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Looking to 2060: Long-term global growth prospects

A GOING FOR GROWTH REPORT

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Looking to 2060: Long-term global growth prospects

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Table of contents

Key policy messages 8

1. Introduction 9

A vision of growth 9

2. Growth determinants 11

Population ageing will reduce the share of the working-age population in most countries 13

Net migration will only modestly lower old-age dependency ratios 14

Structural reforms will be needed to sustain labour force participation 15

Unemployment will return to pre-crisis levels 18

Human capital will continue to improve 18

Capital intensity is assumed to gradually stabilise 19

Efficiency improvements will be the main driver of growth 20

Global growth will be sustained by emerging countries, though at a declining rate 21

The relative size of economics will changae dramatically over the next half century 22

GDP per capita gaps will shrink but significant cross-country differences will persist 23

3. Global saving and current account imbalances 24

The global saving rate will decline over the long-run and be increasingly driven by China and India 24

Global current account imbalances will build up 26

4. Bold structural and macro policies can enhance growth and reduce imbalances 27

Product market liberalisation would speed up convergence 27

Labour market reforms can boost long-run GDP 28

Ambitious fiscal consolidation and structural reforms can reduce imbalances and boost growth 28

Bibliography 30

Annex table 31

Boxes

Box 1. Long-term macro economic projections 10

Abstract / Résumé

Looking to 2060: Long-term global growth prospects

This report presents the results from a new model for projecting growth of OECD and major non-OECD economies over the next 50 years as well as imbalances that arise. A baseline scenario assuming gradual structural reform and fiscal consolidation to stabilise government-debt-to GDP ratios is compared with variant scenarios assuming deeper policy reforms. One main finding is that growth of the non-OECD G20 countries will continue to outpace OECD countries, but the difference will narrow substantially over coming decades. In parallel, the next 50 years will see major changes in the composition of the world economy. In the absence of ambitious policy changes, global imbalances will emerge which could undermine growth. However, ambitious fiscal consolidation efforts and deep structural reforms can both raise long-run living standards and reduce the risks of major disruptions to growth by mitigating global imbalances.

JEL classification codes: O47; O43; O11; J11; I25; H68; F43; E27.
Key words: Growth; Conditional convergence; long-run projections; human capita; productivity; savings; current accounts; fiscal and structural policy; global imbalances.

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Un regard vers 2060 : Perspectives de croissance globale à long-terme

Cette étude présente les résultats d'un nouveau modèle de projection de la croissance économique des pays de l'OCDE et des pays majeurs hors-OCDE sur un horizon de 50 ans ainsi que des déséquilibres qui apparaissent. Un scénario de référence, qui comprend des réformes structurelles graduelles et un assainissement budgétaire suffisant pour stabiliser les ratios de dette/PIB, est comparé à des scénarios alternatifs qui incluent des réformes plus profondes des politiques publiques. Une des conclusions principales est que la croissance des pays du G20 non membres de l'OCDE continuera de dépasser celle des pays membres, mais la différence s'amenuisera au cours des prochaines décennies. Parallèlement, les 50 prochaines années verront des changements majeurs dans la composition de l'économie mondiale. En absence de refonte ambitieuse des politiques publiques, des déséquilibres mondiaux dangereux pour la croissance émergeront. Cependant, une rationalisation plus prononcée des finances publiques combinée à des réformes structurelles profondes pourrait à la fois faire augmenter les niveaux de vie et réduire les risques de déraillement majeur de la croissance en réduisant les déséquilibres mondiaux.

Classification JEL : O47 ; O43 ; O11 ; J11 ; I25 ; H68 ; F43 ; E27.
Mots clefs : Croissance ; convergence conditionnelle ; projections à long terme ; capital humain ; productivité ; épargne ; comptes courants ; politiques fiscales et structurelles ; déséquilibres mondiaux.

Looking to 2060: long-term global growth prospects[1]

Key policy messages

- This paper presents the results from a new model for projecting growth of OECD and major non-OECD economies over the next 50 years as well as imbalances that arise. A baseline scenario assuming gradual structural reform and fiscal consolidation to stabilise government-debt-to GDP ratios is compared with variant scenarios assuming more ambitious policies.

- **Once the legacy of the global financial crisis has been overcome, global GDP could grow at around 3% per year over the next 50 years.** Growth will be enabled by continued fiscal and structural reforms and sustained by the rising share of relatively fast-growing emerging countries in global output.

- **Growth of the non-OECD will continue to outpace the OECD, but the difference will narrow over coming decades.** From over 7% per year over the last decade, non-OECD growth will decline to around 5% in the 2020s and to about half that by the 2050s, whereas trend growth for the OECD will be around on average 1¾ to 2¼% per year.

- **The next 50 years will see major changes in the relative size of world economies**. Fast growth in China and India will make their combined GDP measured at 2005 Purchasing Power Parities (PPPs), soon surpass that of the G7 economies and exceed that of the entire current OECD membership by 2060.

- **Notwithstanding fast growth in low-income and emerging countries, large cross-country differences in living standards will persist in 2060.** Income per capita in the poorest economies will more than quadruple by 2060, and China and India will experience more than a seven-fold increase, but living standards in these countries and some other emerging countries will still only be one-quarter to 60% of the level in the leading countries in 2060.

- **In the absence of more ambitious policy changes, rising imbalances could undermine growth.** As the current cycle unwinds, the scale of global current account imbalances may increase and return to pre-crisis peaks by 2030. Government indebtedness among many OECD countries will exceed thresholds at which there is evidence of adverse effects on interest rates and growth. Global interest rates may therefore start to rise over the long-term.

- **Bolder structural reforms and more ambitious fiscal policy could raise long-run living standards by an average of 16% relative to the baseline scenario of moderate policy improvements.** Ambitious product market reforms, which raise productivity growth, could increase global GDP by an average of about 10%. Policies that induce convergence towards best practice labour force participation could increase GDP by close to 6% on average.

[1] This report draws on "Long-term Growth Scenarios", *Economics Department Working Papers* No. 1000, forthcoming, OECD Publishing.

1. Introduction

During the past decades economic growth among high-income countries has been underpinned by efficiency improvements driven by technological innovation. In decades ahead, such improvements are deemed to play an important role in a wider group of countries. Indeed, income convergence driven by technological diffusion will tend to close the income gap between the developed and developing world. This report sketches the possible transition from the current conjuncture to growth developments in OECD and non-OECD G20 countries up to 2060 focusing on the interaction between technological progress, demographic change, fiscal adjustment, global imbalances and structural policies. A baseline scenario assuming gradual structural reform and fiscal consolidation to stabilise government-debt-to GDP ratios is compared with variant scenarios assuming more ambitious policies.

A vision of growth

The growth scenarios for the global economy over the next 50 years are shaped by developments in education, technological progress and labour force participation based on a framework in which GDP per capita in each country is expected to converge to the long-run path that is consistent with its own endowments, policies and institutions (Box 1). Once this path is reached, all countries are expected to keep growing at the same pace determined by the worldwide rate of technical progress. Nonetheless, cross-country GDP per capita gaps would remain, mainly reflecting differences in technology levels, capital intensity and human capital. These in turn would partly depend on differences in structural conditions and policies. Over a time-horizon covering several decades structural conditions and policies are likely to adapt to changing economic circumstances, in particular those induced by continuing globalisation. Therefore, the baseline long-run scenario for the global economy incorporates a number of policy developments in several areas that would lead to some degree of structural convergence across countries. Reforms in labour and product markets are assumed to continue and, on the fiscal side, it is assumed that government-debt-to-GDP ratios stabilise over the medium term.

Consequently, changes in policies play an important role in the scenario presented here. The scenario also takes into account global macroeconomic influences by ensuring that global saving and investment remain aligned, with imbalances at the national level reflected in current accounts. Whereas the policy changes embedded in the baseline are significant there still remains scope for deeper reforms to improve trend growth, as pushed for within the context of the G20 mutual assessment process. This is explored in variant scenarios.

The assumption underlying this report is that the crisis has only reduced the level of trend GDP, currently and over the next few years, and has had no permanent effects on trend growth rates. Moreover, in keeping with the long-term focus, possible repercussions on trend output of prolonged period of deficient demand are ignored. Thus, the resulting long-term scenario provides a relatively benign long-term outlook for the global economy. Indeed, a number of other factors are also ignored, including the possibility of disorderly debt defaults, trade disruptions and possible bottlenecks to growth due to an unsustainable use of natural resources and services from the environment.

Box 1. Long-term macro economic projections

While there is no single theory of economic growth, there is wide support for models in which each country would be expected to converge to its own steady-state trajectory of GDP per capita determined by the interface between global technological development and country-specific structural conditions and policies (so-called conditional convergence). In the long-run, all countries are expected to grow at the same rate determined by the worldwide rate of technical progress, but cross-country GDP per capita gaps would remain, mainly reflecting differences in technology levels, capital intensity and human capital.

The supply side of the economy consists of a standard aggregate Cobb-Douglas production function with constant returns to scale featuring physical capital, human capital and labour as production factors plus technological progress (so-called multi-factor productivity). Multi-factor productivity is measured as the difference between output and total inputs. These components of the production function are projected to 2060 in order to construct measures of potential GDP measured in terms of constant 2005 USD purchasing power parities (PPPs) (see Easterly and Levine, 2001; OECD, 2003; Duval and de la Maisonneuve, 2010 and Fouré *et al.,* 2010 for similar approaches). The projections for all components to 2013 are mostly consistent with the May 2012 OECD Economic Outlook projections, although some elements of the short-term non-OECD projections are taken from IMF (2012). An exception is the projection of human capital which starts in 2011 as there is no short-term forecast available.

The fiscal side of the model ensures that government-debt-to-GDP ratios stabilise over the medium term via fiscal closure rules for the primary balance which either stabilise debt through a gradual improvement in the primary balance or target a specific (usually lower) debt-to-GDP ratio. Debt service responds to changes in market interest rates, but with lags which reflect the maturity structure of debt. Higher debt levels are assumed to entail higher country-specific fiscal risk premia (*e.g.* Égert, 2010; Laubach, 2009) A further interest rate adjustment equal across all countries ensures that global saving and investment are aligned.

Private saving rates for OECD countries are determined by demographic factors including old-age and youth dependency ratios, fiscal balances, the terms of trade, productivity growth, net oil balances and the availability of credit (see Kerdrain *et al.,* 2010). Total saving is the sum of public and private saving, although there is a 40% offset of any improvement in public saving from reduced private saving due to partial Ricardian equivalence (*e.g.* Röhn, 2010). For non-OECD countries, the total saving rate is modelled by developments in old-age and youth dependency ratios, the terms of trade, the availability of credit, the level of public expenditure (a proxy for public social protection) and productivity growth. Investment projections are backed out from projected capital stocks assuming that depreciation remain stable at recent historical levels. There is no influence from structural policies on investment, except indirectly to the extent that they boost output, although this ignores some evidence to suggest that reforms to product market regulation and employment protection legislation can boost investment rates (Alesina *et al.*, 2005; Egert, 2009; Kerdrain *et al.*, 2010).

Structural policies play an important role in shaping the long-run projections for growth and fiscal and global imbalances presented in this report. The baseline long-run scenario incorporates a number of policy developments in several areas:

- The share of active life in life expectancy is assumed to remain constant, hence the legal pensionable age is implicitly assumed to be indexed to longevity. In addition, recently-legislated pension reforms that involve an increase in the normal retirement age by 2020 are assumed to be implemented as planned.[1]
- Educational attainment continues to converge across countries relying implicitly on an expansion of education systems, particularly in countries with currently low educational attainment levels and; projected labour force participation depends on developments in educational attainment.

- Countries with relatively stringent product market and trade regulations are assumed to gradually converge towards the average regulatory stance observed in OECD countries in 2011. For other countries regulations remain unchanged. This implies faster MFP growth in countries where the regulatory stance is currently more stringent than the OECD average.

- For non-OECD countries, a gradual increase in public spending on social protection is assumed, amounting on average to an increase of 4 percentage points of GDP to a level of provision similar to the average OECD country. It is further assumed that this is financed in a way in which there is no effect on public saving.

- Private credit as a share of GDP is projected on the basis that countries gradually converge on the US level of financial development with the gap assumed to close at 2% per annum. For example, this means that for an average of the BRIC countries, the availability of credit rises from just over one-third of that in the United States in 2010, to around three-quarters in 2060.

Further details of the methodology used to make the long-term projections, including the parameterisation of the links between structural factors and the components of GDP, including via new regression estimates are provided in Johansson *et al.* (2012).

1. The projections take into account legislated increases in the normal pension age taking place up until 2020 (see OECD Pension Outlook, 2012a). The countries for which an adjustment on current exit rates of older workers are made include Australia, Belgium, Canada, Czech Republic, Germany, Spain, Estonia, France, the United Kingdom, Greece, Hungary, Ireland, Israel, Italy, Japan, New Zealand, Slovak Republic, Slovenia, Turkey and the United States.

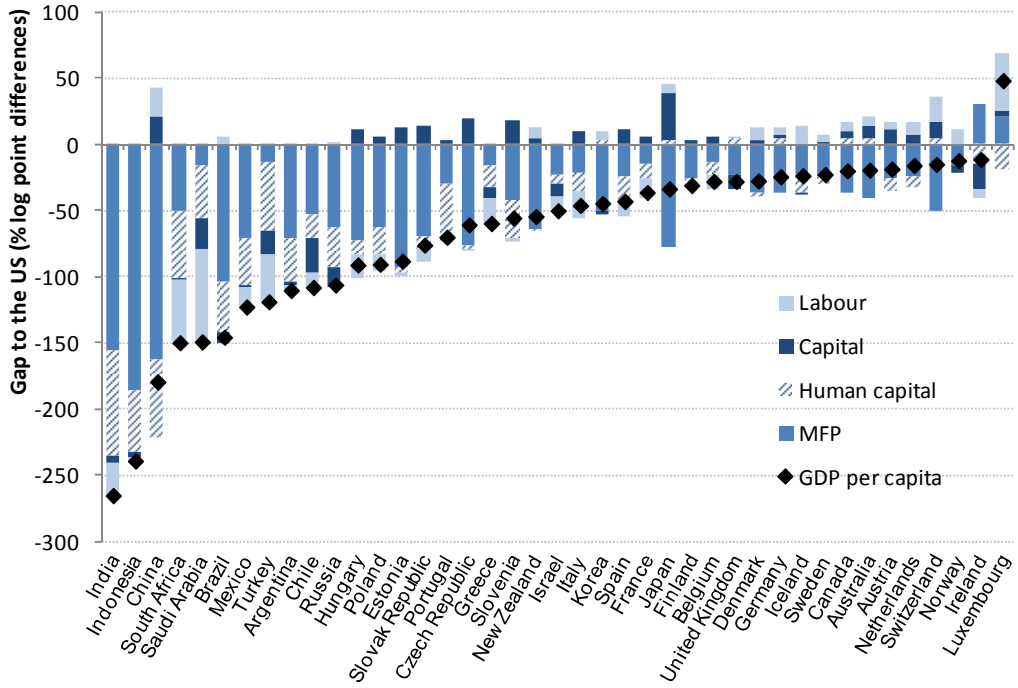
2. Growth determinants

Historically, cross-country gaps in multi-factor productivity (MFP) and, to a lesser extent, in human capital account for the bulk of cross-country differences in GDP per capita (*e.g.* Easterly and Levine, 2001; Duval and de la Maisonneuve, 2010). As shown in Figure 1A, differences in MFP relative to the United States are particularly sizeable in Eastern European countries, Latin American countries and in emerging economies (*e.g.* China, India, Brazil, Indonesia and the Russian Federation). Large gaps in productivity also characterize a few higher-income economies, such as Japan, Korea and Switzerland.

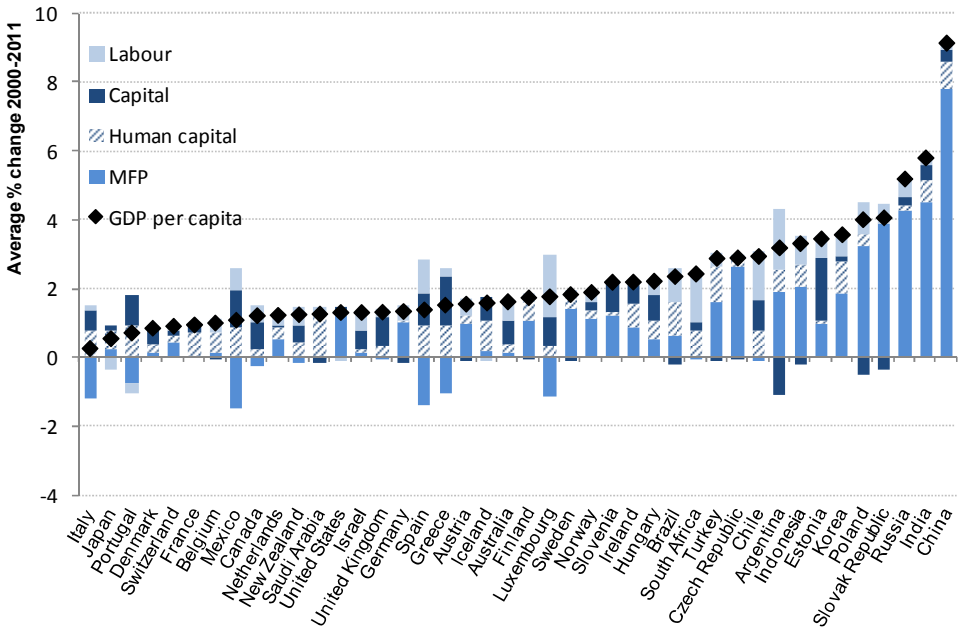
Gradual closure of these gaps also accounted for the greater part of GDP per capita growth over the past decade (Figure 1B) and, given the remaining gaps, MFP is likely to be a crucial driver of long-run GDP per capita convergence in the future. Additionally, considerable scope for improvements in educational attainment exists in several countries -- *e.g.* Portugal, Turkey, South Africa, China, India and Indonesia. While capital deepening has historically contributed to growth (notably in lower-income countries), with decreasing returns to capital, capital deepening itself is not likely to boost long-run growth in most countries. This may not be true for intangible capital, which show increasing relevance in advanced economies and may in the future become more relevant in emerging economies (Andrews and de Serres, 2012). However, growth in MFP can be taken to subsume future contribution of intangible capital. Finally, in the past decade labour accounted for an important part of GDP per capita growth, but going forward this may be reversed as most countries will be characterised by ageing of populations with adverse implications for growth.

Figure 1. **Scope for catch-up in productivity and human capital in many countries**

A: Contribution of production factors to GDP per capita gap relative to the United States at constant USD 2005 PPPs, 2011[1]



B: Contribution of drivers of growth to annual average GDP per capita growth 2000-2011



1. To ensure that the percentage gap in the components of GDP add up to GDP per capita the decomposition is done in log point differences since the decomposition is multiplicative. GDP per capita is equal to the product of the components MFP, Human capital, (Physical capital/GDP)$^{\alpha/(1-\alpha)}$ and employment/population, where α is the labour share..

Source: Long-term Growth Scenarios, *OECD Economics Department Working Papers* No. 1000, *forthcoming*

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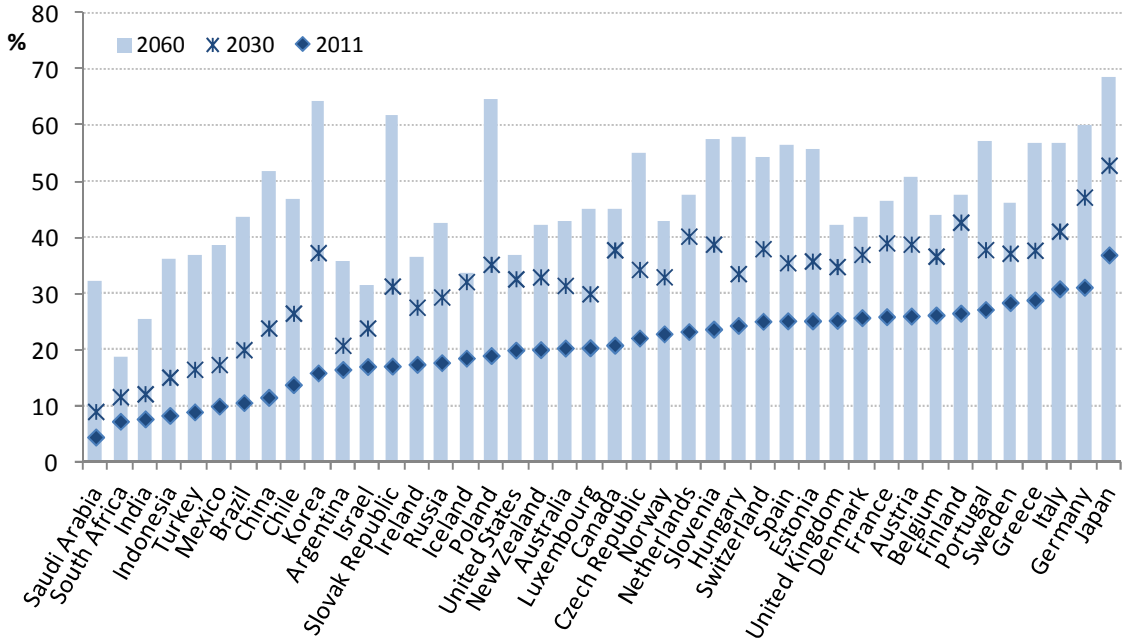
Population ageing will reduce the share of the working-age population in most countries

Population ageing, due to the decline in fertility rates and generalized gains in longevity, has a potentially negative effect on trend growth as it leads to a declining share of the working age population as currently defined (15-64 years), with potentially negative effects for labour force participation. Population projections suggest that ageing over the next 50 years will be particularly rapid in Asia, Eastern European countries and Southern European countries with old-age dependency ratios more than doubling, and even quadrupling in China (Figure 2A).[2] In parallel, the share of the working-age population in most countries is projected to decline over the half century -- by on average about 9 percentage points (Figure 2B). However, some emerging economies differ from high-income countries in this respect: South Africa and India will experience an increase in their share of working-age population. This effect is the well-known "demographic dividend" of the recent decline in fertility rates in those countries, which lowers the youth dependency ratio after one generation (Bloom *et al.* 2003). Taking into account developments of all age groups, total population over the next 50 years is estimated to increase by 0.3% per year globally. All else equal, comparatively high overall population growth will act as a drag on GDP per capita growth in a number of countries (*e.g.* English speaking countries and some emerging economies).

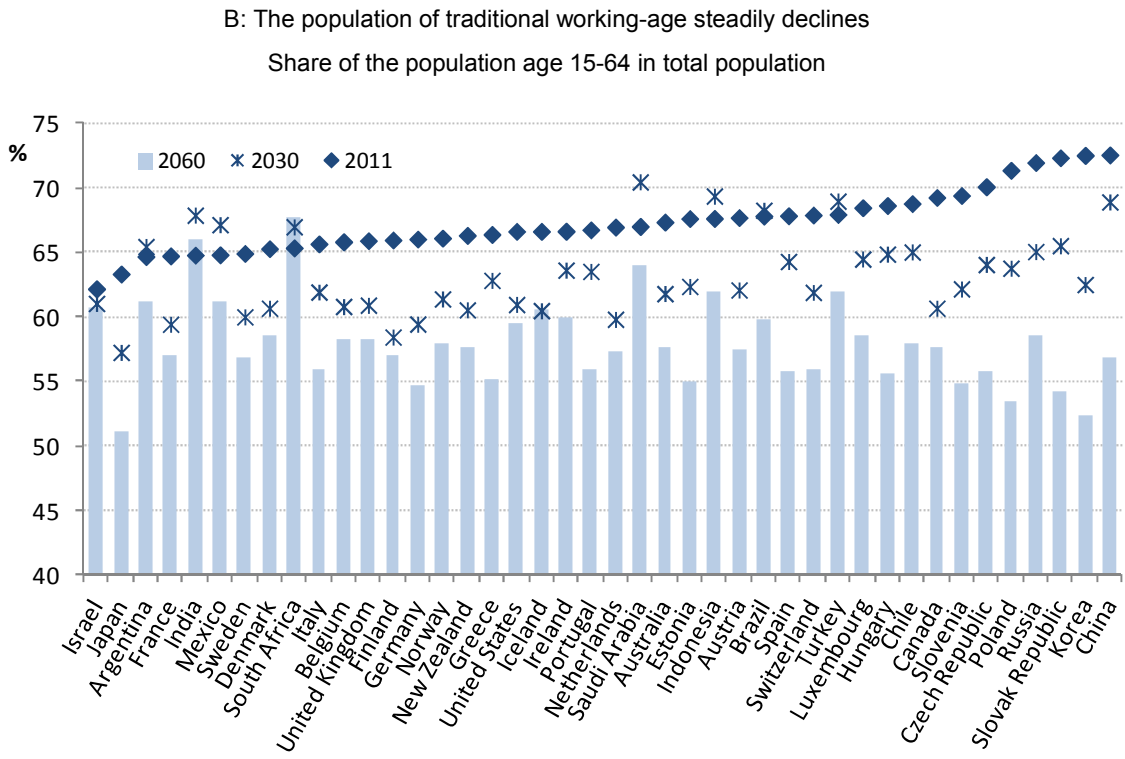
Figure 2. **Populations will age in most countries**

A: The traditionally defined old-age dependency ratio steadily rises

Per cent of the population older than 65 as a share of population aged 15-64.



2 The increase in the old-age dependency ratio quoted in the text is based on a fixed age threshold of 65 years. This may give an overly pessimistic impression as it is likely that gains in longevity will result in longer active working-lives, which would require an evolving definition of working-age population.



Source: United Nations and Eurostat.

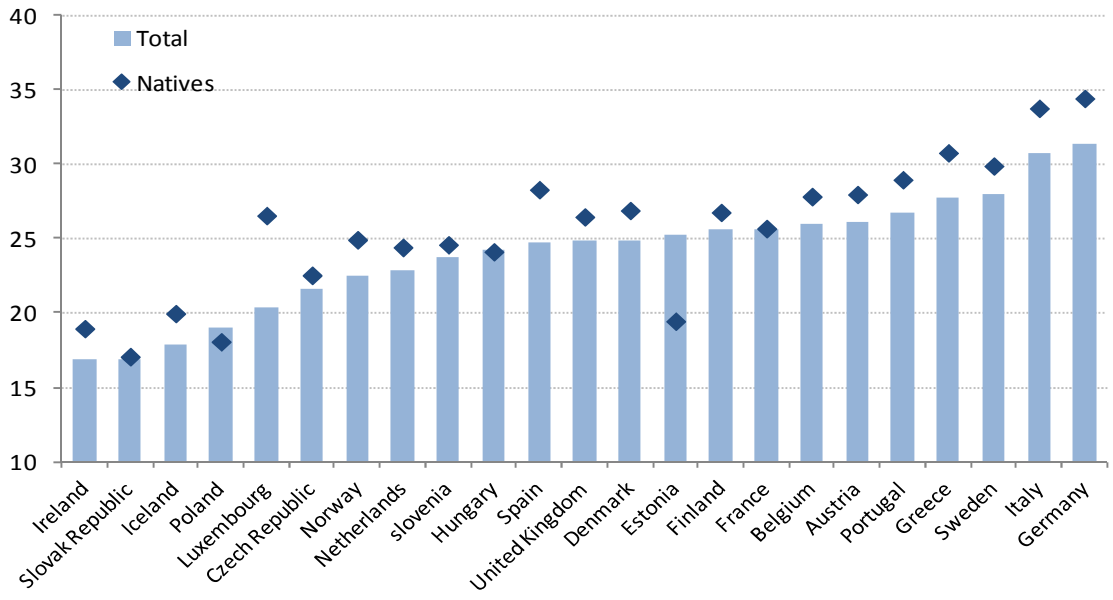
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Net migration will only modestly lower old-age dependency ratios

In the long run, net migration could have a substantial impact on population growth and the working-age population if migration flows remain sufficiently large and sustained over time. Migrants contribute to population growth in two ways. First, they increase total population, and second, they generally have an upward impact on average fertility as fertility of female migrants is generally higher than natives. If past trends continue, the positive contribution of net migration is projected to either mitigate the decline in population in some European countries or even offset the reduction in native population, notably in Austria, Italy, Spain and Switzerland. Moreover, because the foreign-born population has been disproportionately composed of working-age adults, migration has in the past lowered the dependency ratio. This effect was particularly marked in high-immigration countries such as Luxembourg, Spain or Germany, whereas the opposite occurred in high-emigration countries such as Estonia or Poland. If the age composition of immigrants were to remain the same in the future, the projected increase in dependency ratios would also be mitigated in some countries (Figure 3). Even so, given the sheer size of the projected average increase in this rate (26 percentage points by 2060) and reasonable assumptions on labour force participation rates of migrants, net migration would be unable to offset the adverse consequences of population ageing on the labour force.

Figure 3. **Foreign-born population lowers the old-age dependency ratio by around 2 percentage points on average, 2010**[1]

Ratio of population aged 65 and over to population aged 15-64, per cent



1. The Figure shows the old-age dependency ratio in the total population as well as in the native population in 2010, where the difference between the two represents the contribution of foreign-born population.

Source: Eurostat. StatLink http://dx.doi.org/10.1787/888932718250

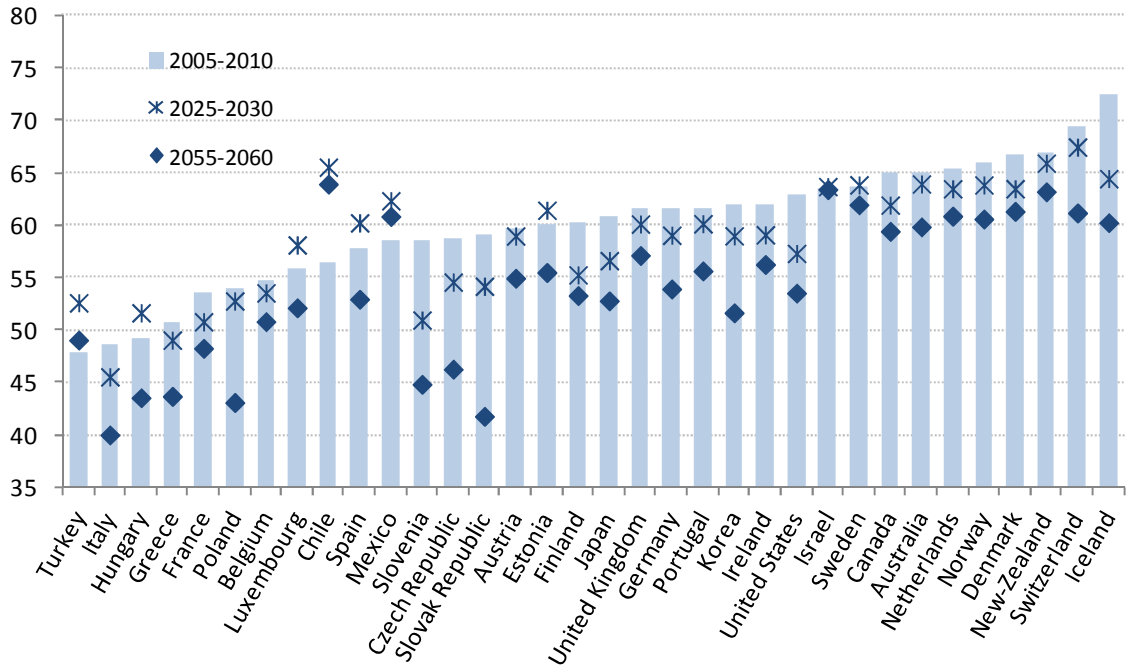
Structural reforms will be needed to sustain labour force participation

Future participation rates are determined by the participation behaviour of the most recent cohorts and the evolution of the relative weight of different cohorts, which is driven by demographic developments.[3] While in the past the fall in the exit rate from the labour force at older age together with the increase in participation of women contributed to sustain aggregate participation, projections suggest that these trends will not be sufficient to offset the adverse effect of population ageing. With unchanged policies, high-income countries would experience an average fall of 5 percentage points in participation (among the population older than 15 years) over the next 50 years (Figure 4).

3 In non-OECD countries for which data on labour force by cohort are not available, aggregate participation is predicted using the coefficient estimates from a dynamic panel model that regresses participation rates on education attainment levels, young and old-age dependency ratios and their interaction.

Figure 4. **Labour force participation is projected to decline at unchanged policies**[1]

Labour force participation among 15+ in a benchmark scenario with unchanged policies, per cent



1. This chart only shows trends in labour force participation for OECD countries for which the cohort-analysis is performed. The data shows the average labour force participation over five years to match the cohorts which are in five-year intervals.

Source: Long-term Growth Scenarios, *OECD Economics Department Working Papers* No. 1000, *forthcoming*

StatLink http://dx.doi.org/10.1787/888932718250

However, in the baseline scenario, the decline in the share of the population at working age does not fully translate into lower labour force participation. Given the strong downward effect of ageing on labour force participation, structural change, partly driven by policy reforms, will be needed to sustain aggregate participation rates in the future. Two such changes are embodied in the baseline scenario:

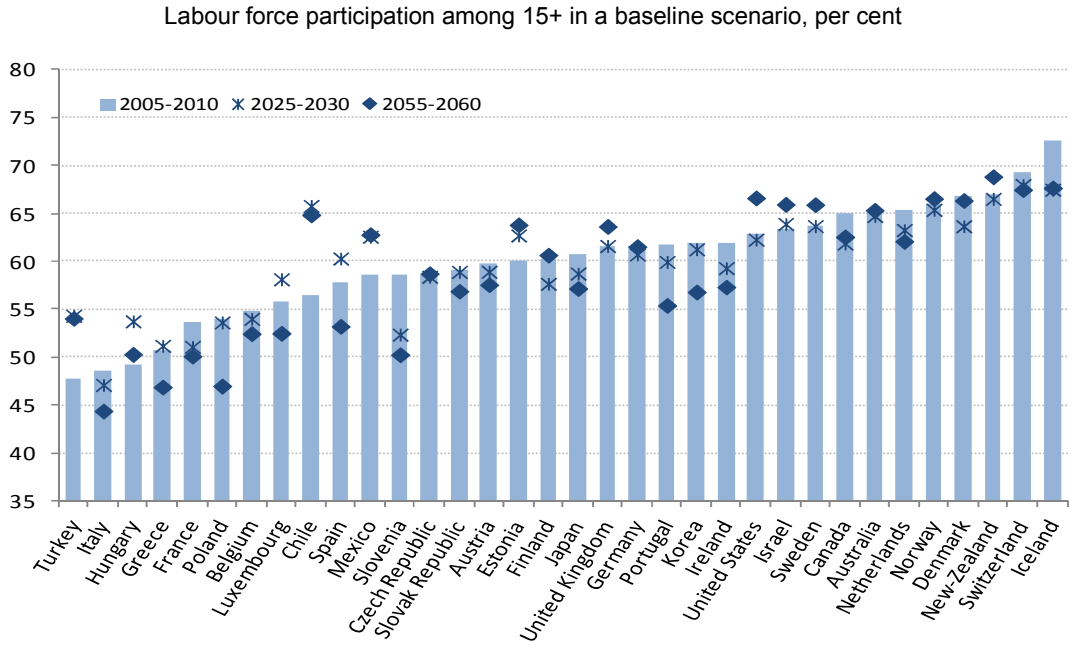
- *The long-term trend expansion of education attainment is assumed to continue*. The longer stay in school lowers the entry rate of younger cohorts into the labour force. However, educated workers are more likely to enter the labour force once they have completed their studies and possibly also less likely to exit the labour force at older age. Due to these offsetting forces, the projected increase in educational attainment only moderately raises labour force participation – on average by 0.5 percentage points in 2060, although, the effect is noticeably larger in some countries (*e.g.* Turkey, Mexico, Korea, Italy and Hungary).

- *The legal pensionable age is implicitly assumed to be indexed to longevity so as to maintain a stable share of each cohort's lifetime spent in the labour force*. Today, workers in OECD countries spend on average 43% of their life span in the labour force, a proportion that ranges from below 35% in Turkey and Italy to 50% in Iceland. This average time spent in the labour force as a proportion of life expectancy at birth (so-called active life expectancy) is

kept unchanged over the next 50 years.[4] In other words, the average duration of active lives will lengthen, but comparatively less than life expectancy, consistent with the idea that the demand for leisure increases with income. In addition, recently-legislated pension reforms that involve an increase in the retirement age by 2020 are assumed to be implemented as planned.

If policies support these structural changes, the aggregate OECD labour force participation rate (among the population older than 15 years) will stay roughly stable over the next half century. However, maintaining a constant share of life spent in the labour force does not imply a fixed labour force participation rate, as the latter also depends on the relative weight of the different age groups in the population. Consequently, there are countries in which participation is still projected to fall *(e.g.* Poland, Korea, Portugal, Japan and Slovenia), and other countries in which participation is projected to increase *(e.g.* Chile, Estonia, Turkey, Mexico, and the United States) (Figure 5).

Figure 5. **Labour force participation is projected to change relatively little in the baseline scenario**[1]



1. The baseline scenario assumes that educational attainment continues to increase and policy reforms are implemented to change exit rates so that "active life" remains a constant share of life expectancy. It also accounts for recent changes in pension age for current exit rates of older workers. This chart only shows trends in labour force participation for OECD countries for which the cohort-analysis is performed. The data shows the average labour force participation over five years to match the cohorts which are in five-year intervals.

Source: Long-term Growth Scenarios, *OECD Economics Department Working Papers* No. 1000, *forthcoming*

StatLink http://dx.doi.org/10.1787/888932718288

4 Active life expectancy is a counterfactual construction that reflects the average number of years that a hypothetical worker would spend in the labour force if he/she would face the same entry, exit and participation rates observed today during his/her entire active life. The calculation of active life expectancy relies on the age and gender-specific probabilities of entering and exiting to/from the labour force and the accompanying participation rates. It is similar to the calculation of life expectancy, which represents the average life time of a hypothetical person facing currently observed mortality rates.

Unemployment will return to pre-crisis levels

Trend unemployment in OECD countries is assumed to gradually return to its pre-crisis level (where it is currently above it), sustaining labour input. Around half of OECD countries have experienced an increase in unemployment larger than 2 percentage points as compared with pre-crisis levels, and long-term unemployment has risen sharply in some countries, such as France, Italy and the United States (de Serres *et al.,* 2012; OECD, 2011). For those cohorts of workers who are disproportionately affected by the economic crisis, namely young and low-skilled workers, there is a high risk of unemployment persistence over the medium term, especially because the probability of leaving unemployment depends negatively on the time spent in unemployment (Van den Berg *et al.*, 1996; de Serres *et al.,* 2012). Thus, the projection assumes that trend unemployment only gradually returns to its pre-crisis level (chosen to be the lowest value of trend unemployment between 2007 and 2013) with persistence in (trend) unemployment depending on a number of labour market policies and institutions such as the tax wedge, spending on active labour market policies and the unemployment replacement rate (for the link between these policies and unemployment (see *e.g.* de Serres *et al.,* 2012). For some non-OECD countries a different set-up is applied reflecting the fact that trend unemployment is currently comparatively high in some of these countries and it is likely that an adjustment downwards will take place as economies develop. Therefore, in countries for which trend unemployment is currently above the average level observed in OECD countries (*e.g.* Argentina, Brazil, the Russian Federation and South Africa) it is assumed that unemployment will gradually converge to the average OECD level. Finally, trend unemployment is assumed to remain unchanged in countries where it is currently below the OECD average.

Human capital will continue to improve

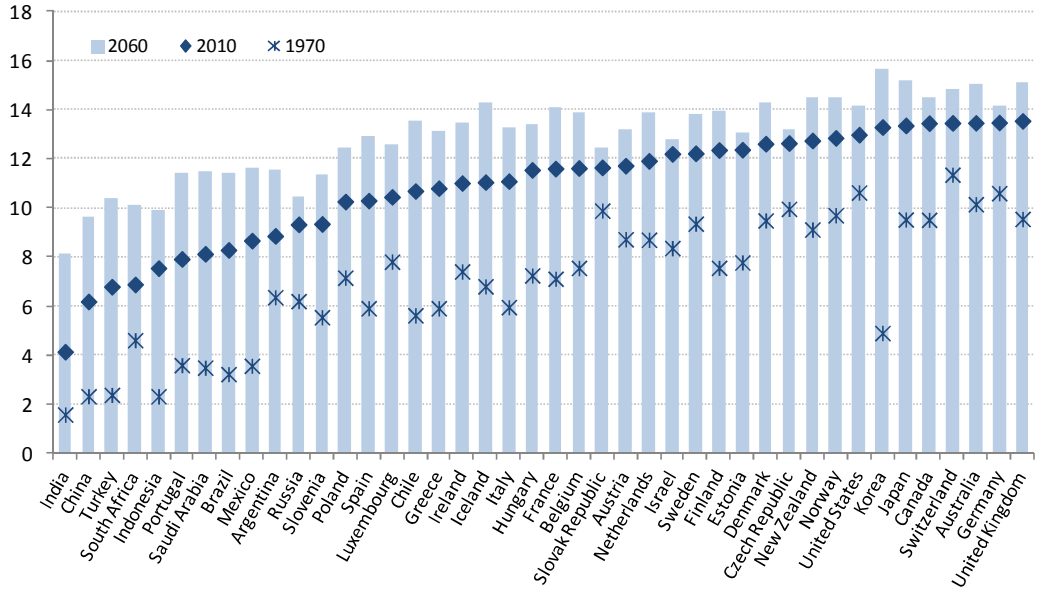
While on balance the quantity of labour used in production will not be a major driver of growth, improvements in the quality of labour will. In the past, educational attainment has converged across high- and medium-income countries (Morrisson and Murtin, 2009) and the average number of years of schooling has increased (on average) by four years over the period 1970-2010, with particularly large up-skilling in countries starting out from very low levels of education in the 1970s (*e.g.* Korea, Indonesia, China, Turkey and Brazil) (Figure 6). The evolution of the stock of average years of schooling among the adult population is translated into a marked improvement in the value of the stock of human capital under reasonable assumptions about the wage return to be expected from additional years of education.[5]

This build up of human capital is set to continue over the next half century. Thus, average years of schooling of the adult population are projected to increase by two years on average over the next 50 years, with attainment of cohorts aged 25-29 slowly converging towards that of the current highest attainment country (Korea), with education in this country also rising over time. Convergence is generally explained by decreasing returns to education for both individuals and society as a whole and by the fact that the cost of additional years of education rises with attained grades (Mincer, 1974; Psacharapoulos and Patrinos, 2004). Marked increases in education are projected in India, China, Turkey, Portugal and South Africa (Figure 6). However, large differences in average education will persist in the long term, as the stock measure of education involves the whole adult population and, therefore, displays sluggish developments.

[5] The assumption on returns embodied in the projections is consistent with a 10%-13% average return to primary education and 6%–7% return to upper secondary and tertiary education, in line with microeconomic and macroeconomic evidence (*e.g.* Morrison and Murtin, 2010).

Figure 6. **Educational attainment will increase over time**

Average years of schooling of the adult population



Source: Long-term Growth Scenarios, *OECD Economics Department Working Papers* No. 1000, *forthcoming*

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Capital intensity is assumed to gradually stabilise

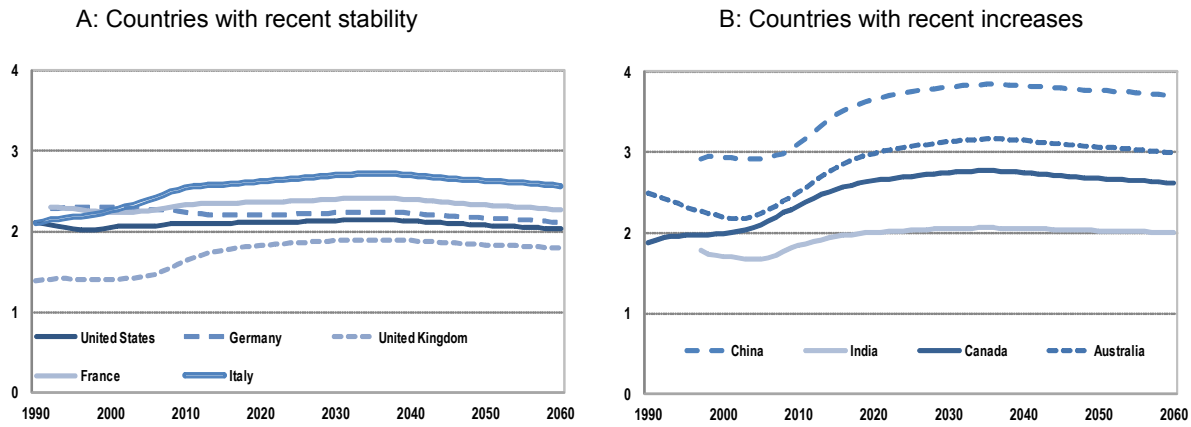
In most, but not all, developed economies, the ratio of (non-residential) productive capital (defined here to exclude housing) to trend output has been relatively stable (Figure 7). In these countries, this stability in capital intensity is expected to continue over the next decades. However, there are a number of countries where capital intensity has shown a definite recent trend. Where this is the case, the trend is expected to gradually disappear so that the underlying capital-output ratio stabilises. Australia and Canada are examples among OECD countries where recent capital deepening is probably related to the commodities boom in mining, and China and India are important examples among emerging countries.

Future capital-output ratios are however influenced by the real cost of capital with changes in such costs translating into opposite changes in capital intensity.[6] The main reason for changes in the cost of capital are changes in real interest rates, which vary for a number of reasons, including the cyclical position of the economy, fiscal risk premia equalising saving and investment at the global level. For instance, higher interest rates on rising government debt put upward pressure on long-term interest rates throughout the economy, thereby reducing capital intensity. A generalised increase in global interest rates related to a fall in the global saving rate (discussed in later sections) accounts for the slight tendency for capital intensity to decline in most countries towards the end of the baseline projection.

6 In the projections, it is assumed that the elasticity of capital intensity to the user cost of capital is consistent with a Cobb-Douglas production function.

Figure 7. **Capital intensity is expected to broadly stabilise**

Ratios of capital to trend output, for selected countries



Source: Long-term Growth Scenarios, *OECD Economics Department Working Papers* No. 1000, *forthcoming*.

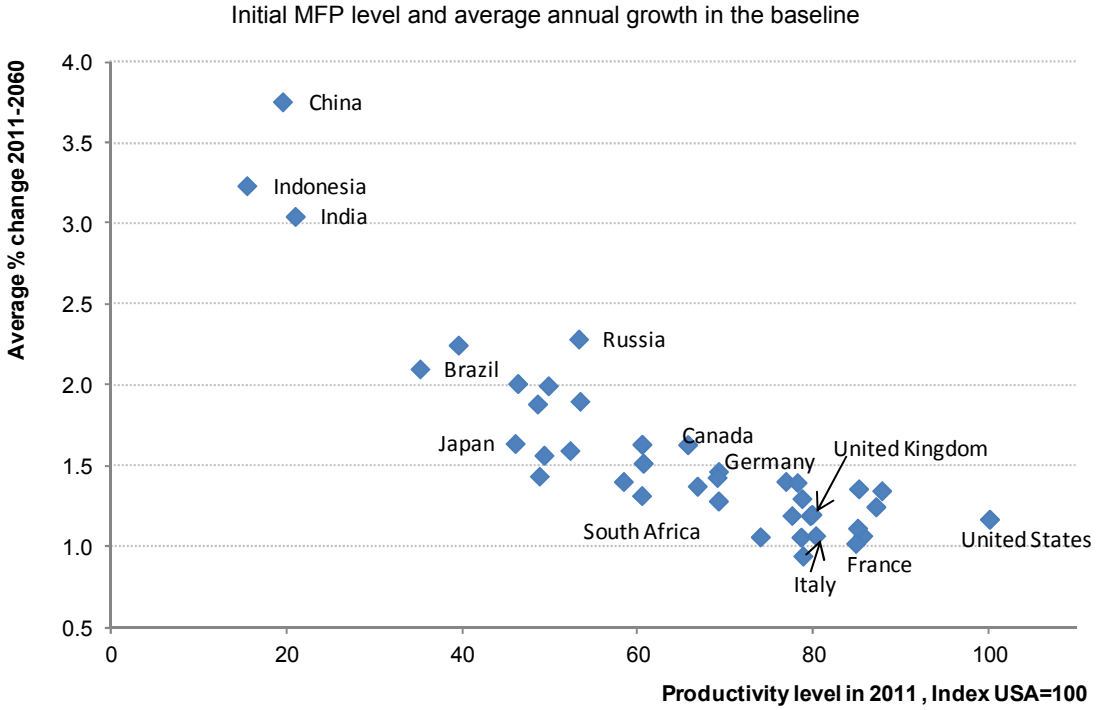
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Efficiency improvements will be the main driver of growth

Sustained improvements in the combined productivity of inputs into production, measured by MFP, will be the main driver of growth over the next 50 years. Average annual MFP growth is projected to be 1.5% globally. But countries having currently comparatively low productivity levels – such as India, China, Indonesia, Brazil and Eastern European countries – are projected to grow faster than more developed economies (Figure 8). This reflects that in each country productivity growth is driven by the global rate of technological progress, assumed to be 1.3% per year (*i.e.* corresponds to the average rate of MFP growth observed among advanced economies over the period 1996-2006), and by the rate at which the country "catches up" with the level of productivity that is consistent with its underlying structural conditions.

Productivity growth is positively influenced by trade openness and the strength of domestic competition (*e.g* Bloom *et al.* 2009; Aghion and Howitt 2009), as determined in particular by border and domestic product market regulations. Indeed, by facilitating technological diffusion, greater openness to trade increases the speed of convergence towards the technological frontier and, thus, enhances productivity growth. Moreover, broader competitive pressures provide firms with strong incentives to improve productive efficiency, thus boosting both the catch-up process and the long-run attainable level of productivity. Over a time-horizon covering several decades these regulations are likely to adapt to changing economic circumstances, with countries where they are initially relatively restrictive of competition slowly converging to the more open and competitive environment currently prevailing in the average OECD country, an assumption that is embodied in the baseline projections.

Figure 8. **Multi-factor productivity tends to converge across countries over 2011-2060**[1]



1. In the baseline scenario it is assumed that PMR regulations are hypothetically eased in restrictive countries to reach the OECD average in the base year (2011) by the end of the projection period.

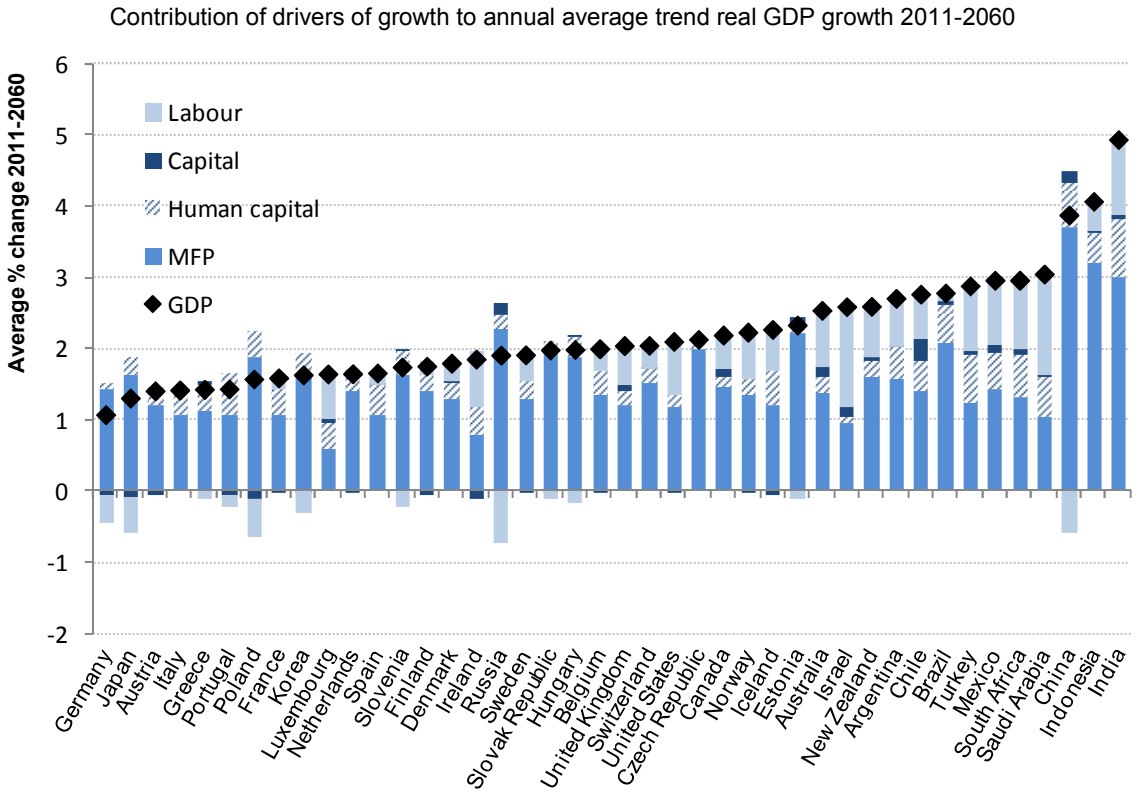
Source: Long-term Growth Scenarios, *OECD Economics Department Working Papers* No. 1000, *forthcoming*.

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Global growth will be sustained by emerging countries, though at a declining rate

The projection framework just described implies that over the next half century, the global economy will grow at around 3% per annum on average, mainly driven as in the past by productivity improvements and build up in human capital (Figure 9). The OECD-wide trend GDP growth rate is projected at about 2% annually to 2060, with declining rates in many countries after the recovery from the current crisis. But global growth will remain fairly stable because relatively fast-growing countries will progressively account for a larger share of global output. Indeed, growth in non-OECD countries will continue to outpace the OECD average, though the difference will narrow over coming decades. From over 7% per year over the past decade, non-OECD growth will decline to around 5% in the 2020s and to about half that by the 2050s (see Annex Table). Until 2020, China will have the highest growth rate among the countries included in this study, but will be then surpassed by both India and Indonesia. This partly reflects a more rapid decline in the working-age population, and consequently in labour force participation, in China than in India and Indonesia.

Figure 9. **Convergence in GDP across countries is mainly driven by education and productivity improvements**



Source: Long-term Growth Scenarios, OECD Economics Department Working Paper No. 1000, *forthcoming*.

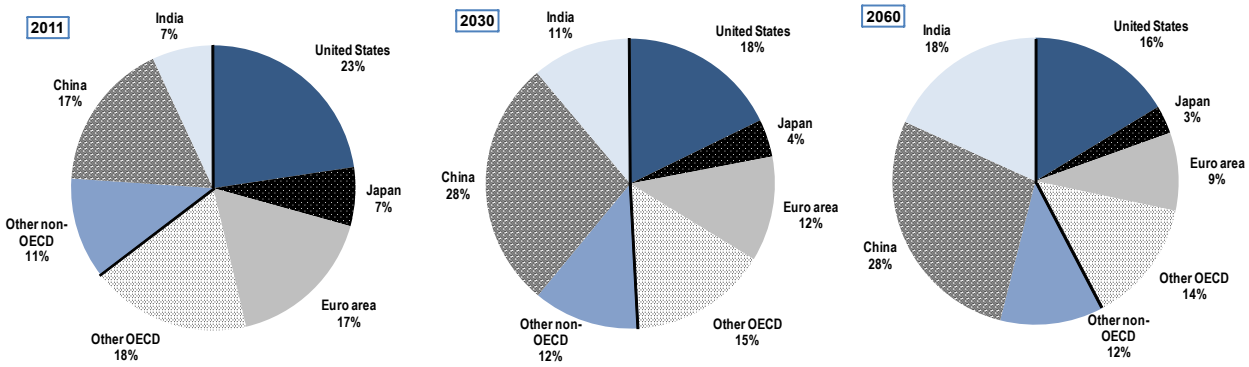
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The relative size of economies will change dramatically over the next half century

The next 50 years will see major changes in country shares in global GDP (Figure 10). On the basis of 2005 purchasing power parities (PPPs), China is projected to surpass the Euro Area in 2012 and the United States in a few more years, to become the largest economy in the world, and India is about now surpassing Japan and is expected to surpass the Euro area in about 20 years. The faster growth rates of China and India imply that their combined GDP will exceed that of the major seven (G7) OECD economies by around 2025 and by 2060 it will be more than 1½ times larger, whereas in 2010 China and India accounted for less than one half of G7 GDP. Strikingly in 2060, the combined GDP of these two countries will be larger than that of the entire OECD area (based on today's membership), while it currently amounts to only one-third of it.

Figure 10. **There will be major changes in the composition of global GDP**[1]

Percentage of global GDP in 2005 PPPs



1. Global GDP is taken as sum of GDP for 34 OECD and 8 non-OECD G20 countries.

Source: Long-term Growth Scenarios, OECD Economics Department Working Paper No. 1000, *forthcoming*.

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GDP per capita gaps will shrink but significant cross-country differences will persist

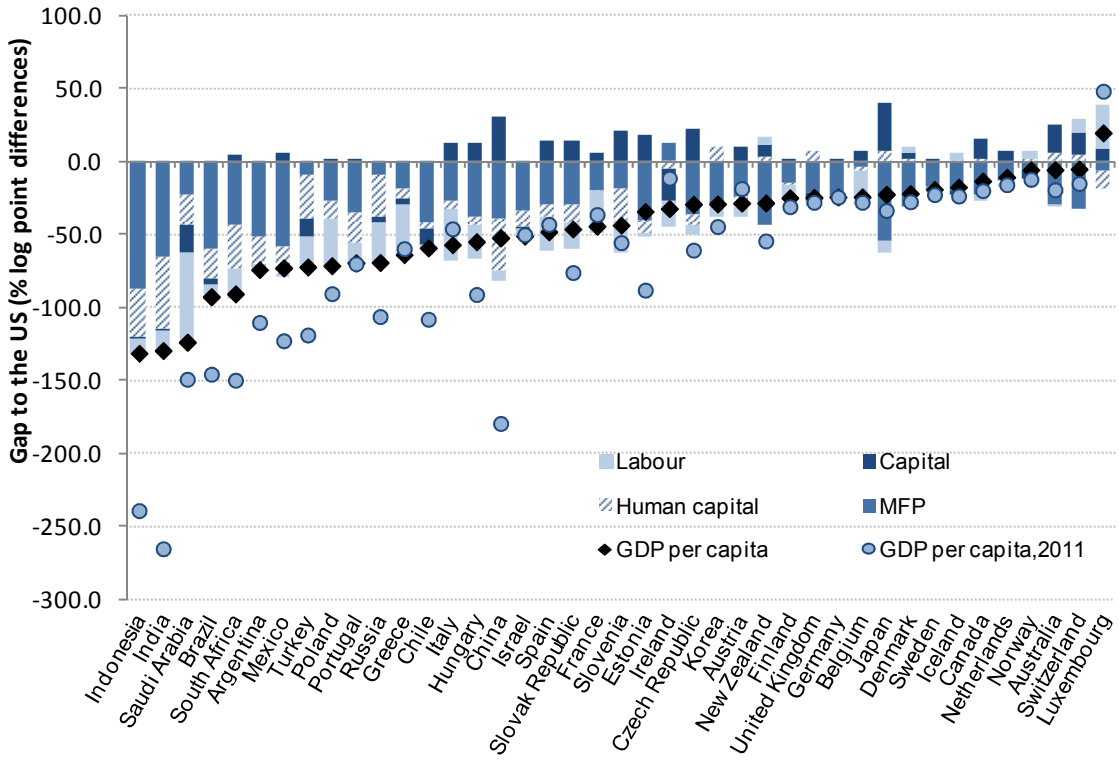
Such changes in shares of global GDP will be matched by a tendency of GDP per capita to converge across countries, which however will still leave significant gaps in living standards between advanced and emerging economies. Over the next half century, the unweighted average of GDP per capita (in 2005 PPP terms), is predicted to grow by roughly 3% annually in the non-OECD area, as against 1.7% in the OECD area. As a result, by 2060 GDP per capita of the currently poorest economies will more than quadruple (in 2005 PPP terms), whereas it will only double in the richest economies. China and India will experience more than a seven-fold increase of their income per capita by 2060. The extent of the catch-up is more pronounced in China reflecting the momentum of particularly strong productivity growth and rising capital intensity over the last decade. This will bring China 25% above the current (2011) income level of the United States, while income per capita in India will reach only around half the current US level.

Despite this fast growth among "catching-up" countries, the rankings of GDP per capita in 2011 and 2060 are projected to remain very similar – the correlation is 0.9 (Figure 11).[7] Even though differences in productivity and skills are reduced, remaining differences in these factors still explain a significant share of gaps in living standards in 2060. Additionally, in a few European OECD countries and some emerging economies differences in labour input will also continue to explain a sizeable share of the remaining income gaps. Indeed, for some European countries, where ageing is more pronounced and/or older-age participation rates are low, these factors are enough to cause a widening in the income gap with the United States, despite continued convergence in productivity and skills levels.

7 One caveat to these comparisons of GDP levels is that using a fixed base year PPP may bias comparisons far into the future, as PPPs themselves are likely to evolve in response to changes in the economic structure.

Figure 11. **Despite substantial gains by emerging countries, differences in GDP per capita still remain in 2060**

Contribution of production factors to differences in GDP per capita relative to the United States (constant 2005 PPPs)



1. To ensure that the percentage gap in the components of GDP add up to GDP per capita the decomposition is done in log point differences since the decomposition is multiplicative. GDP per capita is equal to the product of the components MFP, Human capital, (Physical capital/GDP)$^{\alpha/(1-\alpha)}$ and employment/population, where α is the labour share.

Source: Long-term Growth Scenarios, *OECD Economics Department Working Papers* No. 1000, *forthcoming*.

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3. Global saving and current account imbalances

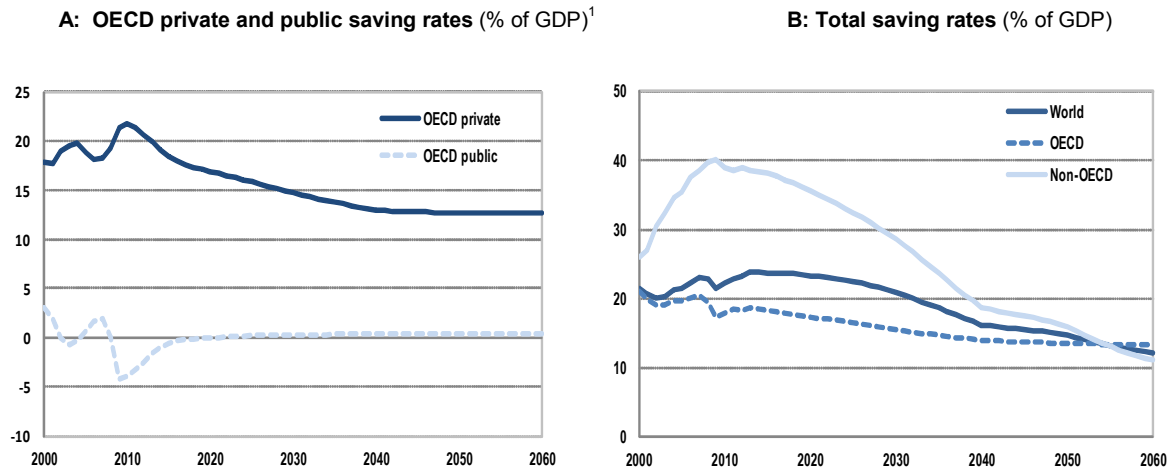
The global saving rate will decline over the long-run and be increasingly driven by China and India

In the short term, most OECD countries face a cyclical fall in private saving rates as output gaps close. Further downward pressure on private saving rates then comes from ageing populations (Figure 12).[8] Demographic developments (combining the effect of changes in old-age and youth dependency ratios as well life expectancy) are estimated to reduce the private saving rate of the median OECD country by about 5 percentage points by 2060. Much larger effects of 10-12 percentage

8 A note of caution is warranted in using old-age dependency ratios based on fixed age groups when projecting saving rates, given that changes in life expectancy and retirement ages are also expected in future decades. Using a rolling definition of the old-age dependency ratio for which the upper age limit is increased in line with the assumption about the extension of working lives would eliminate virtually any demographically-induced fall in saving rates, which seems a too extreme scenario. Instead, the projections incorporate an estimated positive effect from increasing longevity on saving, based on Li *et al.* (2007), which acts to partially offset the negative effect of rising old-age dependency rates.

points are projected for Korea, Portugal and Mexico and 8 percentage points for Chile, Israel and Spain. On the other hand, the demographic effect on private saving is somewhat below the OECD median for many of the largest OECD countries including France, Germany, United Kingdom and the United States. Increases in OECD public saving, required to stabilise general government debt, offset much of the fall in private saving at least until the mid-2020s, particularly in Japan and the United States, so it is only beyond then that there is a clear fall in the total (public plus private) OECD saving rate.

Figure 12. **Saving rates are projected to decline**



1. The disaggregation of total saving between public and private saving is not available for all OECD countries and so they do not sum exactly to total OECD saving.

Source: Long-term Growth Scenarios, *OECD Economics Department Working Papers* No. 1000, *forthcoming*.

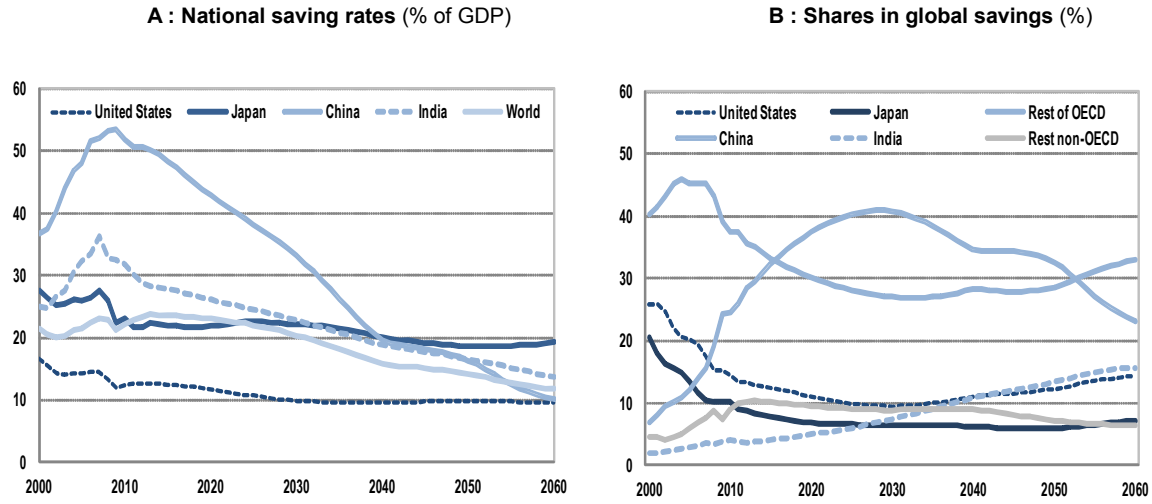
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Among the largest non-OECD economies, projected demographic influences on saving are even more heterogeneous, with two extreme and important cases being India and China. For India, the effect of falling youth dependency rates offsets much of the effect on saving from moderate increases in the old age dependency ratio, so that the overall demographic effect on saving is small. In contrast, for China, a legacy of the 'one-child policy' is that old age dependency rates are projected to rise more steeply than even in most OECD countries, with little change in youth dependency rates. Overall, this implies a very large fall in the Chinese saving rate of around 40 percentage points of GDP to 2060, about half of which is demographically-induced. On top of these demographic influences, there are other downward effects on saving rates in all emerging economies which are assumed to be phased in gradually by 2040 or 2060. A gradual improvement in social safety nets to 2040, through an increase in public spending on social protection of 4 percentage points of GDP to a level of provision similar to the average OECD country, reduces saving rates by 7-8 percentage points of GDP. A gradual catch-up in the availability of credit to 2060, to levels of provision currently available in most OECD countries, typically reduces saving rates by 3-4 percentage points. When including all influences together, total saving rates in the non-OECD fall by between 5 and 40 percentage points between 2013 and 2060 (unweighted average of 19 percentage points).

Paradoxically, while saving rates are falling in most countries, the global saving rate remains near historical levels until the early 2030s as the share of high saving countries in global output rises sharply (Figure 13). Particularly striking is the growing importance of China and India in accounting for global saving, rising from just under 30% in 2010 to nearly 50% by 2030. Beyond 2030, the global saving rate starts falling more clearly as high-saving non-OECD countries grow slower and save less

at the same time. However, large uncertainty surrounds projections for saving rates in emerging economies. Firstly, the panel equations used to project saving have generally under-estimated the rise in saving, notably in China and India, over the past decade, which in turn suggests that there are other, perhaps country-specific, factors at work and/or that saving rates have overshot levels supported by fundamentals. Secondly, future saving rates in emerging economies could be subject to additional change if, for example, the provision of more comprehensive social safety nets or access to easier credit were to be introduced more quickly than assumed in the baseline scenario. The impact of some of these factors is explored in the next section.

Figure 13. **Emerging countries will account for a larger share in global saving**



Source: Long-term Growth Scenarios, OECD Economics Department Working Paper No. 1000, *forthcoming*.

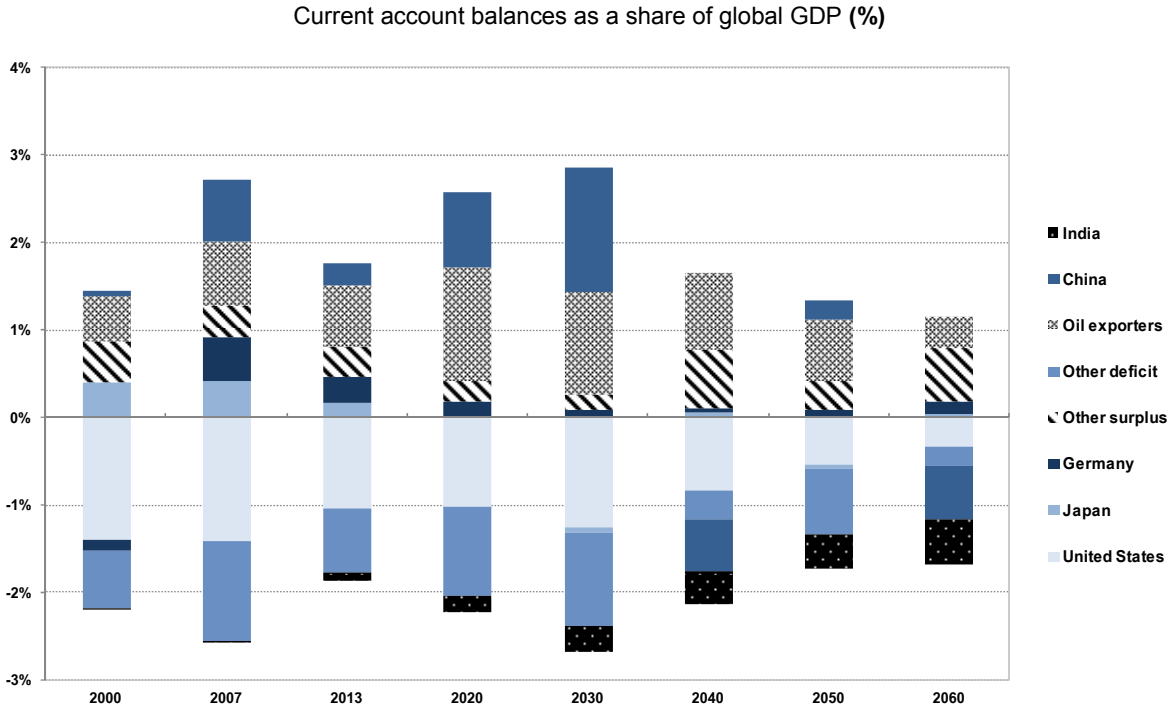
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Global current account imbalances will build up

Global current account imbalances are projected to widen up until the late 2020s, and then narrow again (Figure 14). In the short term, a widening of global current account imbalances is mostly a cyclical response as output gaps close, since those countries that had been running the largest deficits prior to the crisis (most obviously the United States) have more typically experienced sharper downturns than those that had been running surpluses (most obviously China but also Germany and to a lesser extent Japan). Over the longer term the negative effect of ageing populations on saving is the dominant effect, leading to reduced current account balances in most OECD countries, although Germany, Netherlands and some Nordic countries continue to run surpluses. A few countries -- Italy, Greece and Portugal - are projected to run persistent very large current account deficits of 10-15% of GDP. This suggests that some further policy response would be needed, which in most of these cases could include additional fiscal consolidation as government debt remains high in these countries.[9] China is projected to have a widening current account surplus up to the late 2020s as the investment rate falls more rapidly than the saving rate due to slowing potential growth. The current account surplus of oil exporters is projected to rise only slightly to 2030 reflecting modest increases in real oil prices set against the tendency for oil exporters to gradually run down current account surpluses. Overall, the scale of current account imbalances (normalised on world GDP) is projected to approach the pre-crisis (2007) peak by 2025-2030.

9 It should be noted, however, that the baseline projection does not build in any recently agreed fiscal measures, in particular it does not incorporate the effect of recently agreed programmes of fiscal consolidation in euro area countries that have been under financial market pressure.

Figure 14. **Global imbalances are projected to rise over the next two decades**



Source: Long-term Growth Scenarios, OECD Economics Department Working Paper No. 1000, *forthcoming*.

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Beyond 2030 the imbalances of China, the United States and the oil exporters are all expected to decline, bringing some relief to overall global current account imbalances. In the case of the United States, the current account deficit falls mostly because demographic effects are projected to have a smaller negative impact on saving than in many other countries. China's large current account surplus begins to decline in the 2030s as the old-age dependency rate rises more rapidly, lowering the saving rate more quickly. The decline in the current account surplus of the oil exporting countries mostly reflects the technical assumption of only 1% per annum increase in real oil prices after 2030, combined with an estimated response of the overall current account surplus to any oil surplus which diminishes over time.

4. Bold structural and macro policies can enhance growth and reduce imbalances

Product market liberalisation would speed up convergence

The scenario of relatively slow convergence of product market policies towards average OECD levels of regulation may not be realistic given the push for structural reform currently exerted in the context of the G20 mutual assessment process. If more rapid liberalisation in product markets is achieved, productivity gaps may be closed faster. For instance, assuming that the target for product market regulations is the average level of regulations in the five "best practice" countries in 2011 (*i.e.* the United States, the United Kingdom, Ireland, Canada and the Netherlands), average MFP growth would increase by 0.2 percentage points annually relative to the baseline over the period 2011-2060. This would in turn increase GDP by an average of 10% in 2060 relative to the baseline, the impact being greater in countries with relatively stringent regulations, such as China, Turkey, Slovenia and Greece.

Labour market reforms can boost long-run GDP

As in the case of product market policies, deeper labour market reforms than in the baseline can be envisaged resulting in convergence towards higher labour force participation rates. To examine this possibility, an alternative scenario is considered, in which cross-country differences in active life expectancy would be progressively wiped out, with the average duration of individual active life slowly converging in all countries towards the standard observed in Switzerland, one of the leading countries in terms of aggregate participation. Under this deeper labour market reform scenario, ignoring for simplicity any public budget implications of the underlying policies, aggregate participation is projected to increase on average across OECD countries by 2.7 percentage points relative to the baseline, to reach around 62% in 2060. The increase in participation would be particularly marked in Italy (+13 percentage points), Korea (+9 points) and Hungary (+6 points). In other countries, participation would moderately increase or decline by less than in the baseline scenario. As a result of this labour outcome, GDP would be close to 6% higher on average in 2060 as compared with the baseline.

Ambitious fiscal consolidation and structural reforms can reduce imbalances and boost growth

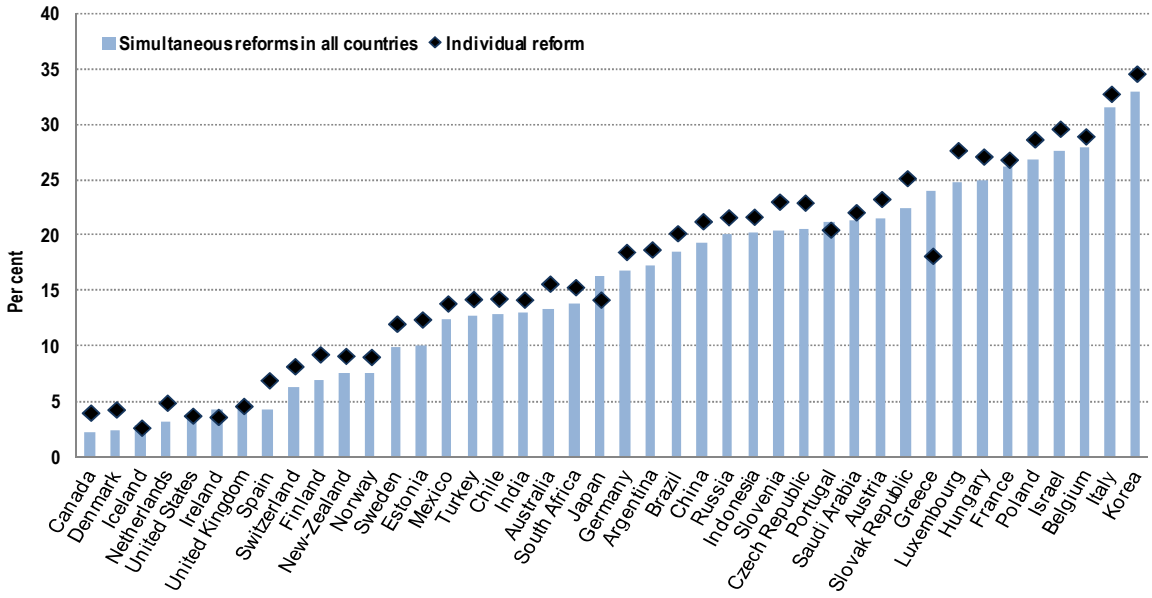
A final scenario combines deeper structural reforms with more ambitious OECD fiscal consolidation policies in which OECD countries are assumed to consolidate their budget position faster than in the baseline scenario to reduce debt ratios to 60% or lower (see Johansson *et al.* 2012 and OECD 2012b for details). Structural policy reforms provide for a faster improvement in product market regulation, higher labour force participation rates and reductions in the tax wedge to lower trend unemployment. In addition, it is assumed that welfare and financial reforms in non-OECD countries occur more quickly than assumed in the baseline: whereas public spending on social protection is assumed to increase by 4 percentage points of GDP by 2040 in the baseline, in this scenario the increase is assumed to take place by 2025; similarly, the availability of credit (expressed as a share of GDP) is assumed to reach the same level in 2035 as was previously achieved in the baseline by 2060.

The main macroeconomic impact of structural reforms is to boost potential growth, with the level of 2060 potential output eventually raised in both the OECD and non-OECD countries, by about 11% and 17%, respectively. There are, however, large differences in the magnitude of this effect across countries (Figure 15), with generally the effect being largest in those countries in which there is currently greatest scope for improvement in structural policies relative to best practice. The effects of structural and macro reforms are usually smaller than they would be if applied to only one country, because simultaneous reforms in all countries implies an increase in the global interest rates which provides a partial offset to the positive effect of structural reforms on GDP. Exceptions are countries where fiscal consolidation is substantial so that the domestic reduction in interest rates more than offset the global effect (*e.g.* Greece and Japan).

In the combined scenario, the largest gainers are Korea, Italy and Belgium where there are large potential gains from raising labour force participation as well as Greece which currently has relatively stringent product market regulations. On the other hand, countries such as Canada, Denmark, Iceland, and Netherlands appear to benefit less from structural reforms, but this is only because they are currently at, or close to, the best practice in respect of product market regulation or labour force participation.

Figure 15. **More ambitious structural reforms and fiscal consolidation raise GDP**

Difference in the level of GDP in 2060 as compared with the baseline (%)



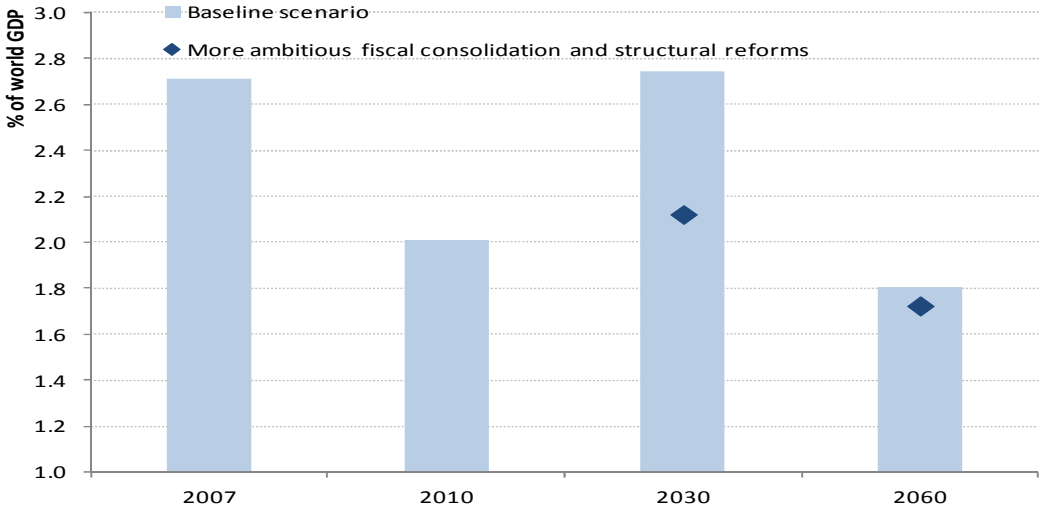
Source: Long-term Growth Scenarios, *OECD Economics Department Working Papers* No. 1000, *forthcoming*.

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More ambitious structural reforms and fiscal consolidation reduce global current account imbalances (Figure 16). This improvement comes about principally by lowering large current account surpluses in some non-OECD economies, especially China, because precautionary saving falls more rapidly as a consequence of implementing more rapid welfare reforms. Additionally, more ambitious fiscal consolidation reduces current account deficits in many OECD countries.

Figure 16. **More ambitious policies can reduce global imbalances**

Sum of current account balances in absolute value divided by 2



Source: Long-term Growth Scenarios, OECD *Economics Department Working Papers* No. 1000, *forthcoming*.

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ANNEX TABLE

Table A.1: **Average growth rate in trend GDP and trend GDP per capita in USD 2005 PPPs**[3]

	Average growth in GDP in USD 2005 PPPs				Average growth in GDP per capita in USD 2005 PPPs			
	1995-2011[1]	2011-2030	2030-2060	2011-2060	1995-2011[1]	2011-2030	2030-2060	2011-2060
Australia	3.3	3.1	2.2	2.6	1.9	2.0	1.7	1.8
Austria	2.0	1.5	1.4	1.4	1.7	1.2	1.4	1.3
Belgium	1.8	2.1	2.0	2.0	1.3	1.5	1.7	1.6
Canada	2.6	2.1	2.3	2.2	1.6	1.3	1.8	1.6
Switzerland	1.7	2.2	2.0	2.1	1.0	1.5	1.8	1.7
Chile	3.9	4.0	2.0	2.8	2.8	3.4	2.0	2.5
Czech Republic	3.2	2.7	1.8	2.1	3.1	2.6	1.9	2.2
Germany	1.4	1.3	1.0	1.1	1.4	1.5	1.5	1.5
Denmark	1.5	1.3	2.1	1.8	1.1	1.0	2.0	1.6
Spain	2.9	2.0	1.4	1.7	1.9	1.6	1.3	1.4
Estonia	3.6	2.8	2.0	2.4	3.8	3.1	2.3	2.6
Finland	2.5	2.1	1.6	1.8	2.2	1.8	1.5	1.6
France	1.7	2.0	1.4	1.6	1.1	1.6	1.2	1.3
United Kingdom	2.3	1.9	2.2	2.1	1.9	1.3	1.8	1.6
Greece	2.4	1.8	1.2	1.4	1.9	1.7	1.3	1.4
Hungary	2.4	2.5	1.7	2.0	2.6	2.7	2.0	2.3
Ireland	4.7	2.1	1.7	1.9	3.2	1.3	0.9	1.1
Iceland	3.0	2.2	2.4	2.3	1.8	1.2	1.9	1.6
Israel	3.7	2.7	2.6	2.6	1.5	1.3	1.6	1.5
Italy	1.0	1.3	1.5	1.4	0.6	0.9	1.5	1.3
Japan	0.9	1.2	1.4	1.3	0.8	1.4	1.9	1.7
Korea	4.6	2.7	1.0	1.6	4.0	2.5	1.4	1.8
Luxembourg	3.8	2.1	1.3	1.7	2.3	1.1	0.8	0.9
Mexico	2.6	3.4	2.7	3.0	1.2	2.5	2.6	2.5
Netherlands	2.2	1.8	1.6	1.7	1.7	1.5	1.7	1.6
Norway	3.0	2.9	1.9	2.3	2.2	2.0	1.4	1.6
New Zealand	2.7	2.7	2.6	2.6	1.6	1.8	2.2	2.0
Poland	4.3	2.6	1.0	1.6	4.4	2.6	1.4	1.9
Portugal	1.7	1.4	1.4	1.4	1.3	1.4	1.6	1.5
Slovak Republic	4.5	2.9	1.4	2.0	4.4	2.8	1.7	2.1
Slovenia	2.6	2.0	1.6	1.8	2.2	1.7	1.8	1.8
Sweden	2.5	2.4	1.8	2.0	2.1	1.7	1.5	1.6
Turkey	4.2	4.5	1.9	2.9	2.8	3.6	1.8	2.5
United States	2.5	2.3	2.0	2.1	1.5	1.5	1.5	1.5
Argentina	3.6	3.6	2.2	2.7	2.6	2.9	1.9	2.3
Brazil	3.3	4.1	2.0	2.8	2.1	3.4	2.1	2.6
China	10.0	6.6	2.3	4.0	9.3	6.4	2.8	4.2
Indonesia	4.4	5.3	3.4	4.1	3.1	4.5	3.3	3.8
India	7.5	6.7	4.0	5.1	5.8	5.6	3.6	4.4
Russia	5.1	3.0	1.3	1.9	5.4	3.2	1.7	2.3
Saudi Arabia	4.4	4.2	2.4	3.1	1.3	2.5	1.7	2.0
South Africa	3.4	3.9	2.5	3.0	2.1	3.4	2.3	2.7
World unweighted average[2]	3.1	2.8	1.9	2.2	2.3	2.3	1.8	2.0
World weighted average[2]	3.5	3.7	2.3	2.9	2.5	3.1	2.3	2.6
OECD unweighted [2]	2.8	2.3	1.7	2	2.1	1.8	1.7	1.7
Non-OECD unweighted[2]	4.3	4.7	2.5	3.3	3.1	4.0	2.4	3.0
OECD weighted[2]	2.2	2.2	1.8	2.0	1.5	1.7	1.7	1.7
Non-OECD weighted[2]	6.7	5.9	2.8	3.9	5.6	5.2	2.7	3.7

1. 1995 or first year available.

2. Aggregate calculations start in 1996, for a few countries, where trend GDP is not available at the beginning of the sample period, actual GDP is used in place of trend GDP.

3. World GDP is taken as sum of GDP for 34 OECD and 8 non-OECD countries.