamlieli, 2010). Despite having the right conditions for the creation of an integrated public transport system, Modiin lacks adequate bus and rail networks because of a lack of co-operation between the Ministries for Housing and Transport, with the result that its inhabitants, most of whom work in Jerusalem or Tel Aviv, tend to travel by car. Similarly, the programmes currently underway to rapidly increase housing supply, such as those promoted by the national Vatmal committee for the development of preferred housing projects, could be better co-ordinated with the need for transport infrastructure (Zanzuri et al., 2015; Tziaon, 2016; OECD, 2017a) to lower road congestion and environmental damage, which undermine both the economy and the well-being of the population.

To solve these problems, the operation of infrastructure planning bodies, which are slow at the regional council and district levels (Bousso, 2016), would have to improve and

co-ordination between different ministries and local government to increase in order to ensure the coherence of investment projects in their entirety. In the case of public transport, this will mean, first and foremost, paying greater attention to the mobility needs of the population to give them a viable alternative to using their cars (Givoni and Banister, 2010), by improving public consultation, which often seems inadequate, as in Modiin or during the reorganisation of the bus lines in Tel Aviv. Improved public consultation, especially in the initial phases of projects, is also particularly helpful in preventing resistance to project implementation in densely populated areas.

It will also mean setting up a decision-making body for each project, endowed with the information and instruments it needs to deal with the inevitable obstacles to implementation and to manage the trade-offs between the divergent interests of the various parties to the project in order to ensure effective execution on the ground (State Comptroller, 2013; Feitelson and Gamlieli, 2010). By way of example, train and bus timetables defined by different companies have to be consistent and, if special bus lanes are created, must be enforced by the competent authorities. More generally, it will be important to evaluate and check the projects' *ex post* results in the light of the *ex ante* targets set, including budgetary targets. As in other countries, problems engendered by poor management, or even corruption, in the implementation of major infrastructure projects are not uncommon (Megiddo, 2016; Bob, 2015). It is essential to introduce mechanisms to ensure the continuous transparency of project management if such difficulties are to be prevented.

Infrastructure regulation reform is taking too long

Increased investment, particularly by the public sector, is no substitute for regulatory reform. Reform has a major role to play in promoting the more efficient use of existing infrastructure, especially by intensifying competition in some sectors. Attempts by the authorities to improve the regulation and efficiency of network industries have, however, often met with difficulties in recent years.

Electricity sector reform is long overdue

Israel's electricity market is more strictly regulated than those of many other OECD countries, and it is one of the few economies in which electricity is still largely controlled by a vertically integrated public enterprise: the Israel Electricity Company (IEC). Not only does IEC control 75% of production, 100% of transmission infrastructure and most of the distribution to end users, it also operates the grid. The changes necessary to improve efficiency in the electricity sector – namely, separating the production, transmission and distribution of electricity – were identified as early as 1996 by the electricity sector law. Repeated attempts to reform the sector and introduce these changes, however, including one in 2013-14, failed because of opposition from IEC workers and their capacity for obstruction, despite the fact that competition from independent private producers (IPPs) has been authorised since 1996 (OECD, 2016a).

Infrastructure management in the electricity sector is faced with the twin challenges of continuing to meet the economy's electric energy needs on the one hand, while helping to cut carbon dioxide emissions on the other. The current generating capacity is largely sufficient, with production reserves amounting to 30% of peak demand. They will have to be increased, however, to cover the replacement of 25% of coal-fired power stations, in line with the government's plan for 2030, and to satisfy increasing needs, although the rise is expected to be modest in the coming years (BoI, 2016). Investments amounting to an

estimated NIS 38 billion (3.1% of GDP) are also needed to increase the share of electricity generated by renewable sources from 2% in 2015 to 17% in 2030. To achieve these targets, the authorities want to promote the construction of gas-fired and solar power stations by IPPs, because IEC has not been authorised to build power stations since 2009 in order the enhance competition. By 2020 almost 40% of installed electricity production capacity will be provided by IPPs, compared to 25% today. The increased use of natural gas, which is used to fuel 60% of the power stations in 2015, will nevertheless require additional infrastructure for the transport of gas produced offshore. It will also be necessary to extend and improve the grid and transmission systems, especially in remote areas (PUA, 2016a). Insufficient investment in the network would restrict the IPPs' ability to develop conventional power stations and, more significantly, photovoltaic installations in the south of the country, where a large number are planned.

The cost-efficient development of infrastructure calls for reform of the electricity market in general and state-owned IEC in particular. The latter's poor efficiency is shown by its high labour costs due to overstaffing and elevated wage levels, which reflect the weak competitive forces to which the firm has been exposed. The workforce is bloated, with a surplus generally reckoned to be around 20% and highly unionised staff paid more than in the average in other SOEs and enjoying generous pension provisions and other benefits, such as free electricity (OECD, 2016a). With regulated electricity tariffs set at a relatively low level by international standards, IEC is weak financially, with a high level of indebtedness (7% of GDP in 2016), which reduces its profitability. The firm is also faced with the steady but inevitable emergence of IPPs with the growth of the renewable energy sector.

Reforms could be introduced gradually, beginning with the correction of transparency failings in IEC management (PUA, 2016a; Navigant, 2015), followed by the separation of its production activities and grid management, creating an independent operator for the national network and a wholesale electricity market (OECD, 2016a). Turning IEC into a holding company with several subsidiaries that have separate activities would allow the regulator to assess the profitability and costs of these activities more accurately and to detect cross-subsidisation, which is illegal and distorts competition in the sector. In this respect, the recent reform proposal currently being discussed between the authorities, IEC and its unions, which is expected to reduce IEC overstaffing and stimulate competition in electricity production, is a welcome move and should be implemented (Gorodeisky, 2017a). In addition to the proposed change, the creation of a wholesale market would also enhance efficiency by enabling exchanges between IPPs, whose production plans are currently based on bilateral contracts with consumers. To work properly, wholesale electricity markets need a sufficient number of electricity producers, none of which enjoys a dominant position. IEC would thus probably have to divest some power stations, as is considered in the reform proposal. If properly organised, such a market would also provide useful information about the sector's needs for increased capacity, unlike the system of production quotas currently allocated by the regulator to meet the expected increase in power demand.

Efforts to lift the barriers to the use of natural gas in the economy must be pursued

It would also be useful to introduce measures to remove certain obstacles to the use of natural gas in the economy. These obstacles involve the terms and costs of the long-term contracts that are typically used on the gas market. They have take-or-pay clauses that oblige customers to buy large quantities of gas and pay in full for those volumes, even if they are not completely used. These clauses represent a financial obstacle to the development of IPPs

to the advantage of IEC and can generate extra costs for consumers. To remove this obstacle, a secondary market could be created to allow electricity producers to sell gas bought on the primary market and not used (PUA, 2016a; OECD, 2016a).

Israel also has insufficient infrastructure for the distribution of natural gas, and this restricts its uptake in the economy. The investment required to develop a gas distribution network for major consumers (SMEs, hospitals, shopping centres, etc.) is estimated by the authorities to amount to around NIS 1.3 billion (0.1% of GDP). Less than 10% of this investment was realised in 2016, however, and just 11% of consumers eligible for connection to the current network have already been connected. The increased use of natural gas by firms, households and transport (in the form of compressed natural gas, CNG) would, however, be good for the environment and reduce Israel's dependence on oil and gas imports.

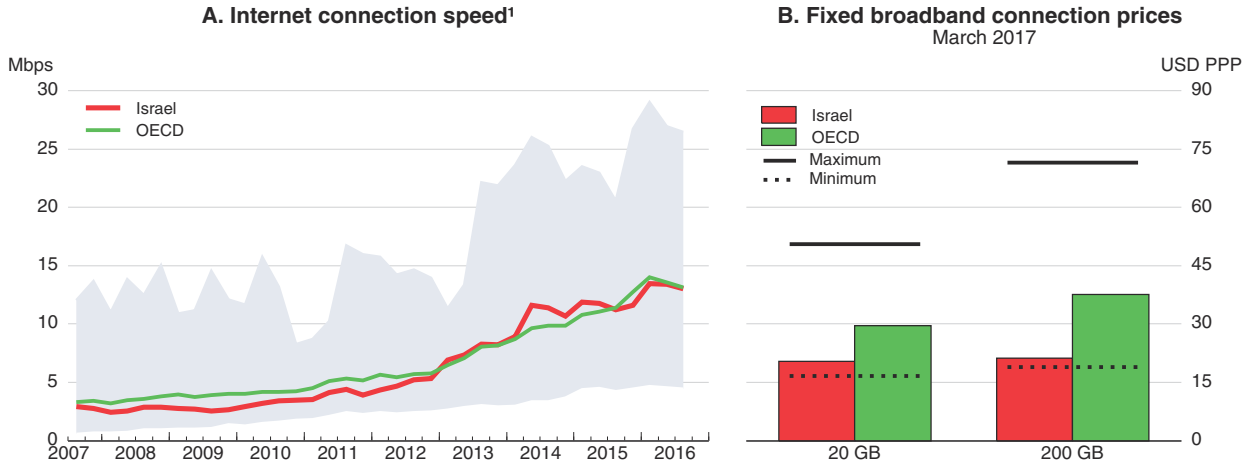
Nevertheless, current economic conditions have reduced the incentive for eligible consumers to replace oil with gas as the energy source for their installations. Low oil prices and the high cost of land in high-density areas are reducing the profitability of the investments required for connecting to the gas network and adapting consumers' installations to this alternative energy source. Accordingly, the main reason for the slow expansion of gas distribution networks seems to be a lack of demand. In 2016 the authorities adopted several measures improving the framework for developing the distribution network and removing the obstacles and simplifying the administrative procedures (regulatory uncertainties, problems with obtaining building permits, etc.) that had previously hindered the conversion of industrial facilities to natural gas (OECD, 2016a). Efforts to promote CNG in transport need to be continued, in line with the government's strategy to reduce the proportion of refined oil products used in transport from 96% at the start of 2013 to 70% in 2020 and 40% in 2025 and, more generally, to lower the use of gasoline and coal in the economy (Rosner, 2013; Gorodeisky, 2017b). The construction of service stations offering this kind of fuel is, for instance, to be encouraged.

The implementation of reforms in the telecommunications sector needs to be improved

There are also problems in the telecoms sector, especially with wireline communications. While Israel's performance in this sector is above or around the OECD average in terms of prices and high speed broadband Internet connections, for example (Figure 2.18), these services are still used only by a relatively small proportion of the population in comparison to other countries (Figure 2.3, above). In addition, the existence of the duopoly consisting of Bezeq, the legacy operator privatised in 2005, with 68% of the market, and Hot, which owns a national cable network, weakens competition and prevents consumers from receiving the best value for money for these services. The deployment of a third, fibre-optic network is planned. It would be faster than Bezeq's and Hot's hybrid fibre and copper networks, but this project has had no impact on competition and is now uncertain to go ahead because the company managing it, IBC, is in financial difficulty. Some recent financial indicators, although partial and incomplete, suggest that Bezeq and Hot, with their dominant positions, are able to generate higher profit margins than other domestic telecom firms and similar enterprises abroad (Figure 2.19). Bezeq also has a dominant position in fixed telephony, controlling 55% of that market's subscriptions and 65% of revenues.

Since 2015, in a bid to stimulate competition, the authorities have adopted several provisions opening Bezeq's and Hot's networks to other operators. First, a wholesale market providing access to Bezeq's infrastructures at a regulated price was created for Internet

Figure 2.18. **Fixed broadband connection**

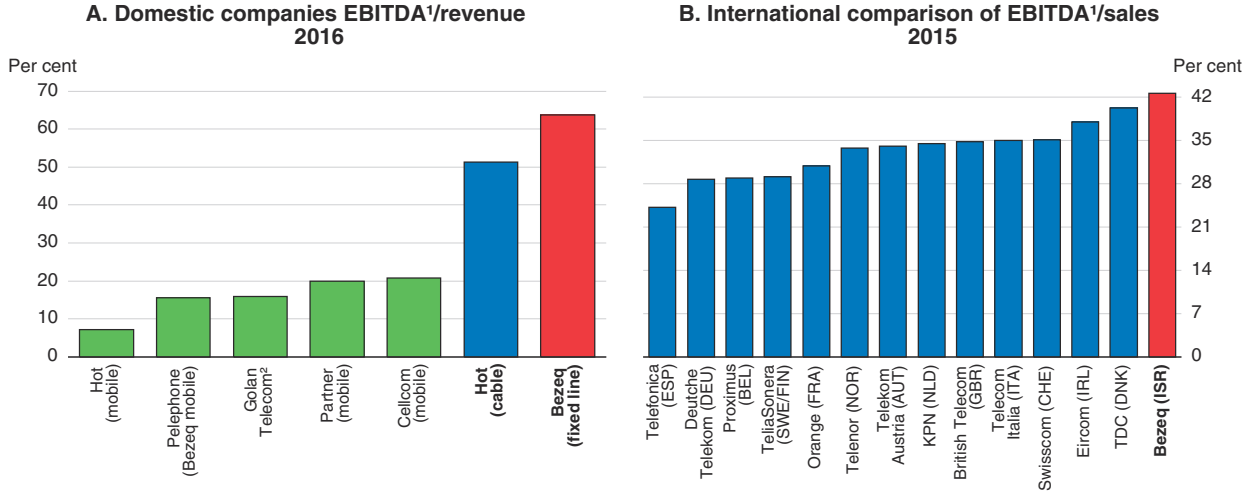


1. The shaded areas represent the minimum and the maximum speed range of OECD countries.

Source: OECD, Broadband Portal, *www.oecd.org/sti/broadband/oecdbroadbandportal.htm*.

StatLink http://dx.doi.org/10.1787/888933674339

Figure 2.19. **Telecom companies margins**



1. Earnings before interest, taxes, depreciation and amortisation.
2. 2015 data.

Source: Ministry of Finance.

StatLink http://dx.doi.org/10.1787/888933674358

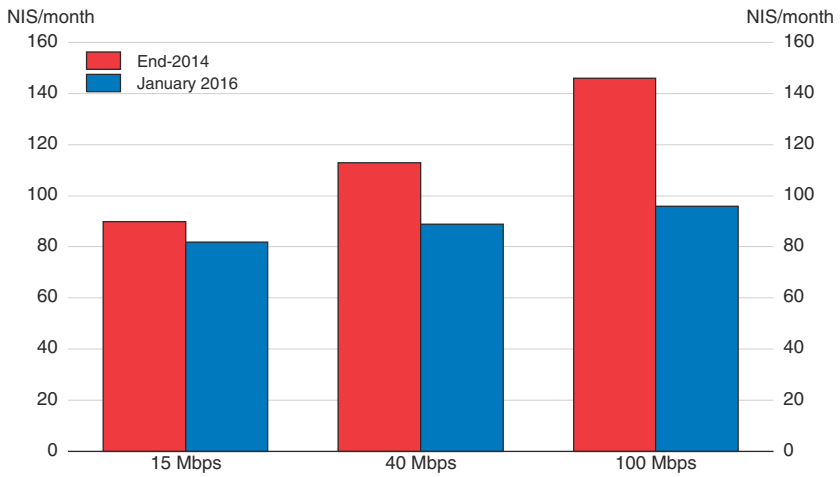
service providers (ISPs). Whereas previously two separate subscriptions were required for access to broadband wireline Internet – one for the infrastructure network and the other for the ISP – consumers can now obtain a bundled offer from other companies than Bezeq and Hot. Second, Bezeq has been forced to give its competitors direct access to its passive infrastructure (conduits, pylons, technical installations, etc.) and landline infrastructure for a reasonable price in order to boost the development of the fibre-optic network and increase competition in the landline segment. Third, a new rule stipulated that Bezeq's various businesses (ISP, mobile operator and activities in landline and broadband Internet networks) were to be separated into subsidiaries within a single holding company so as to prevent cross-subsidisation between the said activities and to facilitate the oversight work of the

sector regulator. Lastly, since mid-2017 and after lengthy negotiations, Hot has also had to allow third parties wishing to use its network under similar conditions to Bezeq's.

To date, the results of these changes have been rather mixed. There has been a slight increase in competition in the broadband wireline market. At the start of 2017, over 15% of households were subscribed to bundles of Internet services. The price of these services, which was already relatively low, has fallen in the last two years (Figure 2.20), but Bezeq has made it difficult for its competitors to access its landline infrastructures directly, citing technical issues, and an alternative solution involving the resale of indirect access rights to its infrastructure was implemented in mid-2017. Bezeq has also made it difficult for its competitors to access to its passive infrastructures, yet again citing technical causes and problems with the cost of work. This has prevented the incumbent's competitors from being able to roll out new network infrastructure at a reasonable price.

Figure 2.20. **Internet package prices per download speed**

Before and after the wholesale market reform



Source: Ministry of Finance.

StatLink http://dx.doi.org/10.1787/888933674377

The overall impression is that the resistance of the two main market operators to implementing regulatory changes has limited the expected benefits thereof. The reforms adopted are nevertheless a step in the right direction and need to be pursued. International experience suggests that increasing competition by boosting the number of actors in these markets through opening access to existing infrastructure, including passive infrastructure, at properly regulated prices is a way of both stimulating investment and preventing the creation of monopoly rents (OECD, 2008 and 2011b). Nevertheless, as is the case in the other network industries, the benefits of these reforms become truly apparent when there is an independent regulator to ensure their application (OECD, 2014b). Recent experience shows that the Israeli Ministry of Communication, which is both the regulatory authority and the body responsible for developing regulations for the telecoms sector, is torn between its duty to enforce the application of reforms and its assignment of carrying out further adjustments to regulations, as a result of intense pressure from the main market actors. Bezeq, for example, continues to lobby for a reconsideration of the functional separation of its activities imposed upon its organisational structure on the grounds that this restricts its ability to generate economies of scale and optimise its tax bill.

This situation is a potential source of regulatory uncertainty. Nor is it conducive to market transparency or investment. The Israeli telecoms regulator does not produce an annual report and publishes relatively little information on its activities and the functioning of the market. For instance, the reasons for the relatively low subscription rate to fixed broadband Internet services, which do not seem to be related to insufficient network coverage or excessive prices, have not been analysed. Moreover, the regulator is not obliged to justify its decisions, and the only authority to which it reports is the government, to which it belongs. A clear distinction would be useful between the role of developing regulations, under the supervision of the Ministry, and the function of implementing the said regulations, which should be entrusted to an independent and transparent entity (OECD, 2014b). This independent regulator needs to have enough authority to deter efforts to impede the enforcement of regulations. It is also important that the general managers of these regulatory authorities be recruited by independent selection committees on non-renewable contracts, thereby reducing any temptation to curry favour with the authorities in a bid to secure a second term.

Water management can be further enhanced

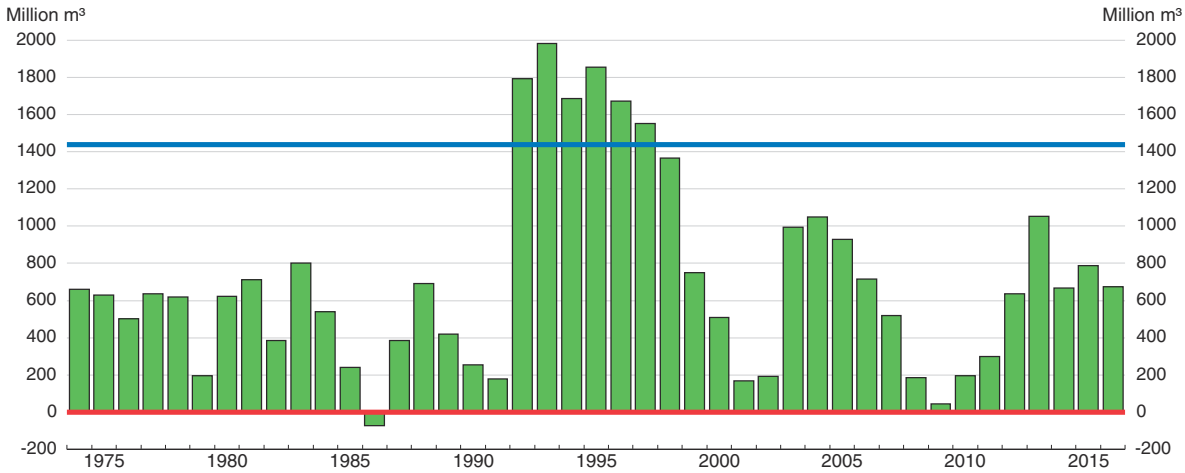
Although Israeli water management is remarkable in many respects (Annex A.2.1), it can be further improved. Despite a substantial reduction in the use of natural sources, there remains a persistent problem of overexploitation due to the decline in their natural replenishment as a result of the droughts of recent years. In 2017 natural sources accounted for merely 50% of the economy's water consumption, compared to 90% in 2005, and the water levels in Israel's three main fresh water reserves (Lake Kinneret and the coastal and western mountain aquifers) remain well below optimum levels (Figure 2.21). In addition, most of these resources lie close to saline water bodies that could infiltrate them in the event of over-pumping (Weinberger et al., 2012). In order to guarantee their sustainable management, it would be advisable to set clear objectives for the minimum acceptable water quality in these natural reserves and to set appropriate upper limits on their exploitation (OECD, 2017c) by increasing the production of desalinated or reclaimed water if necessary. To ensure compliance, they could be written into law, as for Lake Kinneret.

It is also important to recognise that most of Israel's natural water resources are shared with its neighbours. Agreements have been signed with Jordan and the Palestinian Authority for the management of these resources, and Israel transfers 130-135 million m^3 of water there every year (WA, 2015). In July 2017, a trilateral agreement was also signed between Israel, Jordan and the Palestinian Authority to construct a pipeline transferring water from the Red Sea to the dwindling Dead Sea, to build a desalination plant in Aqaba using the electricity generated by the water going down to the Dead Sea (the lowest body of water on earth), and to transfer 32 million m^3 of water per year to the Palestinian Authority (10 million to Gaza and 22 million to the West Bank) (Ahren and Lidman, 2017; Siegel, 2017). Although this project will only marginally contribute to meeting Gaza's need for drinking water and slowing the drying-up of the Dead Sea, it highlights the benefits of co-operation between the region's stakeholders to address common problems. Nevertheless, increased regional co-operation in water management will be required if environmental problems are to be avoided and social and if economic development in the region is to materialise, which is particularly urgent in the case of Gaza (Siegel, 2015), even if the geopolitical context makes this difficult.

The operation of water supply infrastructure could improve still further if the water subsidies for the farming sector were completely abolished and the large number (55) of local water companies were reduced, thereby generating economies of scale and lower

Figure 2.21. **Hydrogeological situation of the main natural water sources**

Total volume of water above the red lines for three main water sources[1]



1. Coastal aquifer, Western Mountain aquifer and the Kinneret. To prevent water salinisation, the hydrological service has defined red lines as the minimal water levels needed for each water source and blue lines as the required water levels to maintain a satisfactory water quality.

Source: Israeli Water Authority.

StatLink http://dx.doi.org/10.1787/888933674396

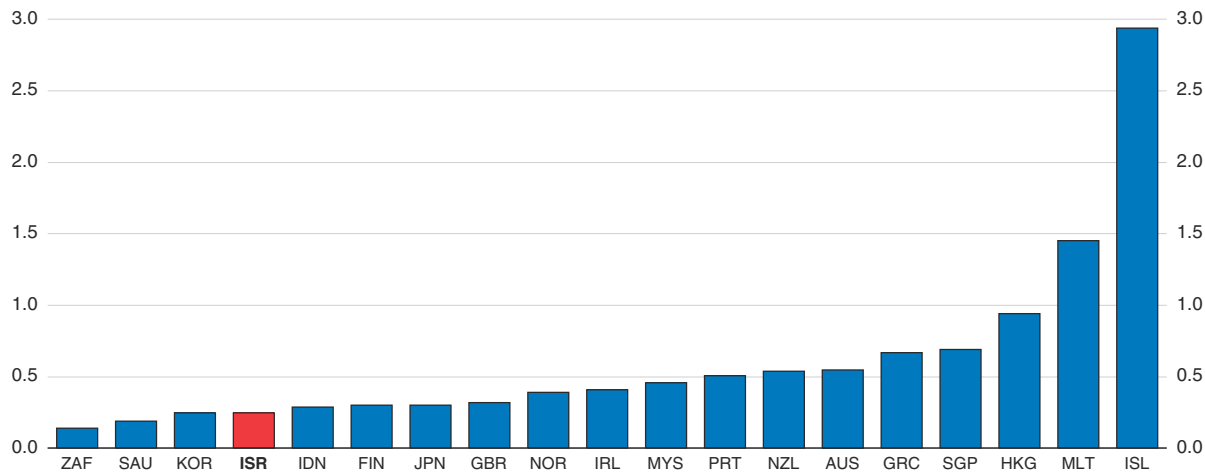
management and administration costs (Globes, 2017b). The authorities could also encourage farmers to trade water quotas to encourage the optimal allocation of these resources (OECD, 2015b).

A reform of airport management is indispensable

Because of its geopolitical situation, Israel depends heavily on air transport for movements into and out of the country. The policies towards air transport liberalisation adopted in recent years, which led to the privatisation of El Al in 2005 and the Open Skies agreements with the United States in 2010 and the European Union in 2013, have helped to bring down the price of transport services and increase demand (OECD, 2016a). Airport management failings, however, prevent the country from reaping the full benefits of these reforms. International benchmarks of connectivity indicators, which summarise passenger movement statistics, airline prices, travel time and available destinations, reveal that Israel's performance lags significantly behind that of comparable countries (Figure 2.22), a situation that undermines the attractiveness of Israel's economy in terms of investment, human capital and tourism (PwC, 2015).

The problems affecting airport management in Israel are caused by a mix of factors related to the monopolistic position of Ben Gurion international airport and the sector's regulatory failings. Over 99% of international passenger traffic transits through Ben Gurion (there is one other small civil airport, in the south of the country near Eilat). Air transport is organised by a public enterprise, the Israel Airport Authority, or IAA, which directly manages almost all of the sector's value chain. The IAA provides all of the country's civil air navigation services and is directly responsible for the commercial management of airports–runways, emergency services, luggage handling, freight terminal unloading, air security and even gardening. The almost complete lack of sub-contractor bidding for management of these services is quite exceptional among OECD countries (Table 2.2).

Figure 2.22. **Air transport connectivity index, 2015**[1]



1. Air connectivity is a measure which captures the number of routes, range of destinations served, frequency of services and overall capacity deployed to and from a country. The better connected a country is, the greater its ability to take advantage of the benefits that air transport can unlock.

Source: IATA Economics based on SRS Analyser, World Bank.

StatLink http://dx.doi.org/10.1787/888933674415

Table 2.2. **Number of airport service providers in selected OECD countries**

	Boarding, check in, lost & found	Baggage handling	Cargo terminal	Ramp services
Israel	**3**	**1**	**2**	**1**
Austria	8	2[1]	6	2[1]
Denmark	3	3	3	3
Finland	3	2[1]	5[1]	3[1]
Ireland	7	5	6	5
Sweden	4	5	3	4
Portugal	8[1]	2[1]	2[1]	2[1]
Belgium	5	2	5	2
Greece	4	3	3	3
Italy	4	2[1]	2[1]	2[1]
United Kingdom	5	5	5	5

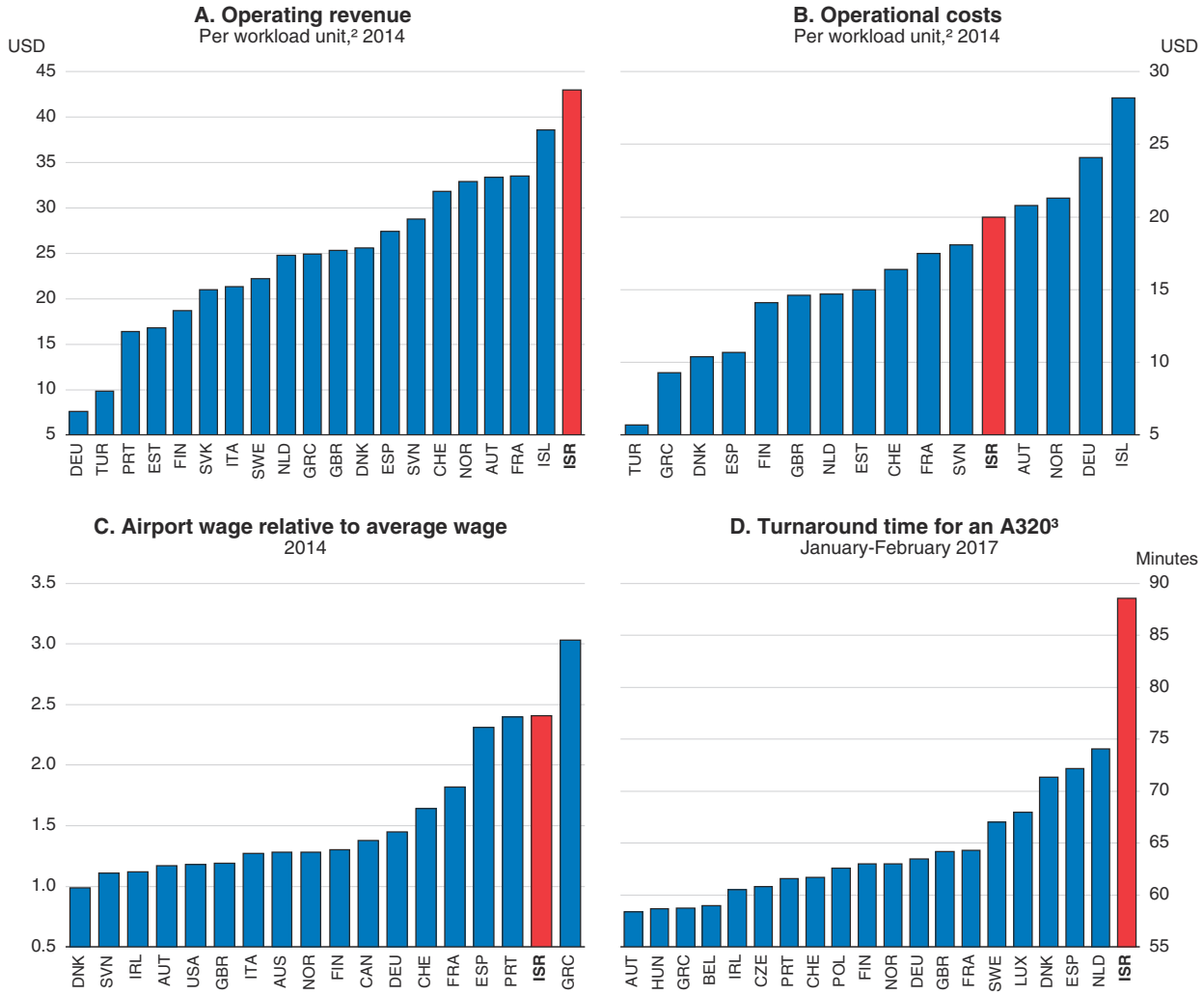
1. One of the providers is the airport operator.

Source: Air Transport Research Society database.

The operation of this public monopoly damages the efficiency of airport management. Revenue per air unit at Ben Gurion airport ranks among the highest in the world because of the high fees paid by businesses and air carriers – costs which are largely passed on to their customers (Figure 2.23, Panel A). Management costs are higher than in most other countries (Panel B), largely because of relatively high wages (Panel C), which are also above those of other Israeli public enterprises (Knesset, 2017). Furthermore, the quality of services provided to carriers is poor, as shown by the lengthy aircraft turnaround times between landing and take-off (Panel D), which is a serious concern for low-cost airlines.

The authorities have announced measures to correct these failings. In 2011 the government pledged to create a new international airport to support Ben Gurion and in 2014 took the decision to have the airport built and managed by private firms under a PPP agreement. According to the PPP management committee, this airport, which should be

Figure 2.23. **Airport management indicators**[1]



1. Data refer either to the airport of the capital (or the average when there is more than one), or the average of the most important ones if the capital's is not available.
2. One passenger or 100 kg of cargo.
3. Time from landing till taking off. Data extracted from Flightradar, based on real time flights during January-February 2017, not including flights from hubs, late flights and connection flights.

Source: Air Transport Research Society; Flightradar database; Ministry of Finance.

StatLink http://dx.doi.org/10.1787/888933674434

located in the north of the country and handle short- and long-haul flights, is expected to open between 2025 and 2030 (State of Israel, 2017).

These are welcome measures that need to be implemented immediately. A new airport built and managed by private companies will challenge Ben Gurion's monopoly. Nevertheless, it is also important to review sector regulation if fair and effective competition is to be guaranteed: responsibility for air traffic control management needs to be handed to a body independent of the IAA; the various activities carried out by the IAA, which could itself be transformed into a holding company, should be organised into separate, distinct subsidiaries to ensure greater management transparency and prevent competition-distorting cross-subsidisation. Lastly, it would also be helpful to enforce the opening-up of ground services at Ben Gurion airport to private companies, in line with best practices such

as EU directives on access to these services. Many signatory countries of the EU's Open Skies agreement have adopted European directive 96/67/EC, which requires that at least one supplier of ground services should be independent of both the managing body of the airport and the dominant carrier.

A better match between supply and demand in mobility services is needed

Information and communications technology has led to the emergence of the sharing economy in the road transport sector, with a better use of the road network through the development of ride-hailing services, such as those offered by Uber. Several recent empirical studies carried out in the United States have highlighted the benefits of this new type of service, which leverages previously underused supply-side capacities. By increasing the number of persons per vehicle, ride-hailing reduces the number of cars on the road along with the associated problems of congestion and urban pollution (Li et al., 2016). These new services improve the well-being of their users and reduce the need to purchase a car and build new road capacity (Cohen et al., 2016; American Public Transportation Association, 2016). They increase options for urban mobility by meeting unsatisfied demand for trips in urban areas by the young population, including in areas poorly served by public transport and taxis (Rayle et al., 2014). Using estimates carried out in large American cities, Cramer and Kruger (2016) show that ride-hailing services are also 30-50% more efficient than traditional taxis based on time spent or distances travelled with passengers. These services also offer better quality and shorter customer wait times. This situation reflects both the better technology used by ride-hailing firms for adapting to demand, their ability to create larger networks of drivers than taxi companies and their more flexible service offering through variable pricing that adjusts to demand fluctuations in real time.

A change in the regulations opening up access to the Israeli taxi market to these ride-hailing firms would also most likely have a positive impact on consumers and on the efficiency of road network use, as stressed by the Israeli Antitrust Authority (Ben-Gedalyahu, 2016). Nevertheless, this type of reform, which is currently opposed by the authorities, would be hard to implement, mainly due to the problems that the traditional taxi companies, subject to stringent charges and regulations, would have in absorbing such an abrupt change in the functioning of the market and dealing with the competition from ride-hailing firms. The issue also arises of a possible restructuring of employment in the sector, with salaried workers replaced by the self-employed. Technological changes, however, raise the question of the need to modernise the regulation and organisation of the traditional taxi companies. In the long term this course of action seems inevitable, and it would be better to deal it with it now (Roger, 2015; Fritz, 2014). Consideration could be, for instance, given to allowing taxi drivers to also work for ride-hailing firms as in the United States (Uberkit, 2017). A discussion of these issues would be welcome, notably with the inclusion of possible accompanying measures for helping the traditional taxi companies and their employees come to terms with these structural changes.

Access to infrastructure in disadvantaged areas, especially Arab cities, needs to be improved

The local financing system should be fairer with poor municipalities

Ensuring that all people have adequate access to economic and social infrastructure is important to ensure equitable opportunity for all citizens and to promote inclusive growth. In Israel this equality of access to many infrastructure services is hampered by differences in financial situations between municipalities that are related to their ability to raise tax

revenues. As mentioned above, the Israeli property tax system (*Arnona*), which is the main tax base of local governments, is unbalanced, with much higher levies on non-residential buildings than housing. Tax rates on commercial or industrial properties can be up to four times higher than for dwellings, and revenues from the latter are often lower than the costs of managing the infrastructure required by residents (Eckstein et al., 2014; OECD, 2017a). This system of financing is thus regressive, because it increases the difficulties of the poorest municipalities, which are not attractive to companies, to improve their supply of public services (Fitoussi et al., 2016).

Steps have been taken to address this problem, which also hampers the government's policy of increasing housing supply (Chapter 1). The State has developed special agreements to finance the infrastructure required for the construction of residential projects in some municipalities, especially for large projects. However, this temporary mechanism applies only to new construction and is based on an *ad hoc* and not very transparent approach (Fitoussi et al., 2016). It does not meet the need to improve infrastructure services in certain existing residential areas, for example in peripheral regions or Arab cities. To correct the financial imbalances between local authorities in 2017 the authorities therefore created an *Arnona* fund. Instead of *Arnona* being paid by central government to municipalities where facilities are located, they will be centralised in this new fund and redistributed equally across all municipalities (Iataskforce, 2016b). This reform is welcome, but questions arise as to the magnitude of the additional resources transferred to the weakest municipalities. If these transfers remain too limited, a new rebalancing of the financing of these local authorities should be envisaged to ensure that poor municipalities would be provided with adequate resource for financing their needs for local infrastructure services.

Existing plans to improve infrastructure in Arab towns are welcome and need to be fully implemented

Over the past few years the authorities have also made increasing efforts to improve the financial situation of Arab municipalities and to help them to catch up with the cities with Jewish and mixed populations in terms of infrastructure. These communities lack not only financial resources but also skilled personnel. The challenge of reforms in this area is therefore not only to increase their financial resources but also to improve their management capacity to enable them to develop autonomously in the long term and to increase their attractiveness for commercial and industrial activities through better infrastructure. Government Resolution 922, adopted in December 2015 after consultation with the leaders of the Arab communities, aims to achieve this dual objective. As mentioned previously, a five-year NIS 15 billion plan will increase the financial resources of local Arab communities through special budgetary allocations in many sectors. This plan also aims to strengthen the administrative capacities of these communities with, in the first instance, the support of qualified external professionals to ensure effective short-term management of new planned programmes (Iataskforce, 2016a and 2016b). In addition, recruitment measures and training of Arab municipal staff have been undertaken to develop their technical skills and ability to "navigate" in central government agencies and offices, while the latter will also strengthen their knowledge and capacities to work with local Arab administrations. A more highly trained municipal staff and better interaction with the central government are essential for the development of infrastructure but also for improving the management of Arab municipalities, including by increasing their relatively low tax collection rates and updating the tax base of properties on their territory (Belikoff and Agbaria, 2014).

To succeed, this ambitious plan must be implemented with care, and welcome provisions have been made in this direction by the authorities. A steering committee, including representatives of the central government and the mayors of the Arab municipalities, ensures the follow-up of the different programmes through regular conferences and updated information on a centralised website (Iataskforce, 2017). From the financial perspective, for example, available information indicates that more than NIS 2.9 billion was spent on Arab communities in 2016, the first year of implementation of this five-year program. The continuation of this programme evaluation process is critical, both to ensure that the targeted improvement of infrastructure services, for example in public transport, is met, and that the administrative capacity of municipalities is strengthened as planned, such as for the collection of taxes. Much of the progress of the plan depends on trust between the Arab municipalities and the central government, but also between the Arab communities and their elected officials (Brender, 2007). A rigorous monitoring and evaluation of the results of the reform in terms of improving the efficiency, professionalism and transparency of the administrative management of municipalities will have a key role in enhancing this trust.

Developing infrastructure in Arab cities also requires addressing the lack of public land problem

Another thorny issue to address for improving public services in Arab municipalities is the lack of public land available to develop the required infrastructures. This requires solving problems of urban planning, cadastre and illegal housing construction in these municipalities where most of the land is private. Moreover, Arab families have traditionally been unwilling to sell their land, preferring to bequeath it to their children. Because of this longstanding practise, land needed for public use (notably roads) is extremely difficult to acquire. A working group established in December 2014 proposed various remedies, including: i) a limitation on financial penalties for the regularisation of illegal construction and past property tax debts with a means-testing mechanism to incentivise lower-income households to register their land; ii) measures to decentralise and strengthen the transparency of land-planning in Arab cities. These proposals are steps in the right direction. Improving infrastructure in such a context requires appropriate and innovative tools, with flexible procedures to sort out illegal buildings that respect a minimum number of rules, for example in terms of space needed for infrastructure development and faster processing for granting building permits. Given the reluctance of local authorities to resort to land expropriation in difficult cases of areas with high concentrations of illegal construction, the use of private land for the development of infrastructure benefiting all residents could be based on experimental land-planning frameworks relying on consultations and agreements of residents. Public incentives, including the provision of additional land by the State in areas where this is possible, could also be useful, as in the city of Umm al-Fahm (OECD, 2017a).

Recommendations for promoting suitable and well-functioning infrastructure

(Key recommendations included in the Executive Summary are in bold italics)

Improve infrastructure sector governance

- Entrust responsibility for conducting the cost-benefit analyses of projects to an independent agency, which would become a reference centre on infrastructure development and research.
- ***Introduce systematic publication of cost-benefit analyses of projects with mandatory justification of policy-makers' choices.***

Recommendations for promoting suitable and well-functioning infrastructure *(cont.)*

(Key recommendations included in the Executive Summary are in bold italics)

- Enhance co-ordination between different ministries and local government in order to ensure the coherence of investment projects. Improve public consultation at the early stages of project development.
- Implement the centralisation of public-sector expertise and management of public-private partnerships within a single public agency. Provide adequate resources for the planning of infrastructure projects managed by PPPs. Involve the private firms selected for these projects in this planning stage.
- Reduce the number of local water companies. Set clear objectives for the minimum acceptable water quality in natural reserves, and set appropriate upper limits on their exploitation.

Expand infrastructure in key economic and social sectors

- ***Raise budgetary resources for infrastructure. Use public-private partnership agreements, especially in public transport, following a careful and clear allocation of their risks.*** Further expand childcare facilities in disadvantaged areas. Increase hospitals' acute-bed capacity.

Diversify infrastructure funding sources, and boost incentives for cost-effective capital investment

- ***Promote road tolls and electricity smart meters to foster user funding of infrastructure.***
- ***Shift car taxes substantially from ownership to vehicle use.***

Promote a more efficient use of infrastructure by enhancing infrastructure regulation

- ***Introduce in particular competition in airport management:***
  - Turn the Israel Airport Authority into a holding company with distinct subsidiaries for different activities.
  - Create a separate air traffic control operator managed by an independent body.
  - Enforce the opening-up of ground services at Ben Gurion airport to private companies.
  - Ensure that the planned new airport is managed by private companies.
- Turn the Israel Electricity Company (IEC) into a holding company with distinct subsidiaries for different activities, and create a separate infrastructure operator. Create a wholesale electricity market with a number of producers, making sure that none has a dominant position. Sell or privatise IEC power plants if necessary.
- Pursue reforms in wireline telecommunication to develop wholesale market and third-party access to passive and active infrastructure in this sector. Create an independent regulator with adequate powers.
- Open the taxi market to ride-hailing firms.

Enlarge access to infrastructure services in disadvantaged areas

- ***Ensure that adequate resources are provided for municipalities to finance local infrastructure services needed in new residential areas.***
- ***Better coordinate large and cheaper residential developments in peripheral areas with public transport to where jobs are located.***
- Implement rigorously and transparently the five-year NIS 15 billion plan (government resolution 922) to increase Arab cities' financial resources and administrative capacities and enhance their infrastructure.
- Address the issues of the lack of public land in Arab cities for infrastructure development. To this end, improve the accuracy of the cadastre, and tackle the illegal construction problem:
  - Adopt flexible procedures for sorting out illegal buildings that respect a minimum number of rules, for example in terms of space. Limit financial penalties when putting illegal construction in order.
  - ***Decentralise and promote transparency of urban planning in Arab cities.*** Experiment with land-planning frameworks relying on consultations with and agreements of residents. This could be helped by incentives such as providing additional public land in cities where possible.

Bibliography

Ahren, R. and M. Lidman (2017), "Israel, Palestinians reach landmark water deal for West Bank, Gaza", the Times of Israel newspaper, 13 July, *www.timesofisrael.com/israel-palestinians-reach-landmark-water-deal-for-west-bank-gaza-strip/*.

Alberta, G. and D. Mahalel (2006), "Congestion tolls and parking fees: A comparison of the potential effect on travel behaviour", *Transport Policy*, Vol. 13, Issue 6, *www.sciencedirect.com/science/article/pii/S0967070X06000461*.

American Public Transportation Association (2016), "Shared mobility and the transformation of public transit", *Transit Research Analysis*, March, *www.apta.com/resources/reportsandpublications/Documents/APTA-Shared-Mobility.pdf*.

Araújo, S. and D. Sutherland (2010), "Public-Private Partnerships and Investment in Infrastructure", *OECD Economics Department Working Papers*, No. 803, OECD Publishing, Paris, *http://dx.doi.org/10.1787/5km7jf6q8f0t-en*.

Arezki, R., P. Bolton, S. Peters, F. Samama and J. Stiglitz (2017), "From global savings glut to financing infrastructure", *Economic Policy*, Vol. 32, Issue 90, April, *https://academic.oup.com/economicpolicy/article/32/90/221/3111731/From-global-savings-glut-to-financing*.

Barbiero, O. and B. Cournède (2013), "New Econometric Estimates of Long-term Growth Effects of Different Areas of Public Spending", *OECD Economics Department Working Papers*, No. 1100, OECD Publishing, Paris, *http://dx.doi.org/10.1787/5k3txn15b59t-en*.

Bar-Eli, A. (2016), "Israeli experiment shows that offering drivers sweeteners can cut traffic jams", Haaretz press article, 30 October, *www.haaretz.com/israel-news/business/1.749964*.

Barkat, A. (2017), "Electricity rates in Israel to fall 3% in January", *Globes*, 20 Aug, *www.globes.co.il/en/article-electricity-authority-cutting-rate-3-1001201875*.

Belikoff, M. and S. Agbaria (2014), "From Deficits and Dependence to Balanced Budgets and Independence: The Arab Local Authorities' Revenue Sources", Edited by Shirley Racah, Jerusalem, Haifa, Nazareth, April, *www.sikkuy.org.il/wp-content/uploads/2014/10/localauthorities_eng.pdf*.

Ben-David, D. (2017), "Longer lives and exasperated patients: Israel's health system does it the hard way", *Shoresh Policy Brief*, April, *http://shoresh.institute/policy-brief-eng-ExasperatedPatients.pdf*.

Ben-Gedalyahu, G. (2016), "Israel Antitrust Authority urges adoption of Uber services", *Globes*, 8 Sept., *www.globes.co.il/en/article-israel-antitrust-authority-urges-adoption-of-uber-services-1001151047*.

Bob, Y.J. (2015), "Comptroller slams nepotism, corruption in Nat'l Transport Co., Dan bus co", *Jerusalem Post*, 28 January, *www.jpost.com/Israel-News/Comptroller-slams-nepotism-corruption-in-Natl-Transport-Co-Dan-bus-co-389309*.

BoI (Bank of Israel) (2010), *Annual Report – 2009*, Jerusalem, *www.boi.org.il/en/NewsAndPublications/RegularPublications/Documents/Doch2009/pe_6.pdf*.

BoI (2014), "Policy Regarding the Development of Israel's Sea Ports", *Recent Economic Developments*, No. 137, *www.bankisrael.gov.il/en/NewsAndPublications/RegularPublications/Research%20Department%20Publications/RecentEconomicDevelopments/develop137e.pdf*.

BoI (2015), *Annual Report – 2014*, Jerusalem, *www.boi.org.il/en/NewsAndPublications/RegularPublications/Research%20Department%20Publications/BankIsraelAnnualReport/Annual%20Report%202014/chap-6.pdf*.

BoI (2016), Annual Report – 2015, Jerusalem, *www.boi.org.il/en/NewsAndPublications/RegularPublications/Pages/DochBankIsrael2015.aspx*.

BoI (2017a), "The Development of the Electricity Market in Israel: Toward a Sustainable Electricity Market", September, *www.boi.org.il/en/NewsAndPublications/PressReleases/Pages/27-9-17.aspx*.

BoI (2017b), Annual Report – 2016, Jerusalem, *www.boi.org.il/en/NewsAndPublications/RegularPublications/Pages/DochBankIsrael2016.aspx*.

Bom, P. and J. Ligthart (2009), "What Have we Learned from Three Decades of Research on the Productivity of Public Capital?", *Journal of Economic Surveys*, Vol. 28, No. 5, pp. 889-916, *www.researchgate.net/publication/228767313_What_Have_We_Learned_From_the_Three_Decades_of_Research_on_the_Productivity_of_Public_Capital*.

Bousso, N. (2016), "Take a sleeping bag and sleep on the floor. I do not care, do not wait for roads to build apartments", *The Marker*, 8 August (in Hebrew), *www.themarker.com/realestate/1.3031692*.

Brender, A. (2007), "Does municipal segregation alleviate the economic disadvantage of Israeli Arabs? : Local tax collection as an indicator", Harry S. Truman Research Institute for the Advancement of Peace, Hebrew University of Jerusalem, *https://searchworks.stanford.edu/view/7861000*.

Bruun, E. and M. Givoni (2015), "Sustainable mobility: Six research routes to steer transport policy", *Nature*, International weekly journal of science, *www.nature.com/polopoly_fs/1.17860!/menu/main/topColumns/topLeftColumn/pdf/523031a.pdf*.

Cohen, P., R. Hahn, J. Hall, S. Levitt and R. Metcalfe (2016), "Using Big Data to Estimate Consumer Surplus: The Case of Uber", *NBER Working Paper*, No. 22627, *www.nber.org/papers/w22627*.

Cramer, J. and A.B. Krueger (2016), "Disruptive Change in the Taxi Business: The Case of Uber", *American Economic Review: Papers & Proceedings*, *http://dx.doi.org/10.1257/aer.p20161002*.

Cramton, P. and R. Geddes (2017), "Markets in Road Use: Eliminating Congestion through Scheduling, Routing, and Real-Time Road Pricing", *www.cramton.umd.edu/papers2015-2019/cramton-geddes-markets-in-road-use.pdf*.

Eckstein Z., E. Tolkowsky, A. Eizenberg Ben-Lulu and Y. Sherman (2014), "Do Local Authorities Face a Negative Incentive to Increase the Population under their Jurisdiction?", *Policy Paper – GGA*, Gazit-Globe Real Estate Institute, March, *http://gazit-globe.idc.ac.il/en/files/Policy%20Paper%20-%20Local%20Authority%20Incentives%20-%20March%202014%20-%20GGA2014_1.pdf*.

Égert, B. (2016), "Regulation, Institutions, and Productivity: New Macroeconomic Evidence from OECD Countries", *American Economic Review,* Vol. 106, No. 5, pp. 109-13, *www.aeaweb.org/articles?id=10.1257/aer.p20161026*.

Feitelson, E. and J. Gamlieli (2010), "Impediments to integrative transport policies: Lessons from the new town of Modiin", Chapter 17 in *Integrated Transport: From Policy to Practice,* Routledge Taylor and Francis, London and New York.

Feitelson, E., M. Givoni, E. Halevy, I. Salomon, D. Rosen, O. Gabay and A. Zvuloni (2013), "Railway to Eilat: Logical examination to establish a joint venture" (in Hebrew), Shasha Center for Strategic Studies, Hebrew University of Jerusalem, October.

Fitoussi, S., I. Yakir and M. Sarel (2016), "The Roles and Preferences of the Local Authorities in the Development of Residential Real Estate" in *Removing the Barriers to Housing Development in Israel*, Kohelet Policy Forum, *Policy Paper*, No. 27, March, *http://en.kohelet.org.il/wp-content/uploads/2016/05/KPF055_eReal_estate_240416.pdf*.

Flug, K. (2017), "Remarks by Bank of Israel Governor Dr. Karnit Flug at the Cabinet meeting on the multi-year infrastructure development plan", *www.boi.org.il/en/NewsAndPublications/PressReleases/Pages/3-9-17.aspx*.

Flyvbjerg, B., M. Skamris Holm and S. Buhl (2004), "What Causes Cost Overrun in Transport Infrastructure Projects?", *Transport Reviews,* Vol. 24, No. 1, January, *https://arxiv.org/ftp/arxiv/papers/1304/1304.4476.pdf*.

Fournier, J.-M. and Å. Johansson (2016), "The Effect of the Size and the Mix of Public Spending on Growth and Inequality", *OECD Economics Department Working Papers*, No. 1344, OECD Publishing, Paris, *http://dx.doi.org/10.1787/f99f6b36-en*.

Fournier, J.-M. (2016), "The Positive Effect of Public Investment on Potential Growth", *OECD Economics Department Working Papers*, No. 1347, OECD Publishing, Paris, *http://dx.doi.org/10.1787/15e400d4-en*.

Fritz, C. (2014), "Mobility-as-a-service: Turning transportation into a software industry", December, *https://venturebeat.com/2014/12/13/mobility-as-a-service-turning-transportation-into-a-software-industry/*.

Frontier Economics (2009), "Ex Post Evaluation Of Cohesion Policy Programmes 2000-2006", Work Package 10, 'Efficiency: Unit costs of major projects', *Final Report*, October, *http://ec.europa.eu/regional_policy/sources/docgener/evaluation/pdf/expost2006/wp10_final_report.pdf*.

Gallo, L. (2016), "Analysis of the factors affecting demand for electricity in Israel, and its projected development in the coming decades", Bank of Israel, 22 November, *www.boi.org.il/en/NewsAndPublications/PressReleases/Pages/22-11-16.aspx*.

Givoni, M. and D. Banister (2010), "The need for integration in transport policy and practice", in *Integrated Transport. From Policy to Practice,* Routledge Taylor and Francis, London and New York.

Glaeser, E. (2016), "If You Build It . . . Myths and realities about America's infrastructure spending", *www.city-journal.org*, summer, *www.city-journal.org/html/if-you-build-it-14606.html?ftcamp=crm/email//nbe/MartinSandbusFreeLunch/product*.

Globes (2017a), "Israeli gov't compiling database of potential PPP projects", *Globes*, 3 Sept, *www.globes.co.il/en/article-israeli-govt-compiling-database-of-potential-ppp-projects-1001203482*.

Globes (2017b), "Merging water corps would save NIS 500m", *Globes*, 24 January, *www.globes.co.il/en/article-merging-water-corps-would-save-nis-500-million-1001172897*.

Gorodeisky, S. (2017a), "Israel Electric to lay off 2,800 as reform agreed", *Globes*, 27 December, *www.globes.co.il/en/article-israel-electric-to-lay-off-2800-as-reform-agreed-1001217230*.

Gorodeisky, S. (2017b), "Israel's Energy Minister: No coal, gasoline by 2030", *Globes*, 4 December, *www.globes.co.il/en/article-israels-energy-minister-no-coal-gasoline-by-2030-1001214304*.

Hazut, A. and Y. Cohen (2016), "Going Green", Report for the Ministry of Finance, December (in Hebrew), *https://media.wix.com/ugd/eff2a0_2960222747e641529d9eb9c709c2f249.pdf*.

Hertie School of Governance (2016), *The Governance Report 2016*, Oxford University Press.

IATA (2008), "Air travel demand – Measuring the responsiveness of air travel demand to changes in prices and incomes", *IATA Economic Briefing*, No. 9, *www.iata.org/publications/economic-briefings/air_travel_demand.pdf*.

Iataskforce (Inter Agency Taskforce on Israeli Arab Issues) (2016a), "Government Resolution 922 Economic Development Plan for the Arab Sector: Current Status, Government Workplans and Civil Society Involvement", July, *http://iataskforce.org/sites/default/files/resource/resource-1462.pdf*.

Iataskforce (2016b), "Government Resolution 922: Economic Development Plan for the Arab Sector Capacity Building for Arab Localities", November, *http://iataskforce.org/sites/default/files/resource/resource-1468.pdf*.

Iataskforce (2017), "Government Resolution 922 Five Year Economic Development Plan for Arab Society: Update on First Year Implementation", May, *www.iataskforce.org/sites/default/files/resource/resource-1520.pdf*.

IMF (2014), "Is it time for an infrastructure push? The macroeconomic effects of public investment", *World Economic Outlook*, October, *www.imf.org/external/pubs/ft/weo/2014/02/pdf/c3.pdf*.

Inderst, G. and R. Della Croce (2013), "Pension Fund Investment in Infrastructure: A Comparison Between Australia and Canada", *OECD Working Papers on Finance, Insurance and Private Pensions*, No. 32, OECD Publishing, Paris, *http://dx.doi.org/10.1787/5k43f5dv3mhf-en*.

Infrastructure Australia (2016), "Australian Infrastructure Plan – Priorities and reforms for our nation's future", February, *http://infrastructureaustralia.gov.au/policy-publications/publications/files/Australian_Infrastructure_Plan.pdf*.

Infrastructure Victoria (2016), "The Road Ahead: How an efficient, fair and sustainable pricing regime can help tackle congestion", November, *www.infrastructurevictoria.com.au/sites/default/files/images/The%20road%20ahead%20final%20web.pdf*.

Jaeger, A. (2014), "Portugal: Improving Fiscal Transparency What is it about? Why is it a good thing? Where are we on this?", IMF, Lisbon Office, Presentation at Conference Budget Watch 2015, ISEG, Lisbon, 26 November, *www.imf.org/external/country/PRT/rr/2014/120114.pdf*.

Knesset (2014), "Public Transportation for the Arab population in some Communities, Snapshot", Research and Information Center, 25 June, *www.knesset.gov.il/mmm/data/pdf/m03412.pdf*.

Knesset (2015), "Government Resolution number 922", 30 December (in Hebrew), *www.pmo.gov.il/Secretary/GovDecisions/2015/Pages/des922.aspx*.

Knesset (2017), Description and Analysis of Airport Authority Fees, Presented to the Economic Committee (in Hebrew), 9 March, *www.knesset.gov.il/mmm/data/pdf/m03927.pdf*.

Lavee, D., G. Beniad and C. Solomon (2011) "The Effect of Investment in Transportation Infrastructure on the Debt-to-GDP Ratio", *Transport Reviews*, Vol. 31, No. 6, *www.tandfonline.com/doi/abs/10.1080/01441647.2011.596581*.

Li, Z., Y. Hong and Z. Zhang (2016), "Do Ride-Sharing Services Affect Traffic Congestion? An Empirical Study of Uber Entry", August, *https://ssrn.com/abstract=2838043 or http://dx.doi.org/10.2139/ssrn.2838043*.

Megido, G. (2016), "Police allege systematic corruption at Netivei Israel", *Globes*, 1 September, *www.globes.co.il/en/article-police-allege-systematic-corruption-at-netivei-israel-1001149809*.

MoF (Ministry of Finance) (2017), Website: The Infrastructure and Project Division – Accountant General, *http://mof.gov.il/en/AG/Pages/InfrastructureAndProjectDivision.aspx*.

Mourougane, A., J. Botev, J.-M. Fournier, N. Pain and E. Rusticelli (2016), "Can an increase in public investment sustainably lift economic growth?", *OECD Economics Department Working Papers*, No. 1351, OECD Publishing, Paris, *http://dx.doi.org/10.1787/a25a7723-en*.

Navigant (2015), "Review of the Electricity Tariffs for the Israel Electric Company", Report prepared for the Public Utility Authority of Israel, *www.energianews.com/files/files/Navigent%20report.pdf*.

OECD (2008), "Convergence and next generation networks", Ministerial Background Report on the future of the Internet Economy, 17-18 June, *www.oecd.org/sti/ieconomy/40761101.pdf*.

OECD (2011a), "Improving the Practice of Transport Project Appraisal", *ITF Round Tables*, No. 149, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789282103081-en*.

OECD (2011b), "Next Generation Access Networks and Market Structure", *OECD Digital Economy Papers*, No. 183, OECD Publishing, Paris, *http://dx.doi.org/10.1787/5kg9qgnr866g-en*.

OECD (2013), *OECD Economic Surveys: Israel*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/eco_surveys-isr-2013-en*.

OECD (2014a), "Financing Infrastructure – International Trends" in *OECD Journal: Financial Market Trends*, Volume 1, *http://dx.doi.org/10.1787/fmt-v2014-1-en*.

OECD (2014b), *The Governance of Regulators, OECD Best Practice Principles for Regulatory Policy*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264209015-en*.

OECD (2015a), *Infrastructure Financing Instruments and Incentives*, OECD Publishing, Paris, *www.oecd.org/daf/fin/private-pensions/Infrastructure-Financing-Instruments-and-Incentives.pdf*.

OECD (2015b), Water Resources Allocation: Sharing Risks and Opportunities, OECD Studies on Water, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264229631-en*.

OECD (2016a), *OECD Economic Surveys: Israel*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/eco_surveys-isr-2016-en*.

OECD (2016b), G20/OECD Support note on Diversification of Financial Instruments for Infrastructure, September, *www.oecd.org/daf/fin/private-pensions/G20-OECD-Support-Note-on-Diversification-of-Financial-Instruments-for-Infrastructure.pdf*.

OECD (2016c), "Israel Policy Brief – Health: Securing adequate resources for Israel's health system", OECD Better Policies Series, January, *www.oecd.org/health/israel-securing-adequate-resources-for-health-system.pdf*.

OECD (2016d), *Open Government: The Global Context and the Way Forward*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264268104-en*.

OECD (2017a), "Spatial Planning and Policy in Israel: The Cases of Netanya and Umm Al-Fahm", Centre for entrepreneurship, SMEs, Local development and tourism, Regional Development Policy Committee, *http://dx.doi.org/10.1787/9789264277366-en*.

OECD (2017b), "A Fiscal Approach for Inclusive Growth in the G7 Countries", Paper presented at the Bari G7 meeting, May, *www.oecd.org/tax/tax-policy/a-fiscal-approach-for-inclusive-growth-in-g7-countries.htm*.

OECD (2017c), *Diffuse Pollution, Degraded Waters: Emerging Policy Solutions*, OECD Studies on Water, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264269064-en*.

Persson, J. and D. Song (2010), "The Land Transport Sector: Policy and Performance", *OECD Economics Department Working Papers*, No. 817, OECD Publishing, Paris, *http://dx.doi.org/10.1787/5km3702v78d6-en*.

PwC (PricewaterhouseCoopers) (2015), "Connectivity and growth: Issues and challenges for airport investment", November, *www.pwc.com/gx/en/capital-projects-infrastructure/publications/assets/connectivity-growth-airport-investment.pdf*.

PUA (Public Utility Authority-Electricity) (2016a), "The Electricity Authority's Evaluation of the State of the Electricity Market, 2015", *https://pua.gov.il/publications/documents/evaluation.pdf*.

PUA (2016b), "Hearing on the new auction system used to introduce over 1000 MW of solar electricity", 10 October (in Hebrew), *https://pua.gov.il/Publications/PressReleases/Pages/hasdara_1000mw.aspx*.

Queiroz, C., A. Uribe and D. Blumenfeld (2016), "Mechanisms for Financing Roads: A Review of International Practice", Inter-American Development Bank, December, *https://publications.iadb.org/bitstream/handle/11319/8082/Mechanisms-for-Financing-Roads-A-Review-of-International-Practice.pdf?sequence=1*.

Rafiah, R. and S. Cohen (2016), "Israel Fast Lane (HOT Lane) Changes in Demand, Modal Split, and the Factors Behind Them", Presentation for the 15th International Conference on Managed Lanes, Miami, 5 May, *http://onlinepubs.trb.org/onlinepubs/Conferences/2016/ML/S5-Rafiah.pdf*.

Rayle, L., S. Shaheen, N. Chan, D. Dai and R. Cervero (2014), "App-Based, On-Demand Ride Services: Comparing Taxi and Ridesourcing Trips and User Characteristics in San Francisco", University of California Transportation Center, *Working Paper*, *www.its.dot.gov/itspac/dec2014/ridesourcingwhitepaper_nov2014.pdf*.

Rogers, B. (2015), "The Social Costs of Uber", University of Chicago, *http://adapt.it/adapt-indice-a-z/wp-content/uploads/2015/06/Rogers_Dialogue.pdf*.

Rosner, K. (2013), "Fuels for Thought: A Competitive Fuels Future in Israel", *Journal of Energy Security*, April, *http://ensec.org/index.php?option=com_content&view=article&id=439:israels-sompeting-fuels-initiative&catid=135:issue-content&Itemid=419*.

Schlosser, A. (2011), "Public Preschool and the Labour Supply of Arab Mothers: Evidence from a Natural Experiment", Eitan Berglas School of Economics, Tel Aviv University, September, *www.tau.ac.il/analias/Public%20PreSchool.pdf*.

Sharabany, R. (2008), "The Effect of Infrastructure Capital on Manufacturing Industries in Israel, 1990-2003" (in Hebrew), *www.boi.org.il/en/Research/Pages/papers_dp0805e.aspx*.

Shiftan, Y., N. Sharaby and C. Solomon (2008), "Transport Project Appraisal in Israel", *Transportation Research Record*, No. 2079, *http://dx.doi.org/10.3141/2079-17, http://trrjournalonline.trb.org/doi/abs/10.3141/2079-17*.

Siegel, S. (2015), *Let There Be Water: Israel's solution for a water-starved world,* Thomas Dunnes Books, St Martin's Press, New York.

Siegel, S. (2017), "A Good Story About Israelis and Palestinians", *New York Times*, 13 July, *www.nytimes.com/2017/07/13/opinion/israelis-and-palestinians-water-deal.html*.

Sikkuy (2016a), "A position paper on public transportation in Arab communities submitted to the Knesset subcommittee on public transportation", Sikkuy Equality Policy Department, February, *www.sikkuy.org.il/wp-content/uploads/2016/03/Sikkuy-PT-position-paper-for-Knesset-Feb.-2016.pdf*.

Sikkuy (2016b), *Newsletter*, No. 9, 13 October, *http://us12.campaign-archive2.com/?u=c4b214463262281c000856a49&id=d21daddfa3&e=a7acee3d26*.

State Comptroller (2013), "Restructuring public transport in Tel Aviv metropolitan area" (in Hebrew), *www.mevaker.gov.il/he/Reports/Report_113/acff0778-f81d-449c-914f-ac2fb7864b59/121-public-t.pdf*.

State of Israel (2012a), "Public Transport Development: Strategic Plan" (in Hebrew), Ministry of Finance and Ministry of Transportation, National Infrastructure and Road Safety, December.

State of Israel (2012b), "How to check the feasibility of transport projects" (in Hebrew), study funded by the Ministry of Transportation, National Infrastructure and Road Safety, and the Ministry of Finance, December.

State of Israel (2017), "The Inter-Ministerial Tender Committee for PPP Airport Project: Request for Information – Consulting and Management Services to the Government of Israel – With respect to an International Airport Project", *http://itrade.gov.il/canada/files/2017/03/RFI-for-Consulting-and-Management-Services-for-an-International-Airport-in-Israel.pdf*.

Taub (2016), "Waiting for Care: Queues in Israel's Hospitals", Taub Center, November, *http://taubcenter.org.il/waiting-for-care-queues-in-israels-hospitals/*.

Terrill, M. (2016), "Cost overruns in transport infrastructure", Grattan Institute, October, *https://grattan.edu.au/wp-content/uploads/2016/10/878-Cost-overruns-on-transport-infrastructure.pdf*.

Thomopoulos, N. and M. Givoni (2015), "The autonomous car – a blessing or a curse for the future of low carbon mobility? An exploration of likely vs. desirable outcomes", *https://link.springer.com/content/pdf/10.1007%2Fs40309-015-0071-z.pdf*.

Tziaon, H. (2016), "Deficiencies in the Construction of Harish, Serious Transportation Problems" (in Hebrew), *Ynet*, 16 November, *www.ynet.co.il/articles/0,7340,L-4879915,00.html*.

Uberkit (2017), "More Details About UberTAXI", UberKit.net Blog, 3 March, *www.uberkit.net/blog/more-details-about-ubertaxi/*.

WA (Water Authority) (2015), "Israel Water Sector: Regional Cooperation", *www.water.gov.il/Hebrew/ProfessionalInfoAndData/2012/06-Israel%20Water%20Sector%20-%20Regional%20Cooperation.pdf*.

Weinberger, G., Y. Livshitz, A. Givati, M. Zilberbrand, A. Tal, M. Weiss and A. Zurieli (2012), "The Natural Water Resources Between the Mediterranean Sea and the Jordan River", Water Authority, *www.water.gov.il/Hebrew/about-reshut-hamaim/The-Authority/FilesWatermanagement/water-report-MEDITERRANEAN-SEA-AND-THE-JORDAN.pdf*.

Zanzuri, A., L. Baumel and I. Ben David (2015), "Lack of public transport solutions in the Committee for Planning and Approval of vast residential units (VATMAL)" (in Hebrew), Traffic Jams Planning Commission, Konrad Adenauer Stiftung, December, *www.teva.org.il/_Uploads/dbsAttachedFiles/1(60).pdf*.

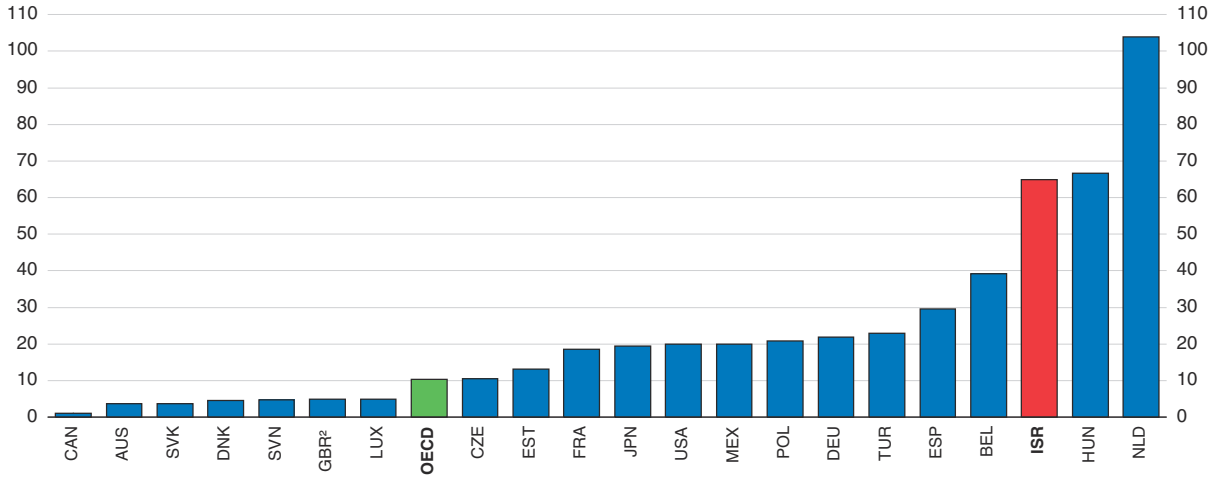
ANNEX A.2.1

The Management of Infrastructure for water supply in Israel

Ever since the creation of the State of Israel, ensuring the security of the country's water supply has been a constant concern for the authorities (Siegel, 2015). With just 40 to 50 days of rain a year in coastal regions and 4 to 5 days of rain in arid areas, natural resources are limited. These resources are subject to strong and growing pressure. The quantity of fresh water available, which amounts to around 1.2 billion m^3 per year, has fallen in recent decades and should fall further – by around 15% by 2050, because of reduced precipitation linked to climate change (WA, 2012). The need for water, conversely, has grown steadily: the population has risen tenfold since 1948, reaching 8.8 million in 2017, and is forecast to reach over 15.6 million in 2050 (CBS, 2017). The total demand from the agricultural, urban and industrial sectors, which came to 2.2 billion m^3 in 2015, was 45% higher than natural resources and is set to rise to 3.6 billion m^3 in 2050 (WA, 2012). The rate of utilisation of natural freshwater resources, which is already very high by international standards, is expected to increase further still (Figure A.2.1).

Figure A.2.1. **Intensity of freshwater use**[1]

2015 or latest year available



1. Water abstraction as a percentage of internal resources.
2. England and Wales only.

Source: OECD, *Environment – Water Abstractions Database*.

StatLink http://dx.doi.org/10.1787/888933674073

It is thus essential for Israel to possess robust infrastructure and institutions to meet its water needs, while managing the available natural resources in a sustainable way. Appropriate regulations must prevent the overexploitation of these resources and limit the associated environmental problems, especially the risk of irreversible damage to water reserves in the event, say, of an increase in their salinity. It is also important to create the right conditions for the development of alternative water resources (desalinated water or recycled wastewater) to meet the country's needs and encourage sufficient distribution throughout the country and between all users (households, farmers and businesses). Public intervention is also needed to regulate the natural monopolies involved in the management and distribution of water at national and local levels.

The State has wide-ranging control over water management in Israel

To achieve these objectives, Israel's water policy, which has been enshrined in law since 1959, relies on extensive State control (Kislev, 2011). The State owns all the country's water resources, whatever their nature: surface water and groundwater, water found on private land, wastewater and runoff. The authorities have also built a national network of pipelines (the National Water Carrier, NWC) to transport water from the north of the country, where it is found in relative abundance, to the densely populated regions in the centre and the more arid areas in the south. This pipeline network has been operational since 1964 and is the biggest ever built in Israel, reflecting the importance attached to this sector by the authorities. Developed by Mekorot, a public enterprise that continues to manage it, the NWC supplies 80% of drinking water and 70% of all water used in the country[1] (Mekorot, 2017).

To meet growing demand, alternative water resources have been developed

With surging demand for water in the last few decades, Israel has developed alternative sources to supplement its natural resources. Since 2005 five desalination plants have been built along the Mediterranean coast to cater to the growing need for drinking water. Most of these production units, which rank among the most energy-efficient in the world (WA, 2015a), were developed by private firms under public-private partnerships (PPPs). Downstream in the cycle, capacity for the recovery and treatment of wastewater has been increased to meet the need for agricultural irrigation. Furthermore, the NWC has been extended and modernised by Mekorot to connect the desalination plants to the rest of the pipeline and allow water to circulate not only from north to south but also from the west coast in every other direction, upstream or downstream, which is unique in OECD countries (OECD, 2011; Mekorot, 2017).

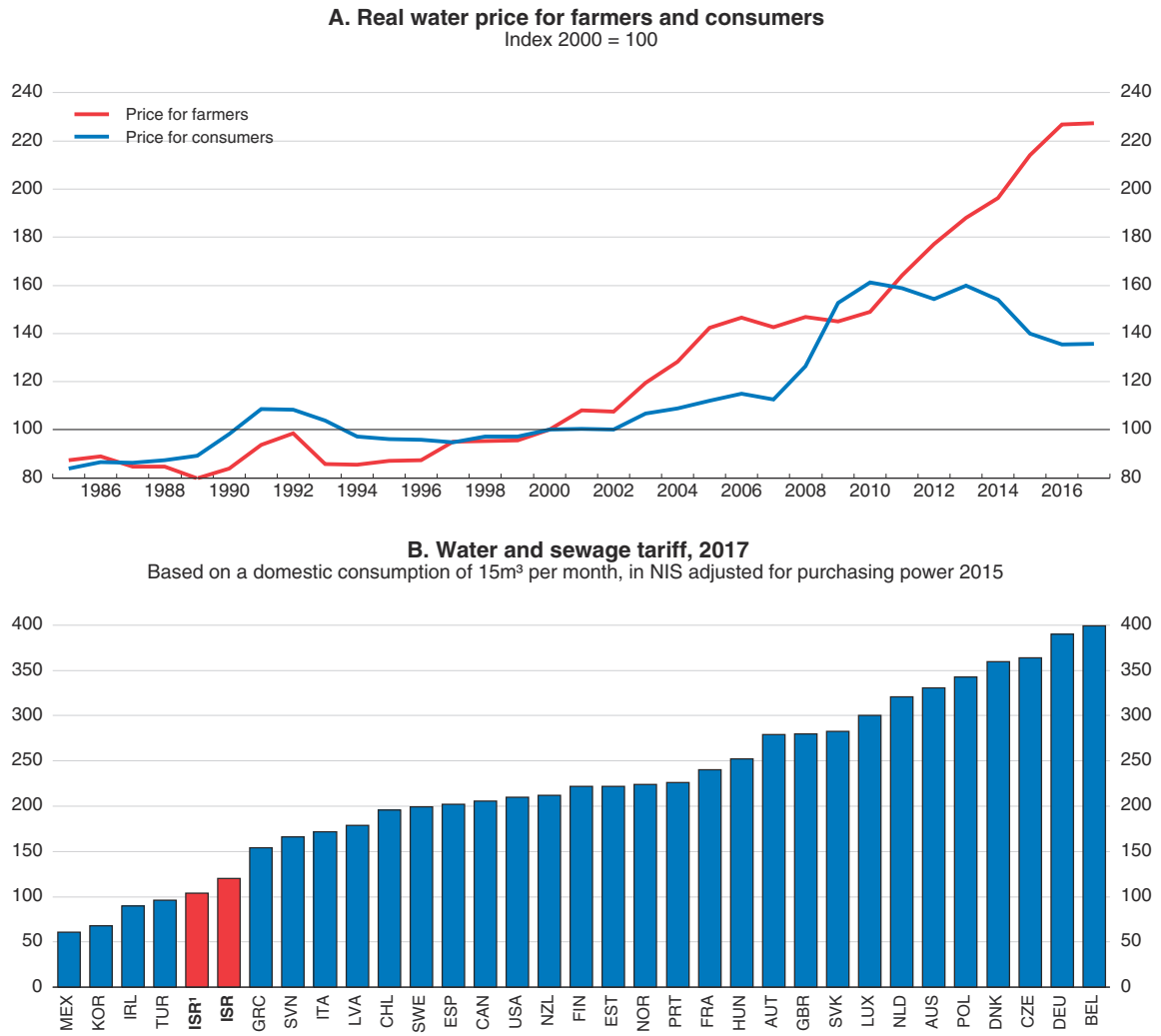
Governance and water management have been modernised

The development and modernisation of this infrastructure has been facilitated by major reforms in water-sector governance. In 2006, the authorities amended the law of 1959 to transfer responsibility for implementing water policy to an independent, apolitical regulatory institution, the Israel Water Authority (Kislev, 2011). This investment in a single authority that was previously divided between various different ministries was designed to make government action more coherent. Another significant reform adopted in 2004 was the removal of the local management of water services and sewage systems from municipal authorities and its subsequent transfer to local public enterprises dedicated to that purpose. Since this change, all revenues derived from water management have been

devoted to the water sector and the maintenance of its infrastructure, instead of being channelled into municipal budgets to finance other local services (WA, 2015b).

In order to implement its water policy the Water Authority took action in several areas. First, it adjusted water tariffs to take account of its full production cost in order to promote the efficient use of the resource and to generate sufficient revenue to maintain and add to the infrastructure in this sector (WA, 2015c). This pricing policy has driven prices up since 2006 (Figure A.2.2, Panel A). Prices paid by households, for example, which include sewage services and reflect the higher production costs of desalination plants, increased by around 40% in the mid-2000s. Prices are applied at the same rate throughout the country and take account of users' ability to pay through a system of block tariffs, which are low if consumption per head falls below a pre-set threshold (WA, 2016). According to the international data available, the price of water for domestic use is no higher in Israel than the OECD average (Panel B). For farmers, water prices vary according to quality (drinking

Figure A.2.2. **Water prices**



1. After reduction of water tariffs by 14.5% for household consumption up top 3.5 m^3 per person as of June 2017.
Source: Israeli Water Authority.

StatLink http://dx.doi.org/10.1787/888933674453

water, reprocessed wastewater or brackish water) and still benefit from some residual subsidies, mostly provided by non-agricultural users, although the authorities plan to abolish all subsidies by 2019.

Conservation has been encouraged

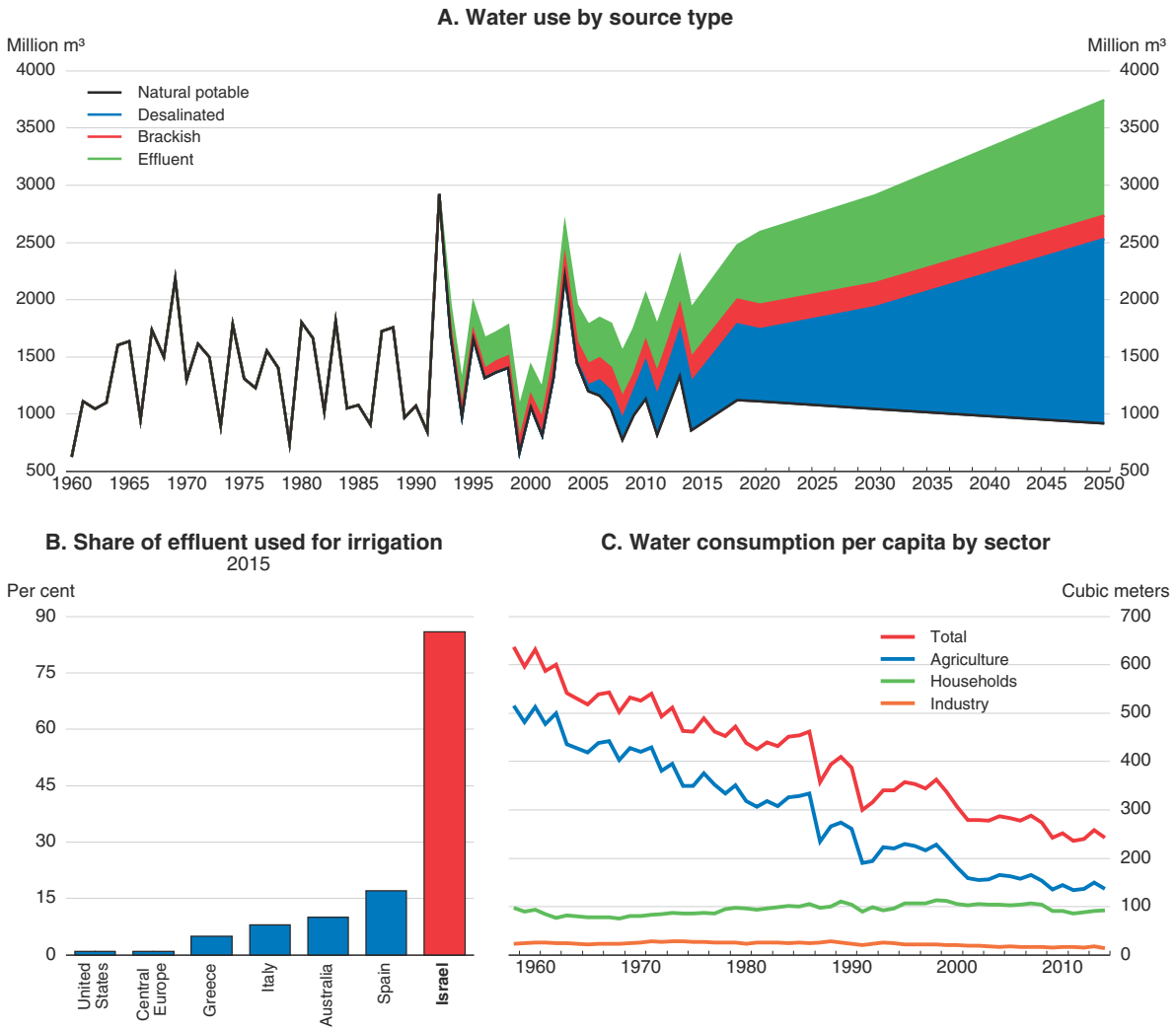
To promote water conservation the Water Authority also launches regular media campaigns to encourage people to use water more sparingly. In addition, the regulator is pursuing the efforts undertaken over recent years to stimulate water-saving innovations, especially by municipal water companies, which are particularly encouraged to combat leaks in the piping system (Siegel, 2015). To this end, it began promoting the systematic use of smart meters, which provide regular information on water consumption and thereby also warn of unexpected surges that may signal leaks. These efforts by the authorities to promote innovation in the water sector have led to Israel's carving out a pioneering role for itself in the efficient use of water, with such ideas as drip irrigation for agriculture and the development of advanced wastewater processing and filtration technologies (OECD, 2015; Siegel, 2015).

In line with water policy objectives, another of the Water Authority's missions is to guarantee the sustainable exploitation of natural resources and to monitor and react to pollution. To achieve this the regulator uses a quota system to share out the country's limited natural freshwater resources. During periods of severe drought, these quotas are reduced for the farming sector, which must then reduce its consumption or increase its use of recycled effluent or brackish water (Kislev, 2011). Water restrictions for the watering of parks or gardens in urban areas may also be introduced, but households retain access to desalinated water. The regulator can also monitor the use of natural resources, the exploitation of which requires official authorisation, since all users are equipped with meters. The Water Authority also has special hydrological units dedicated to the surveillance of water quality in all the natural reservoirs. Every year it returns an allocated amount of water to the environment; in 2010 this came to 60 million m^3, which should rise to 95 million m^3 by 2020 (WA, 2012). The law also imposes limits on abstraction from the country's main reservoir, Lake Kinneret, in order to reduce environmental risks. The other reservoirs are monitored, but their use is not capped by law, and various sources agree that in many cases the quality of these resources is deteriorating as a result of their overexploitation (Fanack, 2017; OECD, 2011).

The management of water infrastructure in Israel has yielded remarkable results

Robust regulation and a good governance system have helped the authorities create the right conditions to secure the water supply of a booming population and economy in a part of the world poor in natural resources, by developing alternatives, which should also meet the country's future needs (Figure A.2.3, Panel A). Between 2005 and 2015, the annual production capacity for desalinated water grew by some 605 million m^3, which represents 75% of the urban demand for drinking water (Mekorot, 2017). Furthermore, 85% of urban wastewater is treated and recycled in farming, which is a very high figure by international standards (Panel B). This source of water, which covers 38% of farming needs and reduces the use of freshwater by the agricultural sector, has two advantages, illustrated by the example of the Tel Aviv agglomeration: first, these resources allow the arid zones in the south of Israel to be irrigated, supporting the farming sector; second, the processing and treatment of this wastewater improve the quality of water at beaches, reducing the health risks that led to epidemics of cholera in 1970 and polio in 1988 (Kislev, 2012). The efficiency of water utilisation has also improved dramatically, as can be seen in the falling rate of consumption

Figure A.2.3. **Water by source and consumption**



Source: Israeli Water Authority and Central Bureau of Statistics.

StatLink http://dx.doi.org/10.1787/888933674472

per capita (Panel C). Many major world cities waste 40% or more of their water in pipe leaks, but that figure was only around 10% in Israel in 2015 (Siegel, 2015). Since 1990, average freshwater consumption per capita has also fallen more sharply in Israel than in most other OECD countries, mainly because of its decreased use in farming, despite the strong growth in agricultural output. These efficiency gains and falling energy prices helped cut consumers' water tariffs by 15% in 2015-16 and a further 14.5% in June 2017. Tariffs charged to farmers were cut by 20% in July 2017.

Note

1. The other suppliers are administrations or local farming associations and private firms operating in rural areas that are not covered by Mekorot.

Bibliography

CBS (Central Bureau of Statistics) (2017), "Projections for Israel population until 2065", *www.cbs.gov.il/reader/newhodaot/tables_template_eng.html?hodaa=201701138*.

Fanack (2017), Website about Water of the Middle East and North Africa – Israel webpage, *https://water.fanack.com/israel/*.

Kislev, Y. (2011), "The Water Economy of Israel", Taub Center, *Policy Paper*, No. 2011.15, November, *http://taubcenter.org.il/wp-content/files_mf/thewatereconomyofisrael.pdf*.

Mekorot (2017), Website about Water Management and Supply, *www.mekorot.co.il/Eng/newsite/WaterManagementandSupply/Pages/WaterManagementSupply.aspx*.

OECD (2011), *OECD Environmental Performance Reviews: Israel 2011*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264117563-en*.

OECD (2015), "Israel: Innovation overcoming water scarcity", *OECD Observer*, No. 302, April, *http://oecdobserver.org/news/fullstory.php/aid/4819/Israel:_Innovations_overcoming_water_scarcity.html*.

Siegel, S. (2015), *Let There Be Water: Israel's solution for a water-starved world*, Thomas Dunnes Books, St Martin's Press, New York.

WA (Water Authority) (2012), "Master Plan for the National Water Sector – Main points of the Policy Paper", March, *www.water.gov.il/Hebrew/ProfessionalInfoAndData/2012/09-Israel-Water-Sector-Master-Plan-2050.pdf*.

WA (2015a), "Water sector in Israel: Zoom on desalination", *www.water.gov.il/Hebrew/ProfessionalInfoAnd Data/2012/05-Water%20Sector%20in%20Israel%20-%20Zoom%20on%20Desalination.pdf*.

WA (2015b), "Reforms in Management of Municipal water Sector in Israel", *www.water.gov.il/Hebrew/ProfessionalInfoAndData/2012/04%20Reforms%20in%20Management%20of%20Municipal%20Water%20Sector%20in%20Israel.pdf*.

WA (2015c), "Water Sector on Israel – IWRM Model", *www.water.gov.il/Hebrew/ProfessionalInfoAndData/2012/02-Israel%20Water%20Sector%20-%20IWRM%20Model.pdf*.

WA (2016), "The Water Economy in Israel – OECD visit", Note provided by the Authorities to the OECD.

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The OECD is a unique forum where governments work together to address the economic, social and environmental challenges of globalisation. The OECD is also at the forefront of efforts to understand and to help governments respond to new developments and concerns, such as corporate governance, the information economy and the challenges of an ageing population. The Organisation provides a setting where governments can compare policy experiences, seek answers to common problems, identify good practice and work to co-ordinate domestic and international policies.

The OECD member countries are: Australia, Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The European Union takes part in the work of the OECD.

OECD Publishing disseminates widely the results of the Organisation's statistics gathering and research on economic, social and environmental issues, as well as the conventions, guidelines and standards agreed by its members.

OECD PUBLISHING, 2, rue André-Pascal, 75775 PARIS CEDEX 16
(10 2018 05 1 P) ISBN 978-92-64-29171-3 – 2018

OECD Economic Surveys

ISRAEL

Israel's economy continues to register remarkable macroeconomic and fiscal performance. Growth is strong and unemployment is low. The external surplus is comfortable, and the public debt-to-GDP ratio, already well below the OECD average, is still falling. However, Israeli society remains marked by weak social cohesion and significant disparities, which penalise parts of the population and threaten the longer-term sustainability of these good results. Despite better employment outcomes among Israeli-Arabs and the Haredim, workers from these communities are often trapped in low-paid jobs due to their weak skill sets, implying persistent poverty and weak aggregate productivity. Moreover, low social transfers imply that the often large families in these communities face deprivation that contributes to child poverty. High cost of living and house prices also weigh on the social situation and well-being, and public transport deficiencies are detrimental to work-life balance and cause urban congestion and poor air quality. The authorities have continued their reform process over the last few years to address these issues. Making growth stronger, more inclusive and more sustainable will require further action and more public investment in education to improve the skills of Israeli-Arabs and Haredim together with additional product market reforms and better transport infrastructure.

SPECIAL FEATURES: EDUCATION AND SKILLS; INFRASTRUCTURE

Consult this publication on line at ***http://dx.doi.org/10.1787/eco_surveys-isr-2018-en***.

This work is published on the OECD iLibrary, which gathers all OECD books, periodicals and statistical databases. Visit ***www.oecd-ilibrary.org*** for more information.

Volume 2018/5
March 2018

OECD publishing
www.oecd.org/publishing

THE LONDON BOOK FAIR WINNER
INTERNATIONAL EXCELLENCE Awards 2017
IN PARTNERSHIP WITH THE PUBLISHERS ASSOCIATION

ISSN 0376-6438
2018 SUBSCRIPTION
(18 ISSUES)

ISBN 978-92-64-29171-3
10 2018 05 1 P

9 789264 291713