

ENTREPRENEURSHIP AND GROWTH: TAX ISSUES



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SUMMARY

The OECD Growth Project concluded that a comprehensive and co-ordinated set of policies is needed to create the right conditions for future economic growth. This includes stimulating innovation, using information and communications technologies (ICT), improving worker skills, and providing more scope for risk-takers and entrepreneurs (*OECD, 2001c*). In many OECD countries, a number of tax features related to entrepreneurship and innovation have been introduced in recent years to improve economic growth. These tax provisions pertain to:

- ***Entrepreneurs*** -- Lower corporate tax rates and special corporate tax reliefs in many OECD countries give preferential tax treatment to small start-ups, but incur risks of tax avoidance. At the same time, certain features of corporate and capital gains taxes tend to discriminate against small firms, which also face relatively higher tax compliance and administrative burdens.
- ***Venture capital*** -- Many OECD countries have front-end (corporate tax credits) and back-end (capital gains tax relief) incentives to spur investments in venture funds and/or small firms. However, their effects on capital markets have not been fully evaluated, and some countries without such tax provisions have relatively high venture investments.
- ***Stock options*** -- Diverse fiscal treatment of stock options in OECD countries alters their attractiveness for employees and firms. The timing and valuation of options for tax purposes and the classification of gains as employment or capital income can determine their value for emerging firms.
- ***Intangible investment*** -- R&D tax credits are widespread in OECD countries, but debate continues on their design (*e.g.* small firms *vs.* large firms, incremental *vs.* level of R&D). Some countries are experimenting with similar tax credits for enterprise training and software purchases.

It is not clear that the benefits from preferential tax treatment of these business features outweigh the costs of veering from tax neutrality and possibly introducing new tax distortions. Most of the newer business tax incentives have not been evaluated with regard to their effects on investment, their efficacy in addressing market failures nor their best configuration and design.

OVERVIEW OF TAXES IN THE OECD

Taxes and economic growth

Taxation is a powerful government policy tool which affects the business environment and overall economic growth in OECD countries. One of the key challenges for governments is to design an efficient, fair and simple tax system that is conducive to industrial growth. Taxes are raised to finance public goods and services that are needed to support economic development and provide economic opportunities to everyone. However, the burden of taxes can adversely affect economic growth by discouraging new investment, work effort, acquisition of skills and entrepreneurial *incentives* (Engen and Skinner, 1996). There have been many theoretical and empirical studies assessing the role of tax policy in economic growth, some of which indicate a negative relationship. However, given the complexity of the tax system and the various channels through which it affects the economy, it is difficult to disentangle the effect of taxes from other factors (Leibfritz *et.al.*, 1997; Disney, 2000).

Taxes can create inefficiencies in the economy by distorting business investment decisions. As long as markets work well, then in the interest of economic efficiency, tax systems should be as neutral as possible, *i.e.* minimise discrimination in favour of or against particular economic choices. As a general principle, this means building tax systems around broad income and expenditure bases and minimising differences in tax rates (Van den Noord and Heady, 2001). However, governments use tax measures to achieve certain economic and social objectives as well as to correct market failures. In certain cases, this can increase economic efficiency but this requires carefully designed and effective policies. For example, while market failures might justify tax reliefs for activities whose social returns are high (*e.g.* research and development), the advantages need to be weighed against the costs of introducing tax distortions and trade-offs in terms of equity and efficiency. There has been a recent trend in business taxation to introduce special features to favour entrepreneurs and innovation. However, it is not clear that the goals of encouraging small firms and intangible investment justify these deviations from neutrality in the tax system, that fiscal measures are the best choice of policy instrument for achieving these aims nor that current tax measures are effective in their use and design.

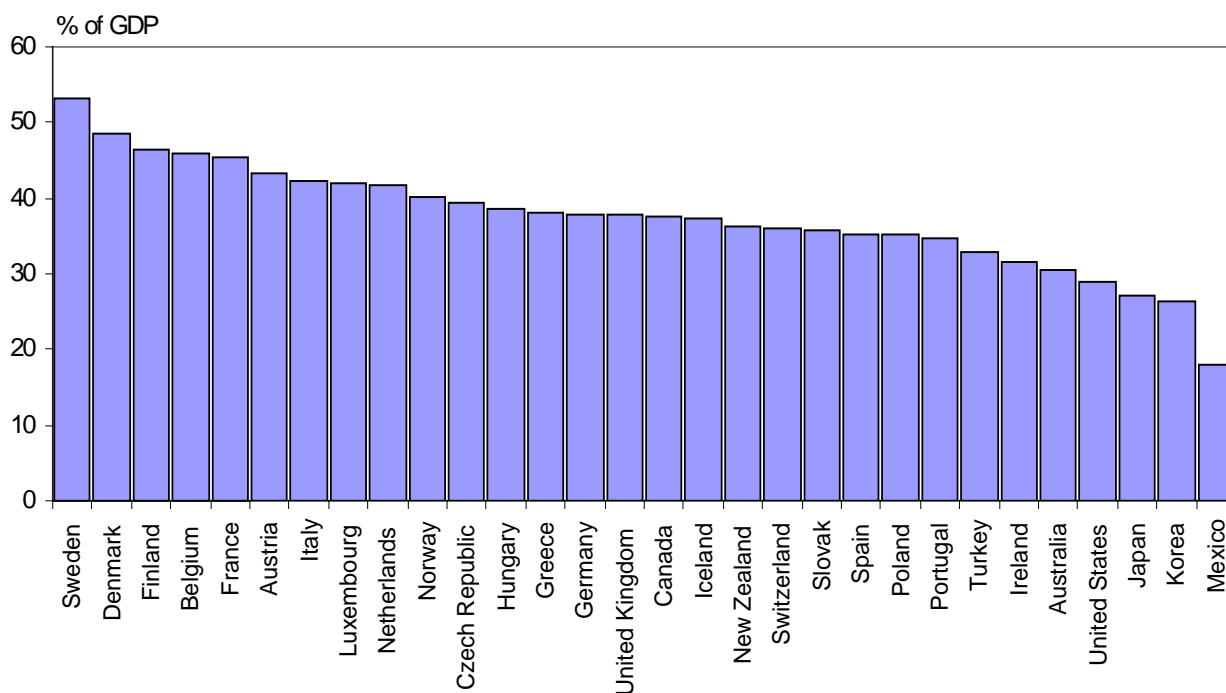
Taxation trends

The overall tax burden as well as individual features can affect business spending and investment decisions. There has been a continuing upward trend in the average OECD tax burden on individuals and on enterprises of all sizes since 1965 driven by increases in public spending. In 2000, Sweden, Denmark, Finland and Belgium had the heaviest overall tax burden -- which includes both personal and corporate taxes -- exceeding 45% of gross domestic product (GDP). In contrast, Mexico, the United States, Korea and Japan shared the distinction of having the lowest tax-to-GDP ratios (**Figure 1**). No OECD country currently has a lower tax-to-GDP ratio than its respective 1965 ratio.

Many OECD countries have reduced their corporate tax rates in recent years to spur economic growth, compete internationally and attract investment. Nearly all OECD countries had lower corporate tax rates in 2000 compared to 1986 except Austria, Italy, Norway, and Spain (**Figure 2**). Corporate tax rates are being further reduced in a number of countries. In Australia, the rate of 34% for 2000/2001 will be reduced to

30% for 2001/2002 and subsequent years. Both Federal and Provincial governments in Canada plan to reduce corporate tax rates over the next few years. The Federal rate is scheduled to fall to 22.12% from 29.12% (including surtax) by 2004. Under proposed legislation in Denmark, the corporate tax rate will be reduced to 30% effective from 2001. In Germany, the central government corporate tax rates of 40% (excluding 2.2% net surcharge) on retained profits and 30% on distributed profits fell to 25% in 2001. Similarly, Poland's corporate tax rate is being reduced to 28% in 2001, 24% for 2003 and 22% for 2004.

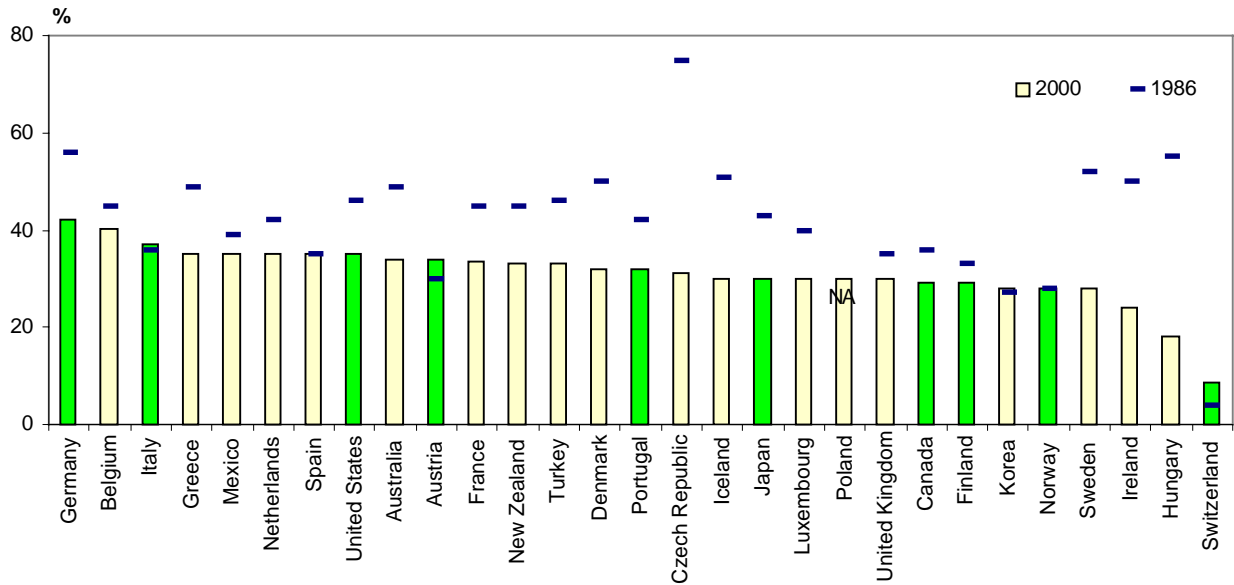
Figure 1. The overall tax burden, 2000¹



Note: 1999 for Australia and Poland.
Source: OECD (2001a).

Virtually all OECD countries, to varying degrees, provide corporate tax reliefs which generally reduce the effective income tax rate. These measures include tax allowances and tax credits associated with specific investments such as research and development (R&D) or those targeted to key industrial sectors or certain geographical areas. Such tax reliefs cause corporate average effective tax rates (AETRs) to be lower than statutory tax rates in most OECD countries. **Figure 3** illustrates the difference between the effective corporate tax rate and the statutory corporate tax rate -- including local government taxes and temporary surcharges -- in the European Union (EU) Member states in the period 1990-96. In addition, tax revenues are collected by different levels of government and the combined corporate tax rate -- including central and sub-central taxes and surcharges -- can differ substantially by country. In 2000, the highest combined rates were in Germany, Turkey and Canada while the lowest combined rates were found in Hungary, Ireland and Sweden.

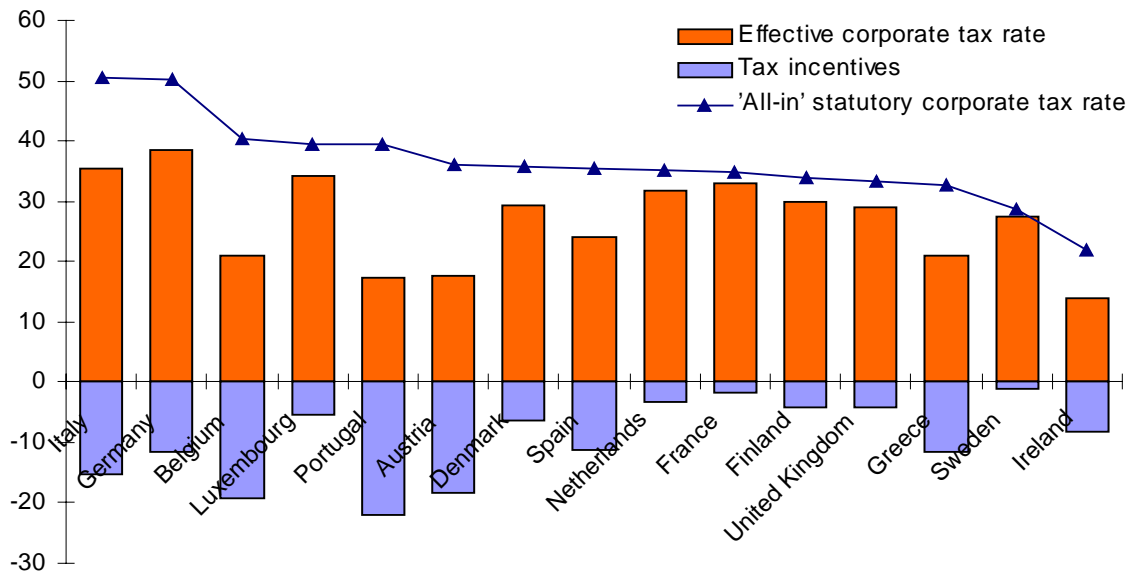
Figure 2. Central government corporate tax rates



1. 1988 rates for the Czech Republic, Hungary and Mexico.
2. Portugal and Switzerland had different rates for distributed income in 1986.
3. Green bars -- Austria, Canada, Finland, Germany, Italy, Japan, Norway, Portugal, Switzerland and the United States also have regional corporate tax rates.
4. Greek maintains a different rate for Greek corporations, Greek and foreign banks and foreign companies operating in Greece.

Source: Bronchi and Burns (2000); Ernst & Young (2001a); KPMG (2001); OECD (2002d); Owens and Whitehouse (1996).

Figure 3. Statutory and effective EU corporate tax rates, average 1990-96



Source: Buijnk, Janssen and Schols (1999).

TAXATION OF ENTREPRENEURS AND SMALL FIRMS

Innovative start-ups or small firms have played an important role in spurring productivity growth in OECD countries in the 1990s (*OECD, 2001b*). Dynamism in firm turnover (*i.e.* entry and exit) reflects the ability of an economy to reallocate resources to respond to technological change and consumer demand. Such "*churning*" of enterprises is a significant contributor to productivity growth. Moreover, small and medium-sized enterprises (SMEs) and the self-employed are important sources of entrepreneurship and innovation. However, not all small firms are high-growth, technology-based start-ups. The nature of the businesses of most small firms and self-employed persons suggests the majority have limited growth potential.

In general, the tax system imposes administrative and compliance costs on businesses -- estimated at 1-3% of GDP in some OECD countries (*Dalsgaard, 2001*) -- which appear to be higher for small firms than for larger enterprises. Economies of scale suggest that the costs of compliance are higher on a per sales basis for SMEs. Small firms generally lack internal tax experts and rely more on expensive outside professionals to deal with tax compliance. They also have more difficulties complying with tax laws at different levels of government and in varying jurisdictions. In recognition of the relatively higher compliance burden on small firms, some OECD governments are simplifying and streamlining tax procedures for small businesses.

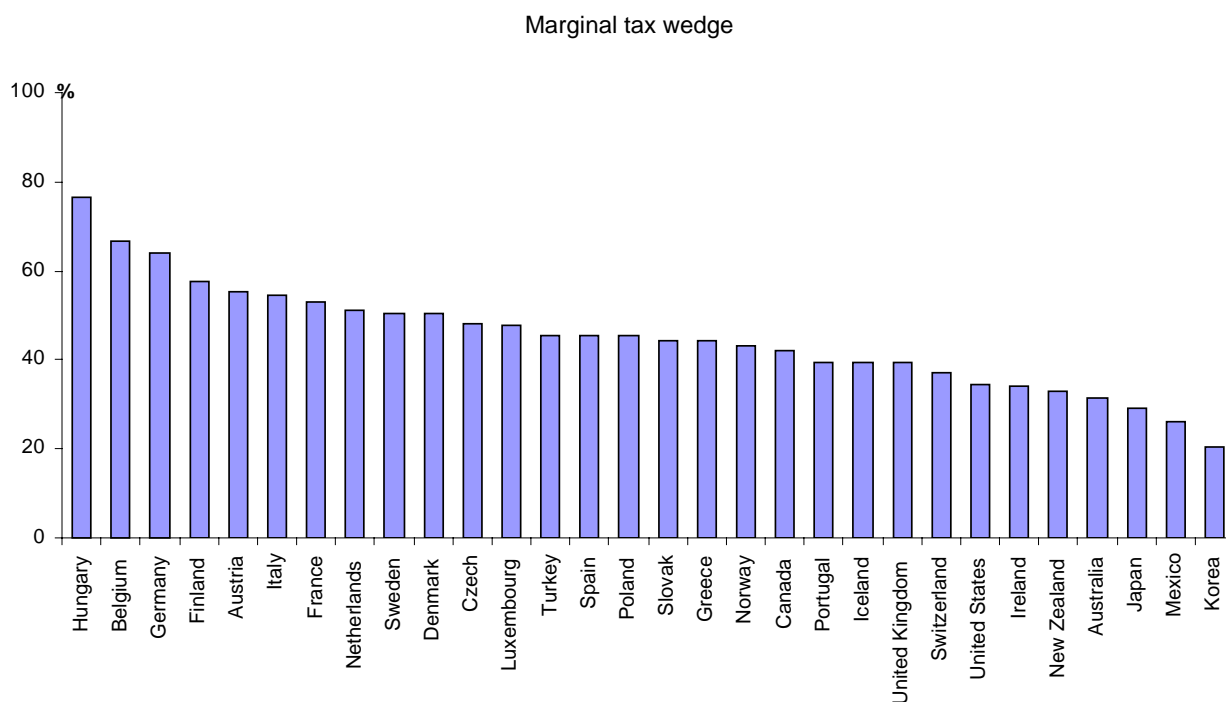
The overall structure of OECD tax systems -- including personal and corporate income taxes and capital gains taxes -- influences decisions regarding financing, start-up, self-employment and incorporation (*OECD, 2002b*). In addition, many OECD countries have special tax provisions that favour SMEs and the self-employed. A better understanding of the effects of tax structure and targeted tax schemes on individuals and small firms can aid in evaluation and design. Below is a discussion of personal income taxes, corporate taxes and capital taxes as they relate to entrepreneurs and smaller firms.

Personal taxes

Many entrepreneurs start as self-employed individuals, who are subject to personal income taxes. Both the level and progressivity of personal income taxes can influence the behaviour of potential entrepreneurs. Although most OECD countries have steadily reduced their marginal personal income tax rates and lowered the number of tax brackets, the tax burden at the personal level continues to be heavy as shown in the labour tax wedge (**Figure 4**). Marginal personal income tax rates were reduced between 1986 and 2000 in most OECD countries by broadening the tax base, but these reforms slowed in the second half of the 1990s.

Figure 4. Marginal labour tax wedge, 2001¹

As a percentage of gross labour costs²



Notes: 1. For a single individual at the income level of the average production worker.

2. Gross wage plus employers' contributions.

Source: OECD (2002c).

Studies generally find that lower personal income taxes can increase rates of self-employment. A highly progressive income tax structure can discourage entrepreneurs, who may be particularly sensitive to tax rates and schedules as income increases (*Gentry and Hubbard, 2000*). Evidence from the United States also shows that lower marginal personal tax rates can induce small enterprises to grow faster, hire more workers and make more investments in equipment and structures (*Carroll et.al., 2001*). It has been recommended that countries continue with on-going efforts to reduce top marginal personal income tax rates while broadening the tax base (*Van den Noord and Heady, 2001*).

The relative rates of taxation of the self-employed vs. employees can influence entrepreneurial decisions. Some countries have tax features that favour the self-employed who are taxed at lower effective rates than wage earners. For example, in countries such as the Czech Republic, Portugal and Greece, the self-employed make lower contributions to the social security system than other workers. In addition, taxation of self-employment income is often based on voluntary compliance whereas taxes on wages and salaries of other workers are withheld. In general, such tax provisions should be designed to reduce opportunities for tax avoidance and evasion by the self-employed.

Corporate taxes

Corporate tax rates can influence investment decisions, financing decisions as well as the choice of organisational form. Corporate tax rates which are below top marginal personal income tax rates --

together with provisions for deferral of personal taxation through reinvestment of profits -- can provide incentives for the self-employed to incorporate their profitable businesses. Lower corporate tax rates for small firms can be beneficial for entrepreneurs and smaller enterprises through increasing after-tax earnings and the supply of equity funds for re-investment in the firm. Many OECD countries have lower corporate tax rates for small firms -- as specified by number of employees, income, profits, turnover and other definitions (**Table 1**). These include Belgium, Canada, France, Greece, Ireland, Japan, Korea, Luxembourg, Mexico, the Netherlands, Portugal, Spain, the United Kingdom and the United States. Other countries apply the same corporate tax rate to all size firms.

Table 1. Federal taxation of corporate income, 2000

Central government corporate taxes			
	Basic Rate	SME Rate	Definition of SMEs
Belgium	40.2	28.84	Income < € 24,789
Canada	29.12	13.12	Income < CD 200 000 ¹
France	33.3	19	Turnover less than FF 50 million
Greece	40	25	For limited partnerships
Ireland	24	12.5	Trading income < IR£ 200,000.
Japan	30	22	Income below 8 million yen
Korea	28	16	Income below 100 million won
Luxembourg	30	20	For low income
Mexico	35	0-2.5 ²	Gross income < 2.2 million pesos ³
Netherlands	35	30	First NLG 50,000 of taxable income
Portugal	32	20	Turnover < 30 million escudos
Spain	35	30	Turnover < ESP 250 million
U.K.	30	10-20	Profits up to £10 000 and £50 000 to £300 000 ⁴
U.S.	35	15	Taxable income < \$335,000 ⁵
Australia	34	Same	
Austria	34	Same	
Czech Rep	31	Same	
Denmark	32	Same	
Finland	29	Same	
Germany	40 ⁶	Same	
Hungary	18	Same	
Iceland	30	Same	
Italy	37	Same	
New Zealand	33	Same	
Norway	28	Same	
Poland	30	Same	
Sweden	28	Same	
Switzerland	8.5	Same	
Turkey	33	Same	

1. For Canadian-controlled.

2. On gross income.

3. After a deduction of three times the minimum wage.

4. Graduated rates rising from 10% at £10 000 to 20% at £50 000. This rate rises further from 20% at £300 000 to reach 30% basic rate at £1.5 million.

5. Corporations with taxable income of less than USD 335 000 are subject to the graduated rates of 15% and 25% on the first USD 75 000 of taxable income.

6. On retained profits. 30% on distributed profits. To be reduced to 25% in 2001.

Source: OECD (2001d).

However, favourable corporate tax treatment of SMEs may encourage underreporting of income or lead entrepreneurs to divide businesses into separate corporations for tax purposes. High degrees of progressivity according to firm size can lead to "under-invoicing" in order to be eligible for lower tax rates

and can also distort the incentives for firms to expand. While lower corporate tax rates can help address market failures in the availability of SME finance, they should perhaps be accompanied by anti-fragmentation rules to prevent larger firms from artificial tax-induced divisions. For example, countries such as Canada and the United Kingdom have special rules applying to groups of companies, so that larger businesses cannot exploit small company tax rates by establishing small subsidiaries.

There are general features of corporate tax systems which may mitigate against growth of small firms, although this is not confirmed. One is double taxation of dividends, which under certain circumstances, could discriminate against incorporation of businesses. In some OECD countries (*e.g.* Switzerland, the United States), companies are subject to corporate tax while shareholders are liable for personal income tax on dividends (**Box 1**). This *classical* treatment of dividends -- as well as the tax deductibility of corporate interest payments -- tends to favour debt over equity financing, which can penalise start-ups relative to large established taxable firms with easier access to bank loans. Tax bias in favour of debt financing exists in most OECD countries (**Figure 5**). Denmark, Finland, Korea and Mexico are neutral between debt and new equity, but not retained earnings. The two countries that are neutral with respect to all three sources of financing are New Zealand and Norway.

Box 1. Corporate tax treatment of dividends

Corporate tax systems in OECD countries can be characterised on the basis of their tax treatment of distributed profits (dividends) vis-à-vis retained profits:

Classical system -- The company is subject to corporate tax while the shareholders are liable to personal income tax (or a withholding tax) on dividends. There is no attempt to relieve the shareholders for tax paid by the company. Thus, dividends are taxed twice under this system (*e.g.* Luxembourg, the Netherlands, Switzerland, the United States). But dividends are subject to a lower tax rate in some countries (*e.g.* Austria, Belgium, Iceland, Japan, Poland).

Imputation system -- Part of the corporate tax paid on distributed profits is imputed to the shareholders and regarded as pre-payment of their personal income tax on dividends. Thus, shareholders are liable for the difference between their personal marginal rates of income tax and the rate of imputation (*e.g.* Australia, Finland, France, Mexico, New Zealand).

Partial credit system -- The shareholder receives a partial credit for corporate tax paid on dividends against personal tax liability (*e.g.* Canada, Denmark, Korea, Portugal).

Partial deduction system -- The company deducts from its corporate tax liability a fixed share of the withholding tax on dividends (*e.g.* the Czech Republic).

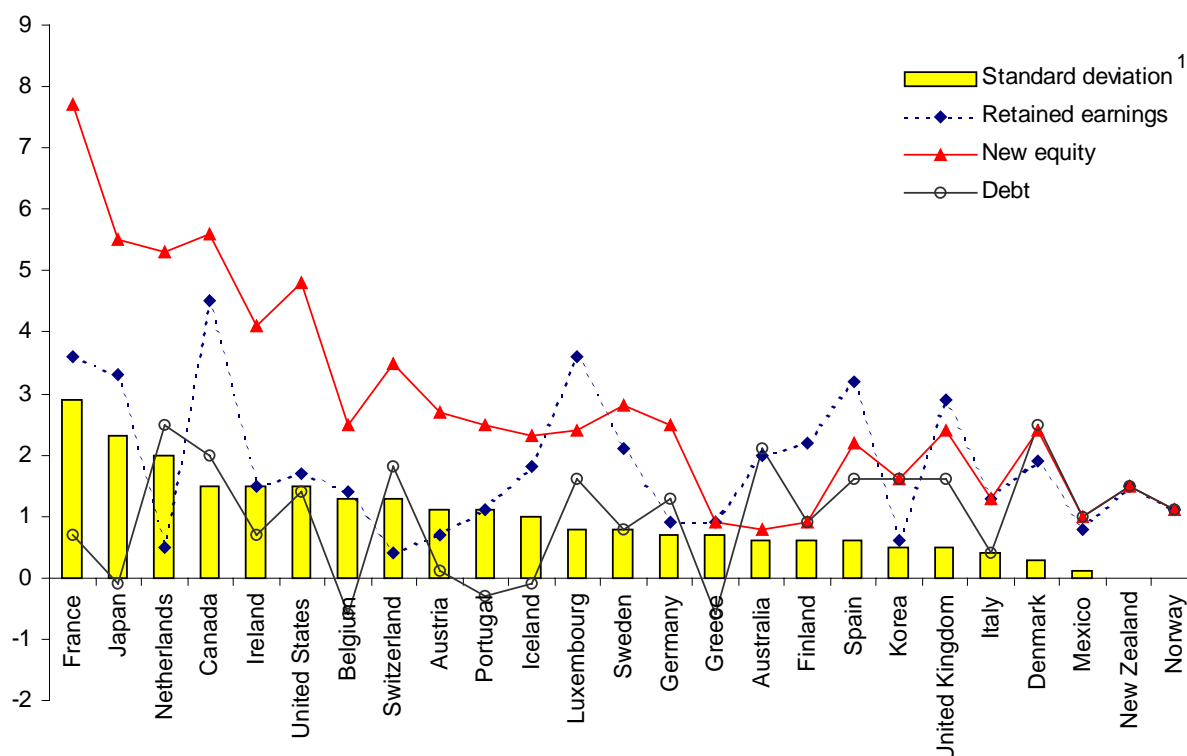
Exemption system -- Under this system, dividends are exempt from personal income tax (*e.g.* Greece).

The treatment of operating losses in corporate tax systems may also discriminate against smaller enterprises. In a tax system that adheres to taxing economic income, profits and losses should be treated symmetrically so as not to discriminate against risk-taking, *i.e.* tax profits and provide tax refunds for losses. The asymmetric treatment of operating losses in the corporate tax system may put start-ups and SMEs at a disadvantage since it may take years before they become profitable. However, full loss offsets or tax rebates may prolong the life of less efficient and economically obsolete firms and tie up valuable capital. In practice, operating losses are carried backward and forward for a limited number of years in most OECD countries, whereas profits are always taxed. Some countries allow losses to be carried forward indefinitely to be applied on future profits, while others (*e.g.* Hungary, Italy, Korea and Spain) which do not have unlimited carry-forward provisions have more generous provisions for start-ups or SMEs.

Many OECD countries have special corporate tax provisions to help SMEs overcome impediments to start-up and growth. A recent tax package for small firms in Korea gives newly created SMEs a 50% reduction in income and property tax payments for up to five years and exemption from registration and transaction taxes for two years. SMEs in the Czech Republic can take advantage of a corporate income tax holiday for up to 10 years in qualified investments in high-technology manufacturing. Japanese SMEs may take advantage of either an investment tax credit of 7% or an additional depreciation allowance of 30% for acquisition of qualifying machinery or equipment. Finland, Spain and the United Kingdom allow more generous depreciation allowances for investments made by small firms. Some OECD countries give more generous tax credits for R&D conducted by SMEs. Italy and the United Kingdom have R&D tax credits in place only for SMEs and are regarded as the most generous in this regard

Figure 5. Financing bias in corporate tax systems

Marginal effective tax wedges in manufacturing by sources of financing
Per cent, 1999



Note: 1. The standard deviation across financing instruments.

Source: Van den Noord and Heady (2001).

Some OECD countries have either value-added tax (VAT) exemptions or special VAT provisions for small businesses to lower their compliance costs and administrative burdens. Switzerland's experience indicates that extensive time and money are spent on VAT compliance compared to other taxes (Carey, Gordon and Thalmann, 1999). Small businesses are exempt from VAT in most OECD countries, while other countries have introduced simplified VAT regimes which have lowered effective VAT rates below standard rates (e.g. Italy, Mexico and Sweden). Payroll taxes are not discussed in this paper due to a lack of empirical studies; however, it is generally recognised that payroll taxes affect smaller firms more than larger firms in terms of administration and cost (Baren, 1996).

Capital gains taxes

Capital gains taxes affect the level of profits retained by individuals and enterprises and can influence risk-taking activity by entrepreneurs and investments by small firms. A substantial part of entrepreneurial or self-employed income may be reinvested in the firm and subject to capital gains tax (when the business is sold) rather than personal income tax. High rates of capital gains tax can increase the bias against savings and investment with negative effects on the supply of capital for entrepreneurs and start-ups. Capital gains tax treatment should also be assessed in relation to tax treatment of dividends. Differential rates can lead taxpayers to realise earnings in the form (gains vs. dividends) which is taxed more favourably; anti-avoidance rules may be needed where the rates diverge significantly.

Taxation of capital gains varies widely across the OECD (**Table 2**). The rate of taxation differs for corporations and individuals, by type of asset, by holding period as well as other conditions. Some countries such as Belgium and New Zealand do not impose taxes on capital gains at both corporate and individual levels. A number of countries including Greece, Korea, Mexico, the Netherlands, Poland and Switzerland do not have capital gains tax on shares held by individuals. About one-third of OECD countries have capital gains tax rates which decline with the holding period. The bias favouring longer-term assets can reinforce “*lock-in effects*” which may hinder the reallocation of capital towards start-ups and entrepreneurs. However, some countries have roll-over provisions where capital gains are alleviated on qualified small business investments when they are reinvested in other small businesses.

Taxes on transfers of wealth or estates may also play an important role in entrepreneurship through two channels. *First*, entrepreneurs typically face liquidity constraints in forming new businesses, and they often rely on inheritance as a source of capital. In fact, the size of inheritance has been shown to have a substantial positive effect on the probability of becoming an entrepreneur. *Second*, high estate tax liabilities may make it difficult for family businesses to survive the death of their founders (*Holtz-Eakin and Marples, 2001*). A number of OECD countries do not have estate taxes including Australia and Canada. For those countries that impose such taxes, the value of the estate where the top rate applies varies significantly. Estate or inheritance taxes appear to be quite high in Japan, the United States and Korea. Some countries, such as France, have introduced special provisions to ease the transmission of small firms and capital assets among family members, including lowering the tax burden.

Policy issues

If encouraging entrepreneurship and fostering the entry and survival of small firms are national policy goals, there are certain steps which governments can take to improve the tax climate for SMEs and entrepreneurs. SMEs face a heavier compliance burden than larger enterprises. Streamlining tax-related administrative requirements and lower costs would encourage SME growth by reducing the burden of filing tax returns and improving the effectiveness of tax administration.

Countries may find it useful to assess national tax systems for differential impacts on large and small firms. A composite indicator of tax features relating to small firms indicates that Ireland has the most favourable tax regime for entrepreneurs followed by Italy, the U.S., and the U.K. (**Figure 6**). This measure is based on taxes on capital investments, which include corporate and personal income taxes on capital income (*i.e.* dividends, interest and capital gains/losses), asset-based taxes and other business taxes on capital inputs. It also incorporates tax provisions such as investment tax credits and tax depreciation allowances. Using this measure, the effective tax rates on capital for small firms have declined in most countries since 1995 except France and Sweden. Small firms (in both manufacturing and services) enjoy a more favourable tax regime than their larger counterparts in Canada, France, Italy, Japan, the United Kingdom and the United States.

Table 2. Taxation of capital gains on shares, 2000 resident taxpayers

	Corporate		Individual	
	Short-term	Long-term	Short-term	Long-term
<u>Countries with same capital gains tax rates on corporations and individuals</u>				
Belgium	0	0	0	0
New Zealand	0	0	0	0
Ireland	20	20	20	20
Norway	28	28	28	28
Finland	29	29	29	29
<u>Countries with lower tax rates on capital gains by corporations</u>				
Hungary	18	18	20	20
Canada ¹	27.9	27.9	31.3	31.3
Sweden	28	28	30	30
Turkey	30	30	50	50
<u>Countries with lower tax rates on capital gains by individuals</u>				
Greece	40	40	0	0
Korea	28	28	0	0
Mexico	35	35	0	0
Netherlands	35	35	0	0
Poland	30	30	0	0
Iceland	30	30	10	10
France	33.3	33.3	26	26
Japan	30	30	26	26
<u>Countries with lower tax rates on longer-term investments</u>				
Spain	35	35	40	18
United States	35	35	39.6	20
Australia	34	34	48.5	23.5
Germany	25	25	53.8	0
United Kingdom	30	30	40	10
Austria	34	34	50	0
Czech Republic	31	31	32	0
Portugal	32	32	10	0
Italy	37	27	12.5	12.5
Denmark	32	32	40	0
Luxembourg	30	0	25	0
Switzerland ¹	29.4	0	0	0

Notes: Typical capital gains tax rate, but it may vary across different asset types. Holding periods for long-term assets differ across countries as do other conditions.

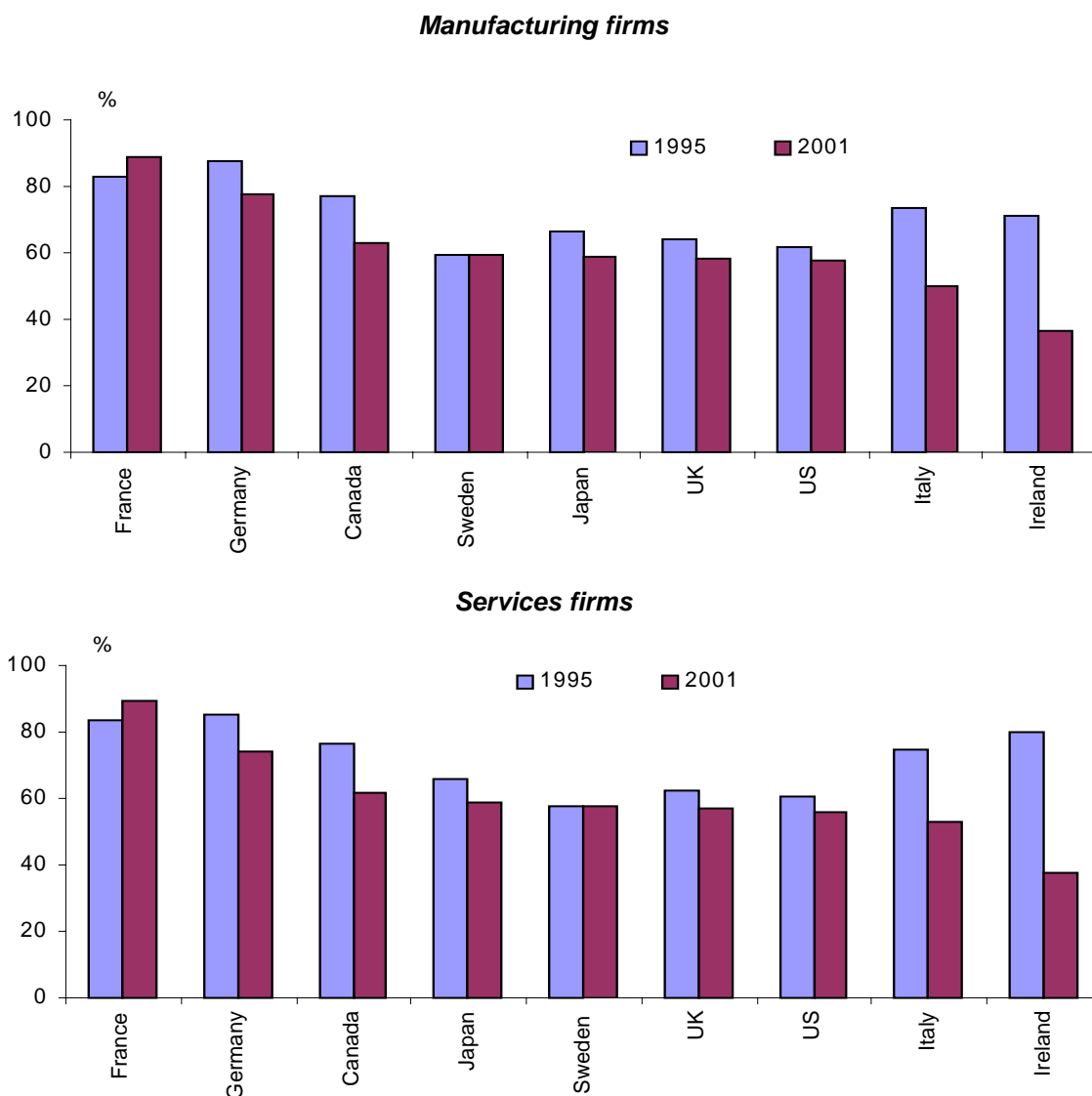
1. Includes both federal and sub-central tax on capital gains.

Source: Dalsgaard (2001); Ernest and Young (2001a; 2001b).

In general, it appears that many OECD countries already have more favourable tax treatment of small firms than of larger firms. This is largely due to lower corporate tax rates for small firms and special corporate tax reliefs, which could be more fully evaluated regarding their justification and effectiveness. The main advantage associated with special SME corporate tax rates may include increased supply of investment funds through higher after-tax earnings. But special SME tax rates should be accompanied by provisions to prevent artificial division of firms or underreporting of income. In order to enhance small firm financing, countries can: *i*) examine ways to reduce tax biases against equity financing (*e.g.* double taxation of corporate profits and corporate interest deductibility), *ii*) enhance loss carry-forward provisions in corporate taxes to aid unprofitable firms, and *iii*) reduce biases in capital gains taxes favouring longer-

term assets. However, such tax modifications must be examined with regard to their overall impacts on tax neutrality and effects on firms of all sizes.

Figure 6. Marginal Effective tax rates for small firms^{1,2}



1. The effective tax rate is the ratio of the tax wedge (sum of corporate and personal tax wedges) to the before-tax rate of return, where the tax wedge is the difference between before-tax and after-tax rate of return on capital. The estimates are based on the assumption that investments are 100% equity financed.

2. Definition of small firms is not comparable across countries since it is based on the tax treatment in each country.

3. The reader should be cautioned that METRs are sensitive to various assumptions in their calculations such as economic depreciation, the real interest rate, the inflation rate and the share of different financing sources. This paper assumes that investment in each country used the same financing structure. Moreover, some financing instruments receive a special tax treatment in some countries. For instance, equity funds financed by pension funds are not taxable at the individual level in some countries. These special features are not considered in this paper. These various points imply that the estimated METRs could have been either overestimated or underestimated in some cases.

Source: Chen, Lee and Mintz (2002).

VENTURE CAPITAL

Trends in venture capital

Venture capital is a special type of equity finance for typically young, high-risk and often high-technology firms. These mostly smaller enterprises need capital to fund start-up, product development or growth and must, by the nature of their business, obtain this capital largely in the form of equity. Heavy reliance on intangible assets, uncertain operating environments and negative cash flows make it unlikely that start-up firms can access bank loans or use other debt financing instruments. Consequently, without venture capital, many of these dynamic firms would be capital-constrained and fail to survive. Venture capital can be supplied from specialised funds which raise money from a range of sources: private individuals, corporations, government agencies, pension funds, banks, insurance companies, endowments and foundations. Or venture capital can be supplied directly by individuals, corporations and other institutions (*Baygan and Freudenberg, 2000*).

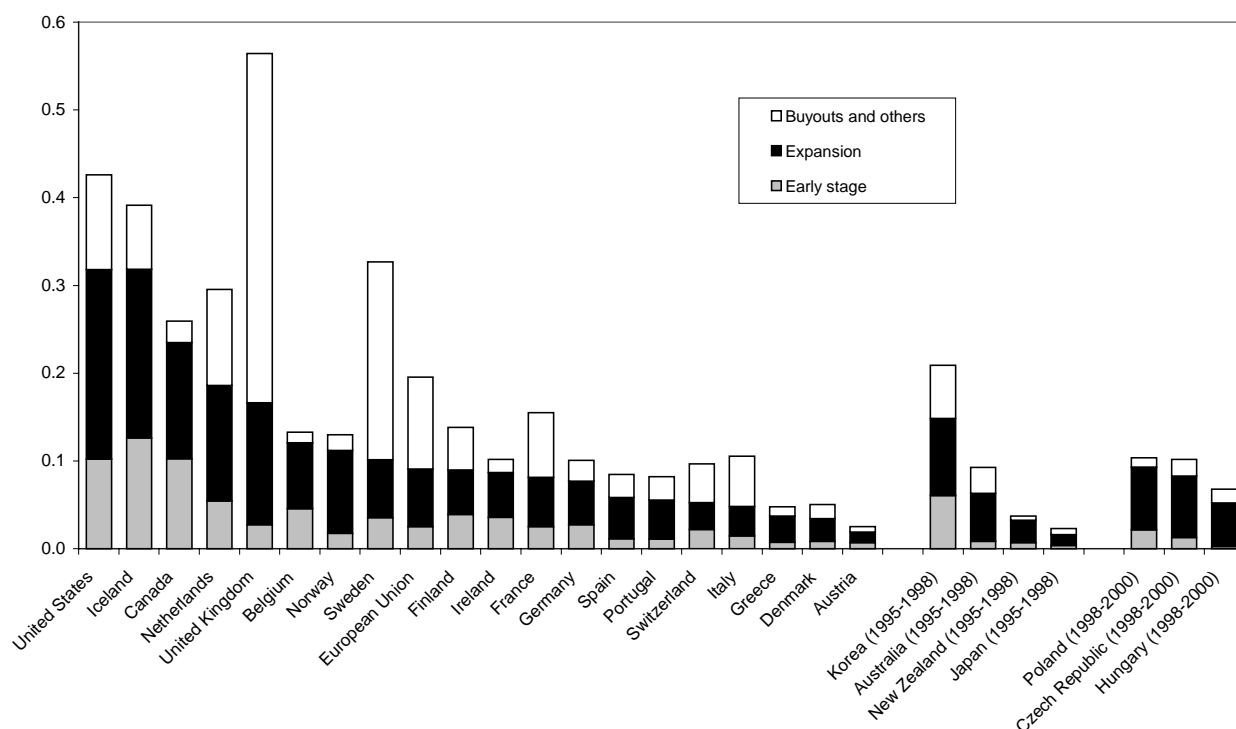
Venture capital activity has grown significantly in most OECD countries through to 2000, but is highest in terms of GDP in the United States and the United Kingdom (**Figure 7**). Investment in the early stages of firms (seed and start-up capital) and expansion of small firms in the United States is almost three times as important as in most European countries. Time series data indicate that venture capital intensity in Europe is about 2 years behind the United States. Venture capital investment in Japan is still relatively rare, while it is small but growing in Korea and Australia.

Tax incentives to venture capital investment

There are numerous factors which affect the supply of venture capital in a country. On the demand side, this includes having a sufficient number of entrepreneurs who are able to develop high-potential projects suitable for investment. On the supply side, this depends largely on creating economic, institutional and regulatory frameworks within which markets can effectively channel resources to new and innovative enterprises. In the 1990s, many governments identified funding gaps which were preventing small, innovative businesses from obtaining sufficient capital and thus from producing public benefits in terms of innovation and job creation. In particular, funding gaps were found to arise for relatively small venture capital deals (*e.g.* under USD 5 million), given the fixed cost element of the required 'due diligence' reviews of potential investments (Bank of England, 1996).

OECD governments initiated steps to remedy deficiencies in private capital markets and to leverage private sector financing. Approaches include loosening regulations on the types of institutions which can make venture investments (*e.g.* pension funds, insurance companies), provision of loan and equity guarantees for start-ups and venture funds, schemes for direct equity infusions and fiscal incentives (*OECD, 1997*). Despite the proliferation of government venture capital schemes in the 1990s, very few have been adequately evaluated to determine their impacts on capital supply to small firms and the relative efficacy of different types of approaches.

Figure 4. Venture capital investment by stages as a percentage of GDP, 1995-2000



Source: Compiled by OECD from national and regional sources.

Tax incentives to venture capital investments take two broad forms: 1) *front-end incentives* whereby investors receive tax credits against income tax for qualifying investments; and 2) *back-end incentives* whereby investors receive reductions on capital gains tax for qualifying investments. The first type rewards all investors, but can cause behaviour motivated primarily by tax shelter considerations. The second type rewards only winners or successful investments and may thus be less expensive to governments than front-end incentives. However, because realising gains is riskier for the investor, back-end incentives may motivate fewer venture investments overall.

Countries vary widely in the conditions which determine the venture investments qualifying for preferential tax treatment. Incentives may be available for investments made directly (by individuals such as "*business angels*" or corporations) into small companies. Or they may apply only to investments in or by pooled vehicles such as venture capital funds. Some evidence shows that direct incentives may attract more business angels who then provide SMEs with added value such as management advice. Fiscal incentives may also be restricted to investments as qualified by sector (*e.g.* technology-based firms), stage (*e.g.* seed or early stage funding), amount invested (lower or upper limits may be specified) and holding periods.

Tax credits against personal or corporate income tax are one means of stimulating venture investments. These tax credits or "front-end incentives" are being targeted to individuals investing in small companies and in qualified venture funds (**Table 3**). Under the UK *Enterprise Investment Scheme* started in 1994, individual investors receive income tax relief equal to 20% of their investment in qualified small companies up to GBP 150 000 per year. The UK *Venture Capital Trust* scheme has similar incentives for individuals investing in qualified pooled vehicles or venture funds. The terms of these two schemes have been adjusted over time to ensure that investments are targeted to early-stage and expanding firms which are capital-constrained. In addition, investments must be held for at least three years. The United Kingdom also has a "corporate venturing scheme" which gives corporations income tax relief for investment in the same types of small companies which qualify under the EIS and VCT schemes.

Table 3. Front-end tax incentives to venture capital investment (2001)

	Front-end incentive (% tax credit)	Amount of qualifying Investment	Scheme
Canada	15%	5 000 CAD	Labour-sponsored Venture Capital Corporations (LSVCCs)
France	25%	75 000 FRF	Fonds Commun de Placement dans l'innovation (FCPI)
Ireland	42%	25 000 IEP	Business Expansion Scheme (BES)
Netherlands	100%	5 000 NLG	Tax Compensation Scheme
Poland	50%	No limit	Investment Tax Credits Programme
Switzerland	50%	500 000 CHF	Federal Decree on Venture Capital Companies
United Kingdom	20%	150 000 GBP	Enterprise Investment Scheme (EIS)
	20%	100 000 GBP	Venture Capital Trust (VCT) scheme
United States (various States)	100%	No limit	Certified Capital Companies (CAPCO) at State level (e.g. Florida, Louisiana, Missouri, New York)

Notes: Federal governments schemes only.

Source: OECD

In France, investors in the *Fonds Commun de placement dans l'innovation* (FCPI) receive a 25% tax credit for up to FRF 75 000 of investment. The *Tax Compensation Scheme* in the Netherlands entitles individuals who invest at least NLG 5 000 in young Dutch companies to an equivalent tax credit. While the United States has no federal tax credit scheme, individual States give 100% (or higher) tax credits (over 10 years) to insurance companies who invest in *Certified Capital Companies*.

Canada gives tax credits to individuals investing in hybrid public/private funds called *Labour-sponsored Venture Capital Corporations* (LSVCCs), which are managed by labour unions and tend to be regionally-based. An investor can receive a federal tax credit of 15% on up to CAD 5 000 of investments in LSVCCs, who then invest in early-stage Canadian small firms. Investments in LSVCCs also qualify for tax deductions under the Registered Retirement Savings Plan (RRSP) rules. In addition, in Canada and some other OECD countries, federal provisions may be supplemented by sub-central tax incentives. Thus, for a Canadian investor with a 45% (combined federal and provincial) marginal personal income tax rate, the RRSP deduction combined with a 15% federal tax credit and a matching 15% provincial tax credit implies an overall up-front incentive rate of 75% for LSVCC investments.

OECD governments are also adopting "back-end incentives" -- which alleviate capital gains taxes on profits realised from venture investments -- which may be more effective than front-end tax credits. Back-end incentives generally give tax breaks to dividends or capital gains realised by individuals on their investments in qualified venture funds or companies. The venture funds themselves can also be exempt from capital gains tax. Many OECD countries have introduced preferential rates for venture investments (**Table 4**). The capital gains tax rate (particularly the differential from the tax rate on ordinary income) can be an important determinant of investment flows to venture businesses. Studies show that general increases in the capital gains tax rate can have a negative effect on contributions to the venture capital industry and greatly reduce risk-taking incentives (*Lerner, 1997*).

Table 4. Back-end tax incentives to venture capital investment (2001)

	Back-end incentive (% tax)	Amount of qualifying investment	Scheme
Australia	0%	No limit	Pooled Development Funds
Austria	0%	260 000 Sch	Individual capital gains tax
France	0%	No limit	Sociétés de Capital Risque (SCR)
	0%	No limit	Fonds Commun de Placement a Risques (FCPR)
Hungary	0%	No limit	Private equity scheme
Korea	0%	No limit	Special Tax Treatment Control Law
Netherlands	0%	50 000 DFL	Tax Compensation Scheme
Poland	Reduced	No limit	Investment Tax Credits Programme
Spain	0%	No limit	Fondos de Capital Riesgo (FCR)
Switzerland	0%	250 000 CHF	Federal Decree on Venture Capital Companies
Turkey	0%	No limit	Risk Capital Investment Funds
United Kingdom	0%	No limit	Enterprise Investment Scheme (EIS)
	0%	100 000 GBP	Venture Capital Trust (VCT) scheme
United States	Reduced	No limit	Initial Public Offering (PO) scheme

Source: OECD.

In the United Kingdom, for example, under the *Enterprise Investment Scheme* (EIS) and the *Venture Capital Trust* (VCT) scheme, investors are exempted from capital gains tax on disposal of EIS or VCT shares. In Australia, investors' dividends, distributions and capital gains from *Pooled Development Funds*, which invest in small firms, are tax-exempt. Investors in the *Sociétés de Capital Risque* (SCR) in France are exempt from capital gains tax on SCR shares held for five years as are investors in *Spanish Fondos de Capital Riesgo* (FCRs). The United States has lower capital gains taxes on shares of small businesses purchased in an initial public offering (IPO) if those shares are held longer than five years.

Countries also have tax deferrals for corporations and/or individuals to encourage reinvestment of capital gains in small or venture firms (e.g. Canada, France, Germany, the United States, the United Kingdom). In Canada, individuals can defer capital gains tax on the disposition of shares in certain small businesses provided the proceeds (up to CAD 2 000 000) are reinvested in other small businesses. In the United States, capital gains tax on eligible venture investments is deferred provided the money is re-invested in another eligible investment within 60 days. Similarly, the United Kingdom defers tax where capital gains are reinvested within three years in unquoted companies carrying on certain trades. Germany recently extended capital gains exemptions to small firms allowing them to reinvest profits made from the sale of investments tax-free.

Policy issues

Front-end (corporate tax credits) and *back-end* (capital gains tax relief) incentives exist in several OECD countries to spur investments by individuals, corporations and venture funds. Such tax expenditures incur costs to governments, and it is important that they be outweighed by economic benefits in terms of firm growth, innovation and employment. Many OECD governments believe there exist significant funding gaps for small firms which need to be addressed. However, it is not certain that fiscal measures are the most effective means for stimulating venture investments, either alone or in conjunction with other types of government programmes. The effectiveness of a policy instrument depends on how much they influence the investment incentive and how sensitive the target is to the incentive. There are OECD countries -- such as Denmark, Finland and Sweden -- which do not have tax incentives for venture investments but instead rely on various guarantee and loan schemes to increase capital supply to small firms.

OECD governments have now had several years of experience with venture capital tax incentives. Many were phased out when judged to be ineffective in bringing forth the desired investments; others were eliminated when they had served their purpose in stimulating private sector venture capital supply; still others were redesigned to sharpen their effectiveness. In terms of design, more schemes are being geared to capital gains tax relief, which tends to encourage risk-taking rather than tax evasion. Fuller evaluation of the effects of these tax incentives on capital markets and investors would yield insights for their future use relative to other policies and their most effective configuration.

STOCK OPTIONS

Trends in stock options

Stock options are a form of employee compensation that has traditionally been used by firms to attract, retain and motivate senior executives (**Box 2**). They have also been seen as an effective mechanism for aligning the interests of managers more closely with those of shareholders, with favourable implications for longer-term firm performance. While there is evidence that options may be important for attracting and retaining key employees, most research suggests that their motivational effects may, in general, be quite modest.

Box 2. Stock options

Employee stock options provide recipients with a right to purchase shares in their company at a pre-determined price – called the “*strike*” price – in the future. The strike price is usually established at the time an option is granted and is generally set at a level equal to the fair market value of the stock, at the time of grant. The grants, which can be made occasionally, annually, or on a more frequent basis, are often structured with variable vesting, and specify a fixed period during which the options can be exercised. An employee, for example, may be granted 100 options in year *x*, with 25% of the 100 share options vesting in each of the four following years. Once they have vested, recipients are then generally free to exercise the options (*i.e.* buy shares) until a fixed expiration date has been reached. Expiration dates generally range from 3 to 10 years from the date of grant.

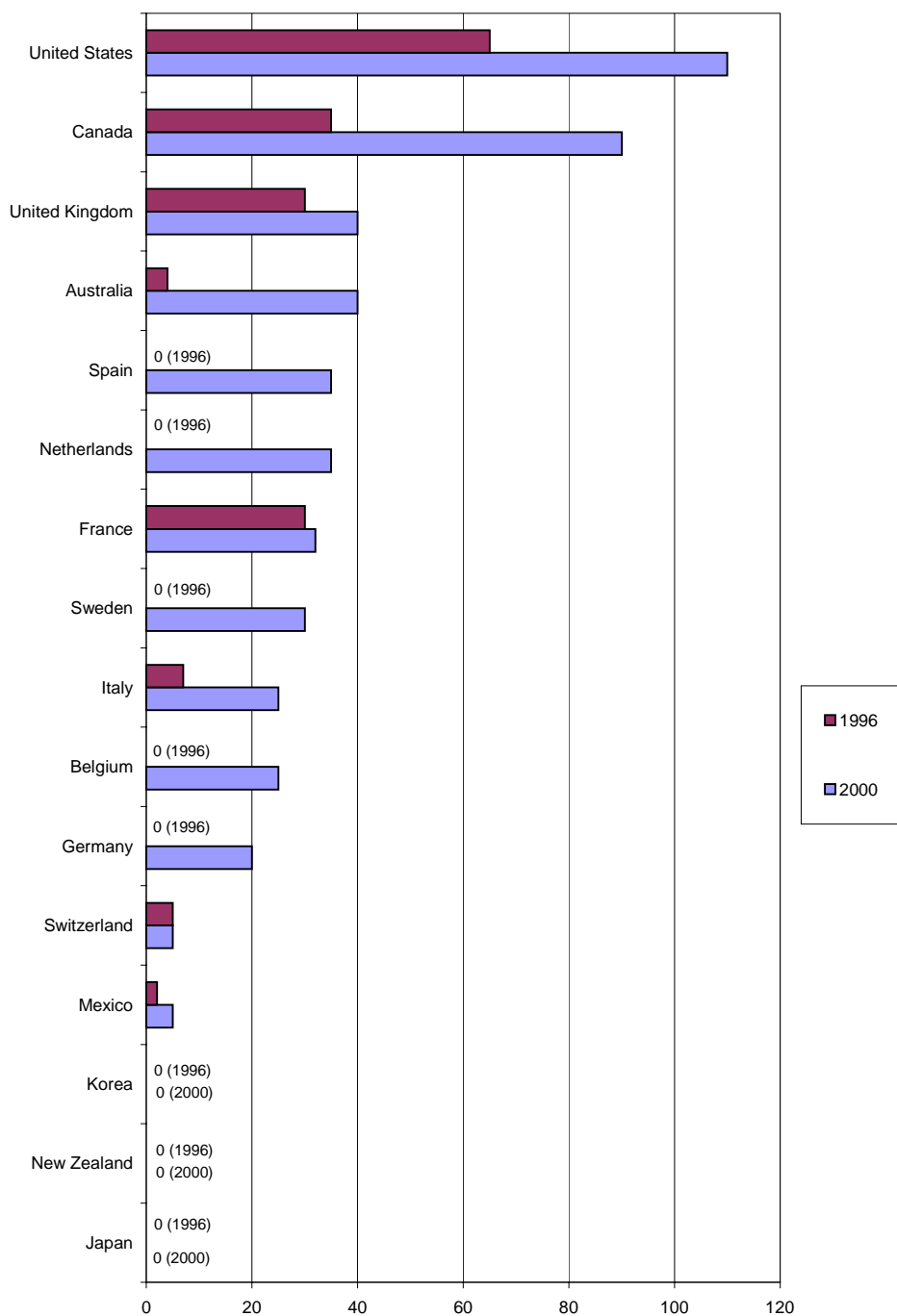
If the market value of the company's shares appreciates following the grant, recipients can purchase shares at the strike price, and then sell the acquired shares at prevailing market prices, realising a capital gain. If, on the other hand, the value of the shares declines, the options would have no value and would not be exercised. The attractiveness of the options lies in the unlimited upward potential for option holders, and the lack of exposure to capital losses (*i.e.* since option recipients are not actually holding shares, none of their personal assets are at risk).

In the 1990s, stock options were a standard feature in most executive pay packages in the United States and were used, to lesser extents, in other countries. Their importance in CEO compensation grew considerably during the decade, reflecting wider use and rising equity markets. In the United States, Canada, the United Kingdom and Australia, for example, long-term incentive pay (*i.e.* principally stock options) represented 40% to 100% of the level of basic compensation of senior executives in major companies in 2000 (**Figure 8**). In contrast, in Japan, they have played a lesser role as they could not effectively be used until 1997, at which time the Commercial Code was amended to permit option plans to operate with far greater flexibility. By 2000, some 17% of all publicly traded firms in Japan (*i.e.* more than 500 companies) had introduced option plans.

In the latter part of the 1990s, a key development in option use was their extension to a larger population of workers in a firm. Keen competition for employees and high turnover rates in technology-based sectors encouraged firms to find new ways to attract and retain workers. Through stock options, those who accept the risks associated with working for dynamic, but unproven companies, are able to share in their potential success. While the value of options varies significantly among companies, their potential

may be greatest in the case of young, emerging firms. Options provide a means through which such firms can compete effectively with more established organisations for high calibre employees.

Figure 5. Long-term incentive pay as a percentage of CEO base pay, 1996 and 2000



Note: Stock options are the largest component of long-term incentive pay.
Source: Towers Perrin, 2000.

Stock options can be an attractive way to compensate employees at no direct cost to the firm, beyond the opportunity cost associated with selling the shares at below-market prices. The direct cost falls instead on existing shareholders, whose holdings are often diluted through the exercise of options. As long as firms do well and the dilution is not excessive, shareholders appear to be tolerant of the practice. There can, however, be negative repercussions if equity markets weaken. In addition to being demotivating, declines in share value can prompt companies to reprice or reissue options. These practices are more controversial *vis-à-vis* third party shareholders, as they effectively provide employees with protections that are unavailable to other shareholders and thus may insulate employees from the risks associated with firm performance. Although interest in options may have peaked during the late 1990s, they will likely continue to play a role in employee compensation, particularly in emerging companies which need to attract and retain key employees.

Tax treatment of stock options

The tax treatment of stock options raises a number of issues concerning the methods that should be used to value options, the types of taxes and charges that should be applied, and the timing of taxation (*OECD, 2002a*). Differences across OECD countries have affected the way that option plans are structured and implemented, which has major implications for the value of options as a form of compensation in firms. The differences across countries has also raised issues for options which are granted, held and disposed of in different jurisdictions. Different tax frameworks could result in situations ranging from total tax avoidance, to double taxation, based on the specific itinerary of an internationally-mobile employee. Comparing the approaches used by countries is complicated by the many nuances that exist within each system.

Options can be taxed at different points in the life of the option transaction -- at grant, vesting, exercise or sale -- with varied effects on their value as compensation. Standard options, which are options that do not meet criteria that qualify them for special treatment, are generally taxed as follows:

- ***Grant of option*** -- Stock options may be taxed at the time they are granted to an employee (*e.g.* Australia, Belgium, Switzerland and, in principle, the United States) The difficulty in taxing at this point concerns the valuation of the benefit. As the characteristics of employee options differ considerably from options sold to third parties, there is generally no readily determinable market value. In the case of Australia and Belgium, taxing authorities have established standardised equations which are used to calculate the value of the option, as a fixed percentage of the value of the underlying shares at the time of grant. In the case of the United States, in the absence of a readily ascertainable value, the taxing point is generally deferred to the point in time when options are exercised.

Unlike other taxing approaches, option holders incur an "up-front" liability for a benefit whose future value cannot be established with any degree of certainty. Such holders are thus required to accept a risk that their paid-in "*capital*" -- in the form of tax payments -- may be lost entirely in the event that share values fall below the strike price. This greatly diminishes the attractiveness of options for employees of emerging firms, where share prices can collapse relatively quickly, thereby rendering the options valueless.

- ***Vesting of option*** -- Taxation of options when they vest (*i.e.* when holders become entitled to exercise their options) is rare, but is practised in at least one OECD country (the Netherlands). Policy issues are much the same as those described above for taxing at grant. The only substantial difference is that the holder would be in a position to buy and sell some of the vested shares, using the "*profits*" earned (assuming share prices have increased) to pay the taxes due.

- **Exercise of option** -- Most OECD countries tax stock options when they are exercised (*i.e.* when employees buy them at the "strike price") (**Table 5**). Unless they qualify for special treatment, the gains that have accrued from the time that options have been granted to the time that they have been exercised are generally treated as employee compensation or wages. In addition to income taxes, the gains are therefore subject to employee and employer social and related charges. While these latter charges may be irrelevant in countries where they are subject to ceilings (such as the United States and Canada), they can constitute a major liability -- particularly to employers -- in countries where they are not. In the case of France, for example, employer social charges on the gains realised by high income earners can in some instances reach 40%.

Table 5. Employee taxation of stock option gains at exercise

Country	Effective tax rate (%)
Australia	49
Canada	45
Finland	60
France	60
Japan	50
United Kingdom	40
United States	45

Note: Taxation of employees in upper income tax brackets; rates are rounded and subfederal taxes are included, as applicable. These are stock options not qualifying for preferential treatment.
Source: OECD.

The exercise of options has implications for employers beyond social charges. In general, there are no tax implications for option calls that are met through newly-issued shares, nor are there any implications for corporate profit and loss statements. In some instances, however, option calls met through treasury stock (*i.e.* repurchased shares that are held by the issuing firm), can give rise to a cost that can be deducted from earnings, thereby lowering taxes due. The situation is more favourable in the United States, where firms are allowed to take a tax deduction when options are exercised, whether the options calls are met through treasury stock or newly-issued shares. As the deduction is not tied to a cost, it does not, however, generally have implications for profit and loss statements.

- **Sale of options** -- In addition to taxing at grant, vesting or exercise, most countries treat subsequent gains as capital income, and tax them accordingly, at the time that shares are sold. Thus stock options awarded to employees may be taxed several times, with different parts of the gain being taxed either as employment income or capital gains.

Most countries have programmes under which options can receive preferential tax treatment, provided specified criteria are met. These criteria vary markedly across countries. In Australia and France, for example, shares have to be held for a number of years before qualifying for preferential treatment (3 years and 4 years, respectively). Canada, Japan, the United Kingdom and the United States have monetary limits on the amount of options that can qualify for preferential treatment per year (per employee). In Canada, however, special treatment is accorded to employees of Canadian-controlled private corporations (CCPCs). The latter three countries also require that options be held for at least two years (in the case of Japan and the United States) or three years (in the case of the United Kingdom) prior to being exercised. If the conditions are met, gains from options are generally treated as capital gains, thereby escaping tax on

employee income and associated social charges (**Table 6**). Moreover, taxes are generally deferred to the time that acquired shares are sold.

Table 6. Employee taxation of qualified stock option gains

Country	Effective tax rate (%)
Australia	24
Canada	23
Finland	60
France	37
Japan	26
United Kingdom	10
United States	24

Note: Taxation of employees in upper income tax brackets; rates are rounded and subfederal taxes are included, as applicable. These are generally stock options qualifying for preferential treatment.

Source: OECD.

In addition, some countries have special tax provisions for stock options with respect to start-ups or small enterprises.. Eligibility for special treatment can be contingent on the length of time a firm has been operation, the type of business in which it is involved, its gross assets or earnings, or its capital structure. France has preferential treatment of options depending on the age and capitalisation of the firm, with options benefits for employees differing based on their tenure in the firm. In the United Kingdom, the *Enterprise Management Incentive* scheme grants favourable stock option treatment to small eligible firms which can offer up to GBP 3 million worth of options to a broad range of employees.

Policy issues

The value and incentive effect of stock options is significantly influenced by their tax treatment. Important issues relate to the timing and valuation of options for tax purposes and the classification of gains as employment or capital income. Gains from standard options (*i.e.* options that do not qualify for preferential treatment) are generally treated as employment income at the time that options are exercised, with any subsequent gains taxed as capital income, at the time the acquired shares are sold..

The rationale for deferring taxation until exercise relates to difficulties in establishing a market value for the options at the time of grant, and the consideration of options as a form of "incentive" pay. Market value is difficult to ascertain as employee options are generally not tradable and the conditions placed on their exercise differ significantly from third-party options. Developing mechanisms or guidelines for estimating the value of options at grant would provide governments with potentially promising alternative ways to improve taxation.

With regard to the "incentive" pay issues, it is argued that options can be viewed as a form of variable pay, with the value as compensation only realised when employees "cash-in" on stock price appreciation through the exercise of options. From that point onward, the employee is considered is to be a risk-taker, with any subsequent changes in the value of the assets to be treated as capital gains or losses, at the time acquired shares are sold. In most instances, however, countries which extend preferential treatment to options that meet specific criteria never treat options as employment income. The disparity in treatment for different classes of options raises important issues related to, *inter alia*, tax neutrality and fairness. More research and debate on the treatment of gains as capital or employment income would be beneficial, as would clearer indications of the conditions under which preferential treatment should be considered.

Finally, the significant role that options can play in strengthening firm performance, particularly in "emerging" companies, needs to be understood and exploited more effectively by governments. It requires

consideration of the tax, accounting, securities and governance issues related to their regulation and use. This is critical as seemingly subtle changes in any of these areas can have significant implications for corporations and their employees. Government Ministries should therefore ensure that tax policies on stock options are considered collectively (*i.e.* on a cross-Ministry basis) prior to implementation.

INTANGIBLE INVESTMENT

Trends in intangible investment

The intangible assets of a firm relate to its investments in research and development (R&D), human resources, computer software, organisational change and other immaterial goods or activities. Intangibles are considered key to firm performance in knowledge-based economies and particularly help augment the firm-level role of ICT, *e.g.* computers, electronic commerce and the Internet. There is a positive correlation between ICT intensity and intangible investment across countries, which may explain differences in growth performance in recent years. Countries that invest more in intangibles tend to invest less in physical assets, and most OECD countries are allocating more resources towards intangibles rather than tangibles over time. The negative relationship between tangible and intangible expenditures may be linked to differences in the structure of production across OECD countries, but may also point to more fundamental differences in their evolution towards knowledge-based economies.

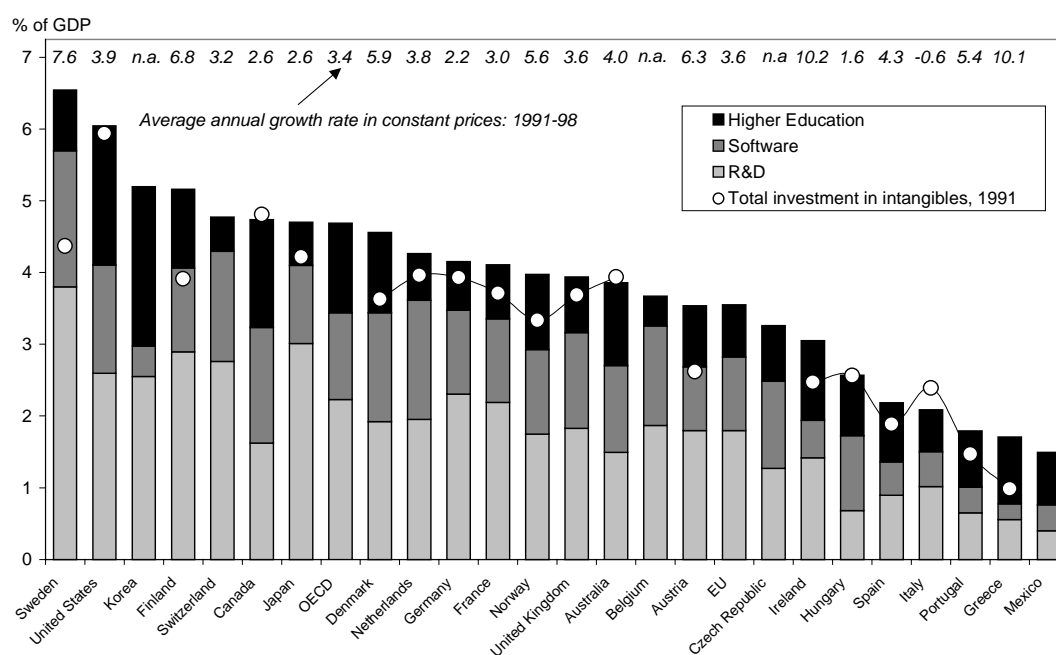
Expenditures on intangibles -- as measured here by public and private spending on R&D, higher education and software -- now represent almost 5% of OECD-wide GDP (**Figure 9**). Total investments are far higher but accurate accounting is hindered by measurement difficulties, particularly the lack of data on private sector investments in training. Investment in intangibles appears highest in Sweden, the United States, Korea and Finland (more than 5% of GDP), and lowest in Mexico, Greece and Portugal (less than 2% of GDP). During the 1990s, investment in intangibles in volume has grown by about 3.4% annually in the OECD area, growth rates being highest in Ireland, the Nordic countries, Greece and Austria.

Tax incentives to intangible investment

Despite the economic benefits of intangible investment, there is some evidence that enterprises are under-investing in research, training, software and other elements that are key to enhanced performance (*OECD, 2001b*). Due to positive externalities, the social rate of return of investment in intangibles is often higher than the private rate of return for the investor, inducing a risk of under-investment by the private sector. This has been evidenced particularly with regard to R&D and workplace training. Governments can act as catalysts to stimulate private sector investment in intangibles, and many are now looking to fiscal incentives.

Current enterprise expenditures (*e.g.* wages, materials) for **research and development** can be deducted from tax liabilities in the year in which they are incurred in most OECD countries. Beyond this, sixteen OECD countries offer additional R&D tax incentives (**Table 7**). Ten countries offer R&D tax credits (amounts deducted from tax liability) and six countries offer tax allowances (extra amounts over current business expenses deducted from gross income to arrive at taxable income). These can be applied to either the absolute value of a company's R&D expenditures (level approach), to the increase in R&D spending over a calculated base level (increment approach), or to a combination of both. Australia will apply both a level and incremental regime for R&D expenditures starting July 2001.

Figure 6. Investment in intangibles as a percentage of GDP (1998)



Source: Khan (2001).

Table 7. R&D tax incentives, 1999-2000

	Level of R&D	Increment of R&D	Combination of level and Increment
R&D tax credits	Canada Italy Korea Netherlands	France Japan Mexico Korea United States	Portugal Spain
R&D allowances	Australia Belgium Denmark United Kingdom	Ireland	Austria

Source: Warda (2001).

There are further variations across countries in the design of R&D tax incentives. Differences exist concerning the rates applied to levels or increments (and the base for increments), the expense base (some countries take into account only current expenditures, while others also include machinery, equipment and buildings), whether these incentives are taxable or not, whether there are any carryover provisions, and the amount of any floors or caps. In addition, while tax incentive programmes in many countries are open to all R&D-conducting firms, some countries have provisions that favour particular targets, such as *small firms* (Italy, Japan, Korea, the Netherlands, the United Kingdom and Norway in 2002), *basic research* (Denmark and Japan), and *R&D collaboration* (Japan).

According to one indicator of the relative generosity of R&D tax measures, Spain, Canada, Portugal, Denmark, Austria, Australia and the Netherlands have the most generous fiscal incentives for R&D conducted by large manufacturing firms, whereas Germany, Iceland, Italy and New Zealand offer the least incentives. Concerning research by small firms, Italy and the United Kingdom, both of which do not have tax incentives for large firms, are the most generous together with the Netherlands, Canada, Spain and Korea (*Warda, 2001*). The United Kingdom is now consulting on how to extend the R&D tax credit developed for SMEs to large corporations.

Special tax incentives for *employee training* are less common. Most OECD countries allow for tax deductibility of enterprise training expenses in the year they are incurred. Some OECD governments offer further training incentives. France has introduced an incremental training tax credit that allows for 25% of any increase in company training expenses to be deducted from taxable profit or income; this is targeted to priority training for underprivileged workers and in smaller firms, and is similar to the R&D tax credit. In the United States, a 30% tax credit for enterprise training expenditures was introduced in the Congress in 2000. In Korea, when enterprises build training centres, they are exempted from related taxes. Similarly, in Australia, expenditures by enterprises on capital and consumable items related to training are deductible from taxable income.

As seen in tax wedges from 1996, investment in training generally benefits from less favourable tax treatment than R&D expenditures (**Table 8**). The tax wedge shows the degree to which the tax system scales up (unfavourable treatment) or down (preferential treatment) the pre-tax rate of return that must be earned on an investment in order to receive the same after-tax return as a bank deposit. R&D tax wedges are negative for many countries, indicating that they receive preferential tax treatment (especially short-lived R&D), whereas tax wedges for training are often positive, meaning that training investments do not receive favourable tax treatment. In 1996, Australia had the highest tax incentive for R&D investments while Italy provided the most favourable tax treatment for enterprise training.

Another intangible, *computer software* is capitalised and amortised over time along with computers and other ICT equipment in most OECD countries. In this, software is generally treated less favourably in tax systems than other types of intangible investment, such as R&D and training. However, countries are now examining more favourable tax treatment for software in order to encourage enterprises and individuals to invest in this intangible. The United Kingdom, for example, offers 100% capital allowances for investment in computer software by small firms. Sweden recently proposed to give more favourable treatment to private software purchases as well as to give tax deductions to enterprises who purchase computer equipment and software for home use by workers. Similarly, in Italy, the accompanying bill to the 2000 Finance Law proposes tax relief to companies that provide computer equipment and software free of charge to their employees.

Policy issues

Studies of R&D tax credits show that tax incentives can increase private research spending by an amount equal to the loss in tax revenue on average (**Table 9**). An examination of panel data on tax changes and R&D spending in nine OECD countries over a nineteen year period (1979-97) finds that tax incentives are effective in increasing R&D intensity; a 10% decrease in the cost of R&D stimulates just over a 1% increase in the level of R&D in the short-run and just under a 10% rise in R&D in the long-run (*Bloom et. al., 2000*).

The effectiveness of tax incentives for intangible investment is contingent on their design. Studies show that an incremental rather than a volume-based approach gives better incentives for companies to increase expenditures on intangibles at the margin. Tax credits which are based on incremental spending have been shown to have a sharper incentive effect and to avoid subsidising expenditures that would occur in any event (*Brean and Leonard, 1998*). However, incremental credits will not assist companies which

already invest a lot in intangibles and also raise questions on how to determine the baseline. Some countries use a fixed-base system or a firm's all-time maximum expenditure to overcome these problems.

Table 8. Comparison of training and R&D tax treatment (%) (1996)

	R&D		Training and education	
	Short-lived	Long-lived	Training	Tertiary studies
Australia	- 6.07	- 1.01	0.67	- 0.58
Austria	- 2.45	- 0.78	- 0.14	- 0.84
Belgium	- 0.47	- 0.47	- 0.51	..
Canada	- 4.43	- 0.83	0.63	- 0.68
Denmark	- 2.27	0.05	0.92	..
Finland	0.53	0.53	0.48	- 0.73
France	- 1.33	- 0.21	0.17	- 0.03
Germany	0.32	0.32	0.21	- 0.41
Greece	- 0.51	- 0.51	- 0.57	..
Iceland	1.07	1.07	0.79	..
Ireland	0.78	0.78	0.78	- 0.86
Italy	- 0.45	- 0.45	- 0.78	- 0.08
Japan	- 0.08	0.15	0.08	0.79
Luxembourg	1.02	1.02	0.91	..
Netherlands	- 3.53	- 0.07	1.04	- 0.54
New Zealand	0.70	0.28	0	..
Norway	- 0.06	- 0.06	- 0.16	..
Portugal	- 0.12	- 0.12	- 0.12	- 0.64
Spain	- 7.63	- 1.37	0.72	- 0.11
Sweden	0.81	0.81	0.72	- 2.00
Switzerland
United Kingdom	0.69	0.69	0.69	..
United States	- 4.36	- 0.76	0.64	0.01
Simple average	- 1.26	- 0.04	0.33	- 0.48

Note: Tax wedges (%) for the top bracketed earner. Includes personal and corporate income taxes.
Source: Gordon and Tchilingirian (1998).

Other provisions pertain to whether tax credits apply to only intangible expenditures or also to related expenditures. The overall impact of R&D tax credits depends on how responsive firms are to a reduction in the cost of R&D, which comprises capital expenditures as well as wages and salaries. For this reason, some countries extend tax breaks to other expenditures related to R&D (wages, facilities). For example, the UK *Research and Development Allowance* allows plant, machinery and buildings used in R&D to be immediately written off against profits (for all size firms). Allowing the tax credit to be carried over increases its value to firms making losses. Studies also show that tax incentives have a larger effect in the long-term and when their design is stable over time.

Since most business expenditures on intangibles are carried out by large firms, several countries target their tax incentives to small firms who are less likely to make these investments. While tax measures aimed at smaller firms are unlikely to have a significant effect on aggregate investment spending, they may encourage innovative expenditures at the margin. However, they should be accompanied by liberal

provisions for carrying forward and backward losses, since many smaller firms may not be sufficiently profitable to take advantage of such credits.

Table 9. Effectiveness of R&D Tax Credits

Study	Estimated elasticity of R&D to tax credit	Period of analysis	Country
Australian Bureau of Industry Economics (1993)	-1.0	1984 - 94	Australia
McFetridge and Warda (1983)	-0.6	1962 - 82	Canada
Mansfield and Switzer (1985)	-0.04 to -0.18	1980 - 83	Canada
Bernstein (1986)	-0.13	1981 - 88	Canada
Bernstein (1998)	-0.14 (short-run) -0.3 (long-run)	1964 - 92	Canada
Mansfield (1986)	-0.35	1981 - 83	United States
Berger (1983)	-1.0 to -1.5	1981 - 88	United States
Baily and Lawrence (1987, 1992)	-0.75	1981 - 89	United States
Hall (1993)	-1.0 to -1.5	1981 - 91	United States
McCutchen (1993)	-0.28 to -10?	1982 - 85	United States
Hines (1993)	-1.2 to -1.6	1984 - 89	United States
Nadiri and Mamuneas (1996)	-0.95 to -1.0	1956 - 88	United States
Bloom, Griffith and Van Reenen (1999)	-0.16 (short-run) -1.1 (long-run)	1979 - 94	G7 and Australia

Source: Hall and Van Reenen (1999).

Some OECD governments (*e.g.* France, Sweden, the United Kingdom) are now exploring whether intangibles should be treated more uniformly in tax systems. For example, it has been recommended that tax treatment of training expenses by firms be brought in line with that of R&D (*OECD, 2001c*). Countries are also introducing or pondering more favourable tax treatment of enterprise investments in other intangibles such as computer software and organisational change as well as for broader categories of "innovation". However, the appropriability of the benefits of different types of intangibles varies, which could argue for more differentiated tax treatment. For example, employers may be less able to appropriate the benefits from job training -- due to the mobility of employees -- than from R&D. However, others maintain that the societal benefits from both R&D and human capital development would be substantial. Fiscal incentives should be compared to other types of policies for stimulating firm-level investments in intangibles and, if deemed useful, further research and country comparisons should be undertaken on their effective design.

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