Session 2

TAXATION AND FISCAL POLICY

CHALLENGING TAX REFORM IN JAPAN

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Introduction

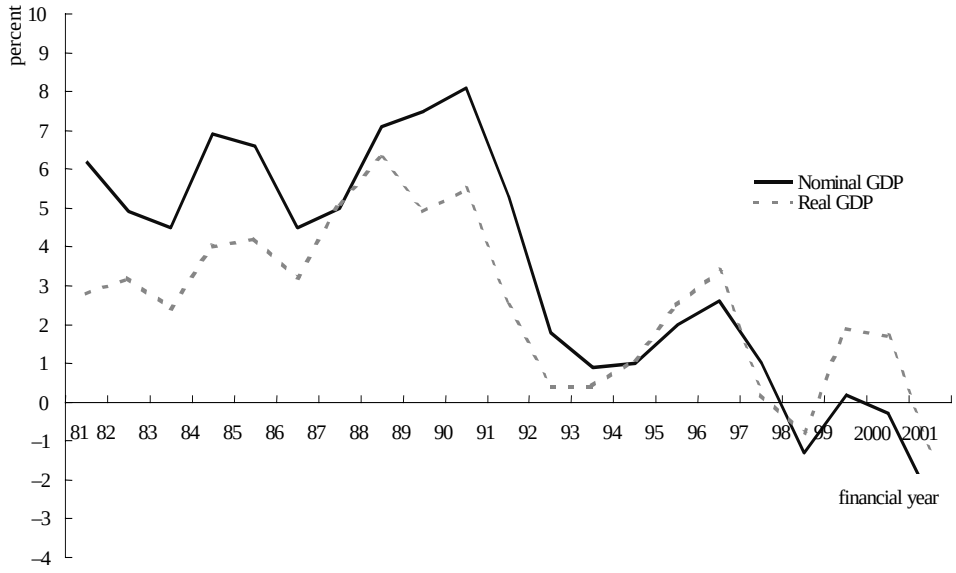
Japan is facing a very tough economic situation under the changing socio-economic circumstances. The Koizumi administration has been trying to climb out of this bind through undertaking structural reforms including tax reform. This paper is aimed at describing the background and the main features of the FY2003 Tax Reform in Japan and summarizing the basic direction of forthcoming Tax Reform.

1. Overview of the economic and fiscal situations in Japan

Nowadays Japan is in a very difficult economic situation (see Figure 1). After enjoying great economic performance in the post-war period – the highest rate of

Figure 1

Rates of Economic Growth, 1981-2001



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Opinions expressed in this paper do not necessarily represent those of the Ministry of Finance.

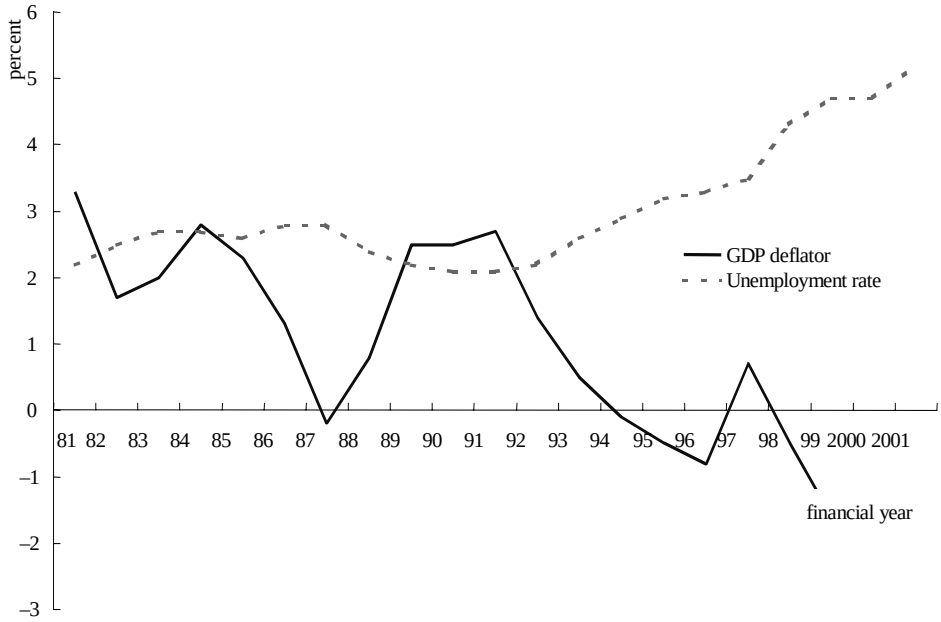
economic growth without the problems of unemployment or inflation – we entered the era that was known as the 'bubble economy' around the late 1980s. After hitting its peak in 1991, the 'bubble' burst, triggering Japan's plunge into a period of stagnation of unprecedented length. The annual real growth rate during the 1990s was a mere 1 percent on average, in contrast to the 6 per cent level of the 1980s.

Of our major headaches, by far the most persistent is deflation, the continuous decline in the prices of goods, services and assets (see Figure 2). Particular attention should be paid to the fact that the nominal growth rate has been lower than the real growth rate since the mid-1990s. This situation is unprecedented among advanced countries in the postwar era.

Three sets of factors are said to be the cause of deflation. First, we have supply-side structural factors, such as the increase in low-priced imports and progress in technological innovation. Second, there are demand factors stemming from weakness on the business front. On top of that, some argue that deflation is deeply connected to our monetary policy stance. With regard to the theme of my presentation today – ongoing tax reform in Japan – quite a few voices are calling for anti-deflation measures in tax policy as well as in other fields.

Figure 2

Price Level and Unemployment Rate

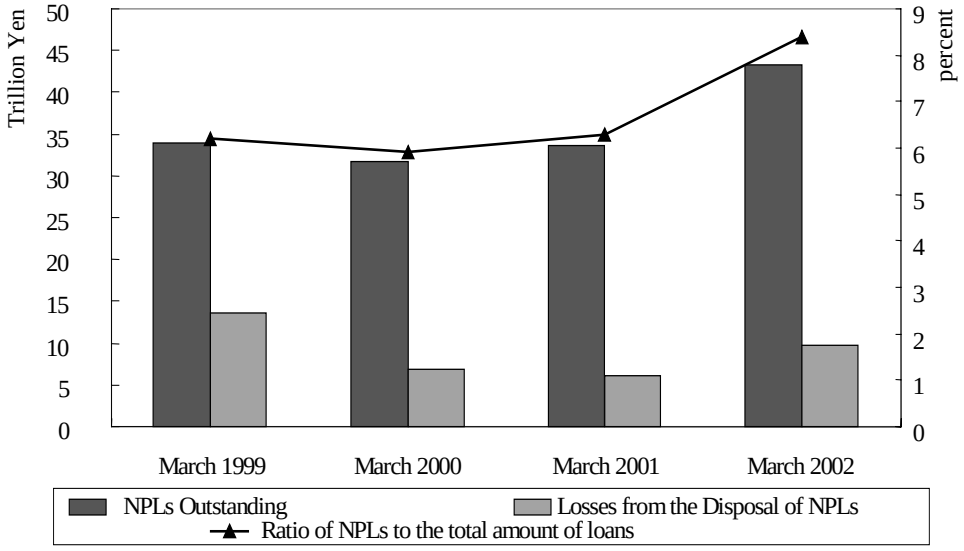


Related to the major headache mentioned above is another problem of great concern – non-performing loans (NPLs) coupled with overhanging debts in the corporate sector (see Figure 3). Deflation and NPLs are closely interrelated. On the one hand, the deflationary economic environment is generating new NPLs, despite banks' efforts to write off past NPLs. On the other hand, the NPL-rooted weakening of financial intermediary functions and sluggish corporate demand for borrowing are undermining the effectiveness of our monetary policy, which is aimed at combating deflation. Again, quite a few people are demanding effective tax measures, which are supposed to expedite the improvement of this situation. Unfortunately, however, we have not come up with the appropriate solutions as of yet.

To an extent even greater than the problems of deflation and NPLs, the most significant source of concern for Japan is its fiscal deficit (see Figures 4 and 5). Our fiscal position has deteriorated significantly from the early 1990s in terms of fiscal deficits and debt accumulation, reflecting the sluggish economy and successive expansionary policies – including fairly large-scale tax cuts – since the collapse of the bubble. The amount of government bond issuance budgeted for FY2003 was more than 36 trillion Yen, which is nearly 45 per cent of government expenditure, or 6 per cent of GDP. Tax revenue has declined by 18 trillion Yen from its peak of 60

Figure 3

Non-Performing Loans of Banks

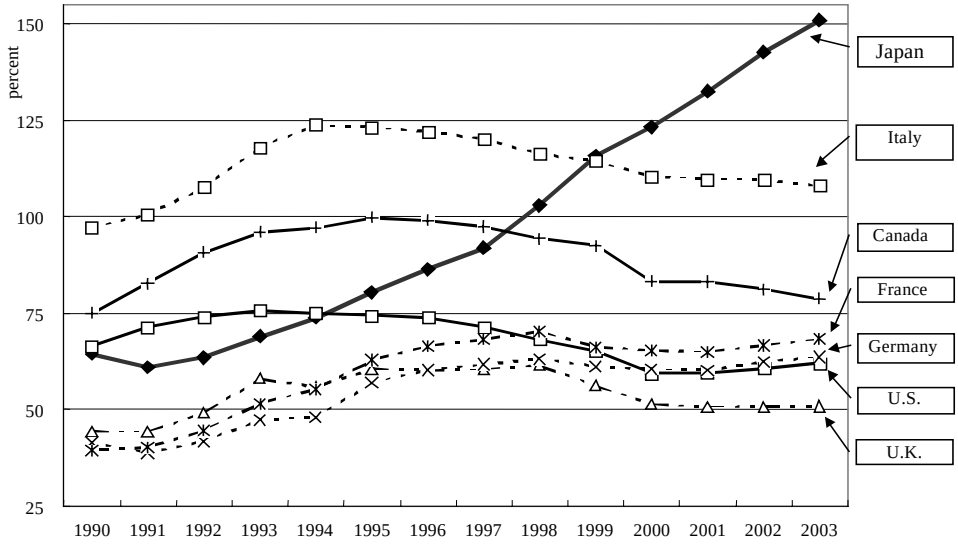


Source: FSA / Ministry of Finance.

NB. Losses from the disposal of NPLs: Book value write off of NPLs, sales of NPLs, new specific provisions specific against loans, less provisions made for the NPLs and the realised value of collateral.

Figure 4

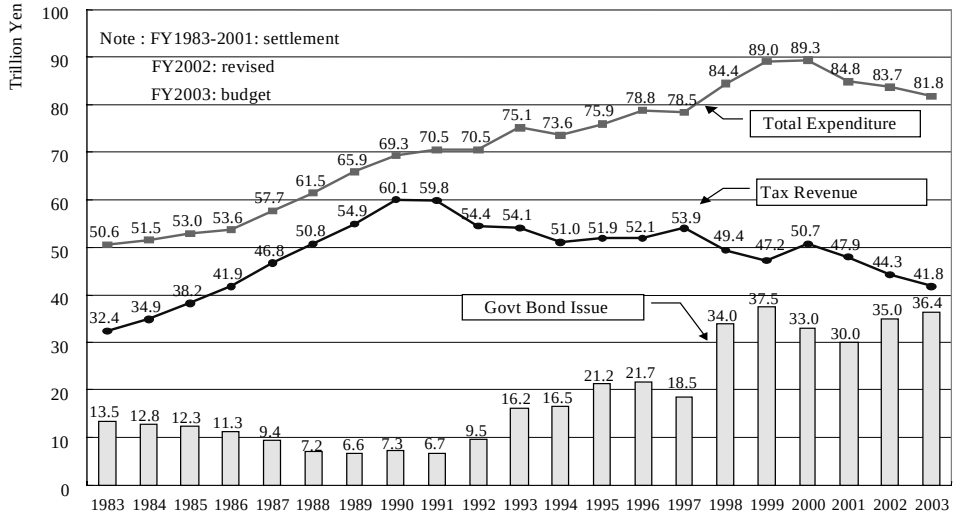
Debt (National and Local) Outstanding
(percent of GDP)



Source: OECD.

Figure 5

Revenue, Expenditure and Bond Issuance (National)



Source: Ministry of Finance.

trillion Yen in FY1990 to 42 trillion Yen in FY 2003. It is widely acknowledged that the causes of deficits in the 1990s were more structural – such as tax cuts – than cyclical. As a matter of fact, the ratio of tax burden to GDP in Japan is relatively low in comparison with other G7 countries.

The shortfall in the primary balance of the central and local governments is expected to be more than 5 per cent in FY2002. This estimate includes additional fiscal expenditure along with the decrease in tax revenues in FY2002. We are still sticking to the goal of achieving a primary balance surplus by the early 2010s, even though this goal might seem very tough to achieve.

2. Tax reform as one of the four pillars of structural reform

As mentioned already, during the prolonged recession in the 1990s, the Japanese government tried to stimulate the economy by adopting expansionary fiscal policy packages (see Table 1). A total of 140 trillion Yen (more than 1,000 billion

Table 1

Expansionary Fiscal Policy Packages since 1992

- Total: 136 Trillion Yen* (727 billion Pounds, 1,046 billion US$)
- 2.7% of GDP per annum* * 1992-2001

	Total			**(Billion Yen)**
		Investment	**Tax Cut**	**Others**
August 1992	10,700	6,250	0	4,450
April 1993	13,200	7,620	150	5,430
September 1993	6,200	1,950	0	4,200
February 1994	15,300	4,500	5,850	4,900
April 1995	4,600	1,077	0	3,543
September 1995	12,800	6,540	0	6,270
April 1998	16,700	7,700	4,600	4,350
November 1998	23,900	8,100	6,000	9,800
November 1999	18,000	6,800	0	11,200
October 2000	11,000	5,200	0	5,800
November 2001	1,000	400		600
February 2002	2,600	2,600		
Total	**136,000**	**58,737**	**16,600**	**59,543**

Note: Over 6 trillion Yen (1.3 % of GDP) in tax cuts have been implemented since Fiscal Year 1999.

Source: Table 8 of OECD Economic Survey, Japan (November 2001) and Ministry of Finance.

USD) was injected as continuous fiscal stimulus in the form of public investment and various tax incentives. However, these Keynesian-type fiscal policies have not brought about the desired effect of boosting the economy.

Japan also attempted to make its economy more buoyant by gradually lowering the official discount rate from its high of six percent in August 1990 right down to the adoption of a zero-interest-rate policy in February 1999. And very recently, the BOJ has been implementing a quantitative monetary easing policy because there is no room for further interest rate cuts. Nevertheless, in real terms, the monetary conditions in Japan remain restrictive *vis-à-vis* promoting investment activity.

Against this backdrop, the Koizumi Cabinet has placed increasing emphasis on carrying out structural reforms, rather than pursuing the conventional expansionary policy. The four main pillars of structural reform are as follows: (1) financial system reform; (2) regulatory reform; (3) government spending reform; and (4) sweeping tax reform.

In the light of these circumstances, the Government Tax Commission ("the Commission", hereinafter) have been engaging in intensive study on sweeping tax reform since January 2002. Following an instruction from the Prime Minister Koizumi, the Commission conducted extensive study on comprehensive tax reform from a long-term perspective and published "Policy Guidance on the Establishment of a Desirable Tax System" ("the Report", hereinafter) in June 2002.

As the next step, the Prime Minister Koizumi instructed the Commission to study specific items to be incorporated in the FY2003 tax reform. The Commission conducted deliberation on specific measures to be taken in the FY2003 tax reform from various items reviewed in the Report, and submitted its recommendation to the Prime Minister. The main part of the FY2003 tax reform bill, which passed the Diet this March, is based on this recommendation.

Talking of the Commission, I suppose it would be very useful to explain the decision-making process for tax policy in Japan.

The Commission consists of three main groups of members, which are: (a) tax experts, such as professors and accountants; (b) opinion leaders; and (c) representatives from various interest groups. The main responsibilities of the Commission are to review the tax system from a theoretical perspective and to make recommendations on tax policy to the Prime Minister.

On the other hand, the ruling parties also have their own tax commission that determines actual specific amendments in tax laws. Generally speaking, because taxation affects the conflicting interests of all people, the role of the ruling parties in the decision-making process of tax policy may be greater than in other areas of public policy. Therefore, for many years, the Commission conducted its deliberations while paying attention to the policy-making process in the ruling parties, and was careful to submit recommendations on tax policy that were in accordance with the prevailing political consensus within the ruling parties, not only

in terms of the timing of their submission but also in respect of their actual content. While this was the case in the past, the Prime Minister Koizumi came into office with the clear intention of leading the discussion and decision-making process in the field of tax policy himself. The initiative the Minister Koizumi took was one of opposing the traditional practices of his own party. As I mentioned above, during the process of FY2003 tax reform, the Prime Minister took the initiative and set the ball rolling for deliberations as early as January, and in response to his request, the Commission submitted its recommendation in November, prior to the culmination of the ruling parties' decision-making process, which was an unprecedented case in Japan. In this sense, it is no exaggeration to say that the initiative of the Prime Minister played a key role in the decision-making process for the FY2003 tax reform.

3. Basic frame of reference of tax reform

The designing of a desirable tax system as recommended in the Report of June 2002 is guided by four basic principles. I would now like to outline the basic frame of reference of the FY2003 tax reform, based on remarks by Doctor Hiromitsu Ishi, the Chairman of the Commission.

3.1 Time perspective

First of all, we have taken a long-term perspective in our discussion on tax reform to design a desirable tax system. Since the economy is not performing well, with no sign of any full recovery visible at the present time, there were widespread voices supporting another round of tax cuts as fiscal stimulus – the short-run viewpoint. However, in accordance with the request from the Prime Minister in January, the Commission took a long-term perspective, rather than focusing exclusively on the short-term policy to be taken, or in other words, tax cuts.

3.2 Changes in the socio-economic structure

Second, there are two aims in conducting the reform. The first is to rectify the mismatch that exists between today's socio-economic structure and the current tax system. The framework of the current tax system was founded on the recommendation of the US tax mission headed by Dr. Carl Shoup in 1950. Since then, the tax system has been subject to constant review, but there still remains a need to adjust it in line with the changing economic and social situation. For example, Japan was in the past a much younger society with a larger proportion of its population in the workforce. Elderly people were given tax privileges because they were considered to be socially vulnerable. Family lifestyle has changed as well. Until recent years, many married women stayed at home to do the housework and those that worked outside the home were in the minority. This is not the case nowadays. Certain exemptions for spouses were introduced to meet the needs of

family lifestyle in the past, but they may no longer be appropriate for families in the gender-equal society of today. The other objective is to secure a stable revenue raising structure.

As discussed earlier, the government of Japan took expansionary fiscal measures in the 1990s, including tax cuts... tax cuts… and more tax cuts. As a result, the ability of the Japanese tax system to raise the revenue necessary for public services has become poor. Given that Japan is moving rapidly towards becoming a society with fewer children and an aged population, the tax system will soon be unable to fulfill its fundamental role. Therefore, establishing a stable revenue base is another important goal of the tax proposal.

3.3 Streamlining of expenditure

Third, expenditure cuts and administrative reform are emphasized as an absolute prerequisite to tax reform. It is obvious that revenue-increasing measures need to be taken in the future. The general public, however, will not accept any attempts to increase their burden without assurances that the tax money they pay is spent effectively and efficiently by the government. The Commission is giving very serious consideration to this problem and expenditure cuts and administrative reform will be one of the starting points of the sweeping tax reform.

3.4 Stimulation of the economy

Fourth, although the basic thinking behind the tax reform is to focus on the medium-to-long-term perspective, we cannot ignore the current issue of buoying the depressed economy. The Minister Koizumi has accepted the necessity of taking tax measures to revive the flagging economy. At the same time, however, adding to the fiscal deficit was obviously something that had to be avoided.

As described earlier, a number of fiscal measures to stimulate the economy have been taken in the past. At those times, it was constantly hoped that the economy would be boosted by such measures, through which economic recovery could in turn recoup the loss in revenue from the tax cuts. Such an irresponsible attitude can no longer be tolerated. The design of short-term tax measures to pull the economy out of recession should be compatible with the long-term perspective of the reform.

In this context, at first, the Prime Minister seemed to be insisting that the tax reform package should be single-year revenue-neutral. In August of last year, he gave the instruction that a FY2003 tax reform package should be formulated, including over 1 trillion Yen in advance tax cuts on a revenue-neutral basis over several fiscal years. This indicates his firm commitment to employ all policy tools – including taxation – toward improving the Japanese economy without further damaging the fiscal situation.

The FY2003 Tax Reform package, that is summarized below, includes advance tax cuts from FY2003 (tax incentives for R&D and plant-equipment investment, as well as rate reduction and base broadening in inheritance and gift taxes), and subsequent tax increases (widening the income tax base and diminishing the scope of special treatments for small traders in the consumption tax) that will be implemented later. The plan is that the resulting loss in revenue will be recovered in 6 to 7 years. What is important is that both tax cuts and tax increases are enacted through *one* law, the whole of which has been passed in the Diet at the same time.

4. Reform of each tax

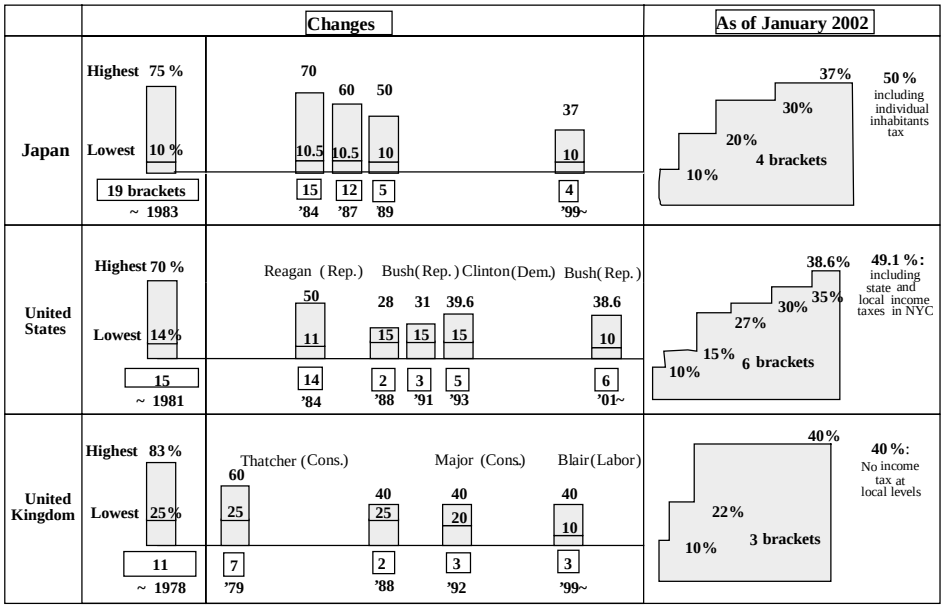
In light of this basic frame of reference, we have reviewed each tax and set the following objectives in terms of achieving a desirable tax system.

4.1 Individual income tax

With regard to individual income tax, the number of tax brackets has been reduced from nineteen in 1983 to four in 1999, and the top rate has been cut from 75 to 37 per cent (see Figure 6). The progressive structure of tax has become very

Figure 6

Changes in Income Tax Rates



Source: Tax Commission.

moderate. This policy trend has been explained as the policy means to enhance people's incentive to work, in particular workers in the middle or upper ranks in terms of income.

On the other hand, broadening of the base of the income tax has not been carried out. We need to reduce or eliminate numerous exemptions and deductions, which add up to more than 20 items in the existing tax system. In 1950, when the Shoup tax system was established, there were only five or six exemptions and deductions in the individual income tax. These 20-plus items have increased the level of minimum income at which obligation to pay income tax starts (the so-called tax threshold) and are greatly eroding the tax base.

In addition, a mismatch between the current tax system and the socio-economic structure is created by these numerous exemptions and deductions. For instance, the criticism is often made that the special exemption for spouses is not appropriate in this gender-equal society, and that it hinders the employment opportunities of housewives. Similarly, with respect to broadening the tax base, it is also important to remove or lessen the scope of several deductions for salary income, retirement income, pensions, working students and so on.

These factors have led to the phenomenon known as "hollowing out" occurring for individual income tax. As a matter of fact, approximately a quarter of the total workforce does not pay income tax, mainly due to the high tax threshold. The burden of individual income tax to National Income is remarkably low in Japan compared with other advanced countries. This not only brings about tax revenue shortfall but also leads to deterioration of the built-in stabilizer and income redistribution functions.

From these viewpoints, from 2004, we are abolishing the special deduction allowed for spouses (maximum of 380,000 Yen). This deduction serves to lower the tax threshold – for example, from 3.84 to 3.25 million Yen for a family of a husband and wife with two children (see Table 2). Surprisingly, this is the first attempt to raise individual income tax in the postwar period in Japan.

The remaining issues related to individual income tax are as follows.

a) reorganizing other family-related deductions;

b) reviewing elderly-people-related deductions including the public pension deduction;

c) widening the minimum marginal rate bracket, which covers about 80 per cent of taxpayers under the current system.

4.2 Corporation tax

Businesses pay corporation tax on the profits they create by production, sales, services and other activities. These business activities are a source of vitality for the Japanese economy. It has, therefore, been argued that the corporation tax burden

Table 2

Tax Threshold of Individual Income Tax (A Couple With 2 Children)
(thousands of Yen)

Current

Deduction of Employment Income	Deduction of Social Insurance Payment	Basic Allowance	Allowance For Spouse	Special Allowance for Spouse	Allowance for Dependent	Allowance for Specific Dependents
(1,308)	(384)	(380)	(380)	(380)	(380)	(630)

3,842

From 2004

Deduction of Employment Income	Deduction of Social Insurance Payment	Basic Allowance	Allowance For Spouse	Allowance for Dependent	Allowance for Specific Dependents
(1,155)	(325)	(380)	(380)	(380)	(630)

3,250

should be reduced to some extent so as to make Japanese corporations more competitive in the global market.

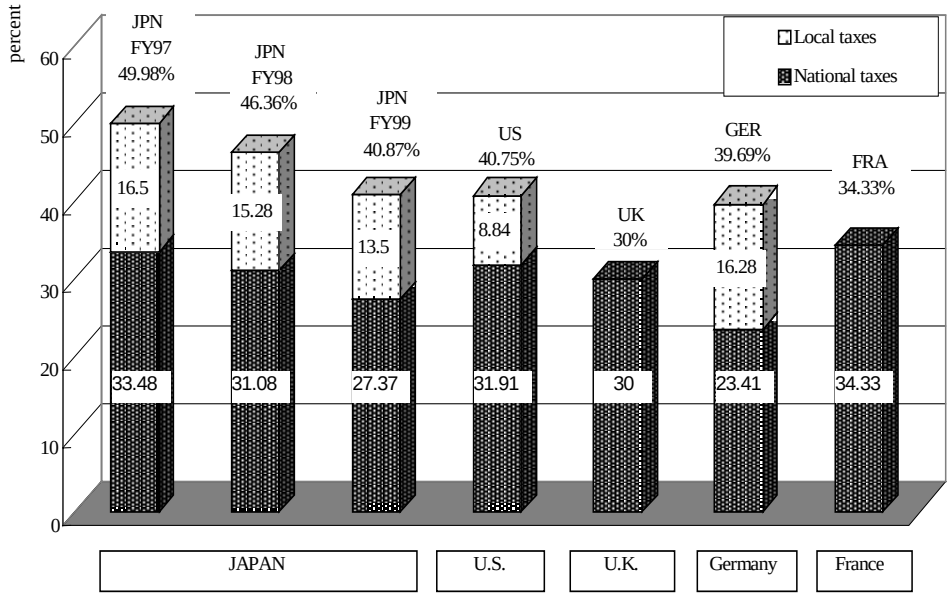
Based on this standpoint, the corporate tax system has undergone a number of reforms since fiscal 1998. On the one hand, the corporate tax rate has been reduced to a level compatible with the levels of other major advanced countries. From 1998 to 1999, the effective corporate tax rate in Japan was reduced from 49.98 percent (FY1997) to 40.87 percent (FY1999). This was a tremendously large tax cut for such a relatively short period (see Figure 7).

Japan's corporate tax burden is higher than that of the UK or France, mainly due to the tax imposed at local government level. Although the UK and France have no local corporate-related taxes, there are other taxes on corporations collected by local governments, such as "non-domestic rates" in the UK and "tax professional" in France. It is therefore difficult to accurately compare the situation among various countries with different tax systems.

Unfortunately, in the sluggish economic conditions, we have not been able to present factual evidence of the effects of reduced taxation on corporations' activities

Figure 7

International Comparison of Effective Corporation Tax Rates



Source: Tax Commission, as of Jan 2003.

Statutory Tax Rates

	JAPAN			USA	UK	GER	FRA
	-FY98	-FY99	After FY99				
Corporation Tax (CT)	37.5%	34.5%	30%	35%	30%	26.5%	33 1/3%
	(Enterprise Tax)			8.84% (1)	n.a.	19.45% (2)	CT x 3% (4)
	12%	11%	9.6%				
	(Corporation Inhabitants Tax)					CTx 5.5% (3)	
	CT x 17.3%						

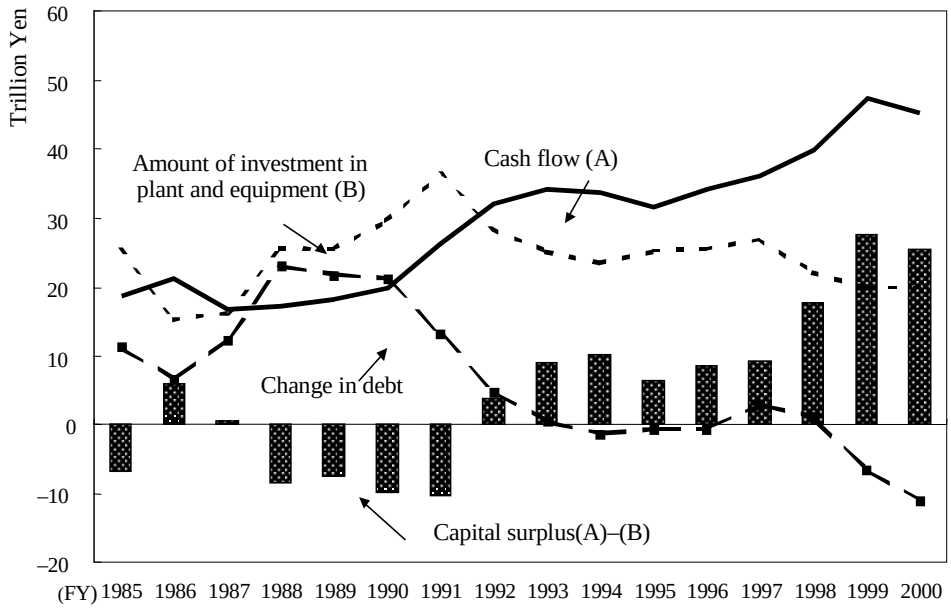
such as capital investment and so on. The corporate sector in Japan has recently been a large source of excess saving (see Figure 8). In other words, on the whole, Japan's corporate sector does not need a great amount of cash flow. Under these circumstances, Japanese corporations would probably repay outstanding debts rather than making productive investment, if they were to obtain cash flow by virtue of a general corporate tax rate cut.

Therefore, we have decided not to lower the current level of corporate tax rate any further at this time, even though some influential voices have been calling for a further rate cut.

Then again, it is very important to strengthen the global competitiveness of Japanese corporations. From this viewpoint, in FY2001, we introduced a new taxation system relating to the restructuring of corporations, such as splits, mergers and investment in kind. In FY2002, we installed the consolidated tax system, under which corporation tax is charged on the integrated amount of profit and loss of all of the corporations in a given corporate group. On top of that, in FY2003, a new framework for R&D tax credit and focused investment incentives will be introduced as follows.

Figure 8

Investment and Cash Flow in the Corporate Sector of Japan



Source: METI, MOF.

a) Proportional R&D Tax Credit

A new proportional R&D tax credit shall be introduced as an alternative to the existing incremental R&D tax credit. For R&D activities conducted by corporations, a proportional R&D tax credit of eight percent plus two percent (applicable only for FY2003 to FY2005) of the amount of R&D expenditure shall be introduced. For corporations with a higher proportion of R&D expenses, up to two percent of additional tax credit shall be applied.

b) IT Investment Incentives

Since IT investment would create immediate demand and improve productivity in the mid to long-term, the investment incentives outlined below shall be applied for FY2003 to FY2005.

- Scope of qualified IT investment includes both hardware and software.
- Certain expenses for leasing are to be eligible.
- Corporations may select tax credit (10 per cent) or special allowance for accelerated depreciation (50 per cent).

c) Accelerated depreciation for R&D investment

In addition to the R&D tax credit (above), a special allowance (50 per cent) shall be applied for R&D investment in FY2003 to FY2005.

4.3 Taxation related to financial assets

As is the case in other countries, taxation related to financial assets is one of the most serious concerns in tax policy, especially under the current circumstances. From the viewpoint of creating simplified taxation related to financial assets to ensure neutrality among them, taxation of listed stocks and publicly traded stock investment funds shall be revised and the usability of a “designated account” for stocks, which allows stock holders to skip the step of filing returns, shall be improved on a permanent basis.

- Dividends from listed stocks will be taxed (by selection) at the rate of 20 percent by withholding (after the passing of five years as mentioned below).
- Losses arising from publicly traded stock investment funds can be aggregated with capital gains, if any, on stocks.
- A new type of special account system will be introduced under which tax will be paid by withholding and no filing of returns will be required.

In addition, we shall take special tax measures to promote a shift from deposit saving to security investment as follows:

- Dividends from listed stocks and distribution from publicly traded stock investment funds will be taxed at the reduced rate of 10 percent by withholding for five years.
- Capital gains on listed stocks will be taxed at the rate of 10 percent for five years.

As a matter of fact, even in the current difficult times in the stock markets of Japan, the price performance of high-dividend-rate stocks has been fairly good (see Figure 9).

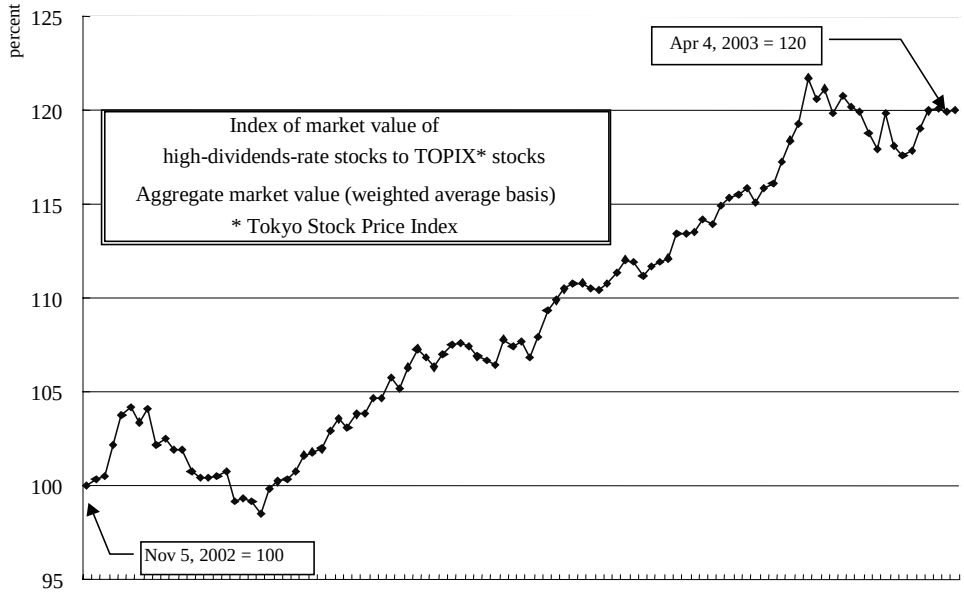
4.4 Consumption tax

It has been more than ten years since we introduced the consumption tax (Japan's VAT) in 1989 as a totally brand new tax in Japan. Needless to say, the consumption tax is one of the typical examples of "broad and thin burden," because this tax has quite limited non-taxable transactions and its rate is only 5 per cent as a single rate.

The consumption tax will play an even more important role in Japan in the future, since the cost of social security expenditure will inevitably rise in the rapidly

Figure 9

Movement of Stock Price Indices



Source: Author.

aging society. There are a couple of advantages to the consumption tax, although a regressive tax burden is unavoidable among low-earners. For example, the burden of consumption tax does not fall excessively on the working generation but is shouldered by the elderly population too. Accordingly, the consumption tax promotes fairness between generations.

Since the introduction of the consumption tax in 1989, its tax revenue has increased steadily, now accounting for about 20 per cent of total national tax revenue, and staking a claim to a position as one of the major taxes in the present tax system. However, the current rate of Japan's consumption tax is still ranked at one of the lowest levels in an international comparison.

Given the future importance of consumption tax in Japan, it is obviously necessary to gain broad majority support for such a tax among the Japanese people. Efforts should be made to improve the transparency of the consumption tax, whose base should be broadened, and to ensure that revenue gains due to special privileges for small vendors are not produced.

For this purpose, we shall introduce the following measures after FY2004.

- Diminishing the exemption for small vendors to a level one third the current level: Reducing the tax exemption threshold for eligible small vendors from 30 million Yen (current level) to 10 million Yen.
- Scaling down the simplified method for calculation of taxation (*i.e.,* use of the deemed ratio for a purchase): Restricting eligibility for the application of the simplified tax scheme by lowering the ceiling from vendors with annual sales of Yen 200 million or less to those with annual sales of Yen 50 million or less.
- Increasing of the frequency of tax payment: Taxpayers whose annual tax amount exceeds 60 million Yen should pay every month (currently once every three months).
- Making net price display obligatory: Vendors shall be obliged to display the net price (cost plus tax) of goods and services

4.5 Inheritance and gift taxes

From the viewpoint of promoting the transfer of assets held by the older generation (*i.e.,* parents) to the younger generation (*i.e.,* children), we will introduce a new system for adjusting gift tax at the time of inheritance. In other words, we aim to reduce the prohibitive effects that the gift tax has been imposing on asset transfer between generations.

A new system to calculate gift and inheritance taxes at the time of inheritance (applied by selection) shall be introduced by deducting the amount of previously paid gift tax from the total tax amount calculated on the total amount of gifts and inheritance property.

- Qualified gifts: the new system will be applied for gifts from parents of age 65 or older to children of age 20 or older;
- Exemption threshold at the time of receiving gifts: gifts not exceeding 25 million Yen (in total) will be exempt from tax;
- Tax rate at the time of receiving gifts: prepayment of gift tax will be charged at the rate of 20 per cent on the amount exceeding the exemption threshold. The amount of gift tax will be treated as prepayment of tax against inheritance tax at the time of inheritance (refundable);
- Additional exemption for residential housing: a tax exemption threshold of 35 million Yen will be applied for gifts from parents (no age qualification applies) to children (20 years or over) for the purpose of purchasing residential housing until 2005.

On top of that, the top rates of inheritance tax (currently 70 per cent) and gift tax (also 70 per cent) will both be reduced (to 50 per cent) along with a reduction of the number of inheritance tax brackets (from nine to six) and gift tax brackets (from thirteen to six).

5. Next step of tax reform

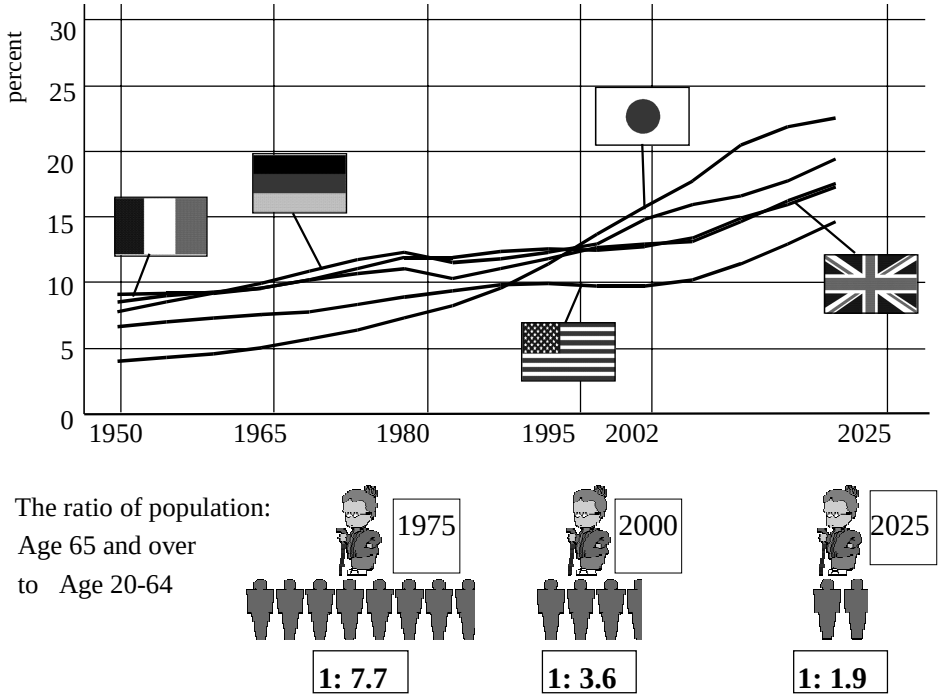
We started another stage of the deliberations on tax reform this January. One of the key points in these deliberations is related to the impact that Japan's aging population would have on the tax system. The increase of the proportion of the population that is elderly will place increasing burdens on non-elderly persons to maintain public services such as pensions and medical care. The phenomenon of the aging population is seen in the sharp rise of the elderly ratio (the proportion of the population that is 65 or over to total population) in G7 countries (see Figure 10). Particular attention should be paid to the projected surge in Japan's elderly ratio in the first quarter of the 21st century. Indeed, Japan's population is becoming the most aged among G7 countries. The ratio of the working population (aged 20-64) to the elderly population has been falling rapidly, from 7.7 in 1975, to 3.6 in 2000, to 1.9 in 2025. This implies that, in 2025, for every two persons in the working population, there will be one elderly person who needs to be supported.

In conjunction with this point, the decline in our potential economic growth rate would also be on the agenda in our deliberations. As shown in Figure 1, Japan's growth rate was slightly above four percent in the 1980s, the level of which is relatively high for a mature economy. Moving into the 1990s, we entered a 1-to-2 per cent-growth era. Some critics called that period "the lost decade." But the main reason for this trend is the decline of the potential growth rate, which is closely related to Japan's economic system from not only the domestic viewpoint but also from the global perspective.

On the other hand, in the case of today's Japan, the National Burden Ratio (ratio of total national and local tax revenues to national income) is fairly low

Figure 10

Japan's Population is Rapidly Aging (Age 65 and Over)



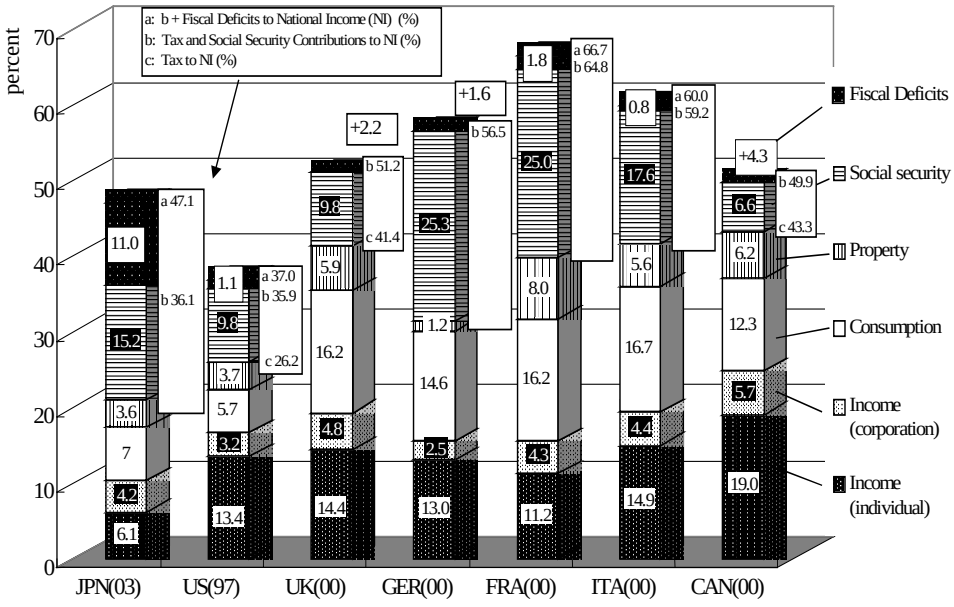
compared with those in other countries (see Figure 11). The outstanding characteristics of national burden in Japan are as follows and Japan should readjust its tax system in light of the change in the economic situation mentioned earlier. No longer can we rely on an increase in tax revenue occurring naturally along with economic growth.

- The tax burden, in particular on individual income and consumption, is very low, as discussed earlier.
- Social security contributions are on a par with those in other countries.
- And finally, very regrettably, the large fiscal deficit stands out.

First off, as for individual income tax, we should widen the tax base proactively because the current tax system has various exemptions, such as favorable treatment for elderly people. In particular, taxation related to the public pension system should be reviewed. Under the current system, the amount of contribution to pension funds is completely deductible and pension payments are

Figure 11

National Burden Ratio in Major Countries



Source: Ministry of Finance.

almost totally excluded from the tax base due to the large amount of public pension deduction. We need to include pension payment in the tax base, irrespective of whether this is done at the "entrance" or "exit" stage.

Additionally, we should investigate the economic and political feasibility of an increase in the consumption tax rate.

With regard to this point, the Minister Koizumi has been asserting that he has no intention of raising the consumption tax rate during his time as the Prime Minister, because he believes by far the most pressing issue is to streamline the public expenditure structure.

Dr. Ishi, the Chairman of the Commission, has asserted that the consumption tax rate will inevitably have to be raised to a two-digit rate "in the future". He has also said that sweeping tax reform cannot be achieved without widespread support from the Japanese public. In this sense, to hold nationwide, discussion-type public hearings is very meaningful. The Commission held such hearings to explain the reform plan, and to engage in a mutual exchange of views with the general public. The meetings were held at eleven venues during the period of March-September, 2002. And we are going to hold such meetings in the coming summer, too.

As referred earlier, the consumption tax *was* a totally brand new tax when it was introduced in Japan. Therefore, it took some time for the Japanese people including consumers and business people to get used to this tax. In this sense, one cannot be positive that the consumption tax is very popular among Japanese people. However, one might be able to say that, in particular, younger-generation people in Japan are less disinclined towards the consumption tax compared with older-generation people because, when they became independent consumers, this tax already existed and because they often go abroad and experience paying tax of a similar type as the consumption tax in Japan. Interestingly enough, about 70 percent of the participants in those meetings supported the Commission's idea of a desirable tax system including the possible increase of the tax burden in the future.

Of course, we need to exert our best efforts to streamline the expenditure structure as the Prime Minister Koizumi has been saying and to consider improvement of the system of the consumption tax, for example, by the introduction of the"invoice"system and multiple-rate system to avoid too much regressiveness if necessary.

Anyway, as Chairman Ishi said once, Japanese people will be able to accept future tax increases but a precise roadmap and firm commitment to advance will be needed.

6. Mid-term report of the tax commission (June 2003)

Since the Perugia workshop in April, the Tax Commission submitted its mid-term report "A sustainable tax system for Japan's aging society" to Prime Minister Koizumi in June 2003. The new report discusses further a new desirable tax system. A new tax system outlined in the report is a tax system with: (i) Confidence (secure stable revenue sources for public services. Carry out expenditure reform); (ii) Participation (younger and older generations pay equally according to their ability to pay); and (iii) Enhanced Vitality (neutral and simple tax system with minimum distortion in economic choices and easy to understand). Please see attached informal translation of the report for more detail.

TAXATION IN AUSTRALIA

Greg Smith[*]

Introduction

This paper provides a short survey of some taxation arrangements and reform issues in Australia.

The paper presents information in four sections:

Section 1 Taxation reform

Section 2 Taxation and labour market issues

Section 3 Taxation and fiscal policy

Section 4 Tax competition and harmonisation

1. Taxation reform in Australia

This section makes observations of the Australian tax reform experience at two levels. Firstly, consideration is given to the main influences on the tax reform policy debate. Secondly, a brief survey is provided of several main waves of tax reform in Australia dating since the mid-Eighties.

1.1 Influences on tax reform

The main influences on taxation policies and reforms can be seen as a combination of country-specific factors (such as politics, history, institutions, location, economic development and social values), the application of economic theory to the formulation of public policy, and the application of empirical research to policy questions. The relative strength of these influences varies between countries and, over time, within countries. In Australia's case, country-specific factors and theoretical economic research have generally been the main influences. Some tax issues have been informed by empirical studies, but as often these have been limited or not available.

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The views expressed in this paper are those of the author and do not necessarily reflect those of the Australian Government or Treasury.

1.2 Country-specific factors

Some of the country-specific factors evident in Australia have reinforced the quest for tax reform. Others have operated as a constraint.

Australia is an open, highly urbanised, small-medium developed country. It has a population of almost 20 million (0.3 per cent of the world's total) and an economy that is about 1 per cent of the world's total. In purchasing power parity terms, it currently has similar per capita income to that of the major European countries and Japan. Like the US, Australia has a federal system of Government.

While Australia appears broadly similar to many other OECD countries, it also has special features that can influence aspects of its approach to taxation. For example,

- Although a developed economy with sophisticated industries, Australia also is a major mineral, energy and rural producer and exporter, a structural feature more in common with many developing nations;
- Australia is located close to, has its main export markets in, and has other strong economic links with, East and South East Asia where many countries have relatively small general government sectors and low tax rates; and
- For most of its history (and continuing at the present time) Australia has adopted a development strategy involving substantial net immigration and net inwards foreign investment.

In recent years, these features have combined to emphasise in Australian policy debate the need for public policies that support Australia's productivity potential. There has been a strong focus on ensuring that policies maintain macro-economic balances and support competitive markets and innovation.

This was not always so. When Australia had a smaller population (particularly up until the Sixties) able to exploit highly-valued resources from a seemingly boundless land mass, public policies tended to emphasise distributional goals and other public sector programs or development strategies. These included centralised wage-fixing arrangements, which introduced considerable rigidity into labour markets, together with protective tariffs to promote a manufacturing import replacement development strategy. Many of the attitudes formed in the earlier era have had to be rethought, in the face of the new competitive settings of the economy and also a heightened awareness of the environmental consequences of excessive exploitation of a relatively fragile landscape.

The long traditions of Government involvement in redistributing income and other public sponsorships have not disappeared, however. Distributional concerns in particular continue to play a very major role in attitudes to tax policy. For example, when Australia recently introduced a new goods and services tax, comprehensive measures were found necessary to ensure that adequate compensation was paid to those on lower and middle incomes.

Despite these factors, tax reform has been one part of a culture of policy reform as Australia seeks to adjust to the new realities.

There are, of course, many other specific factors within Australia's history and circumstances that play a major role in tax design even today. Without attempting to be comprehensive, some that may be of interest include:

- Australia has no estate, inheritance or gift taxes. These were abolished in the Seventies largely in the context of concerns about the effect of such taxes on the viability of farming and other small businesses following intergenerational transfers which often required borrowing at relatively high interest rates to pay these taxes.
- Australia has no national social security scheme and hence imposes no social security contributions, either on employees or employers. Instead, Australia has a means-tested "safety net" public pension scheme funded from general revenues. It also imposes a compulsory retirement savings contribution (generally at the rate of 9 per cent of wages) on employers in respect of their employees. These contributions are paid into private sector pension funds for the exclusive purpose of providing greater retirement incomes.
- A high degree of vertical fiscal imbalance has developed under Australia's federal system. The eight States and Territories levy no income tax and are constitutionally prohibited from levying excises or other taxes on sales of goods. As a result they developed a number of relatively inefficient, narrowly based taxes, particularly on property transfers, gambling, financial and insurance transactions and a relatively heavy payroll tax. Since the States and Territories are responsible for many public services (including schools, hospitals and police) these taxes have been inadequate sources of revenue and so very large fiscal transfers are made to the States by the central Government. The greater part of these transfers have now been replaced by the revenues from the new Goods and Services Tax which, although collected under national laws, are wholly paid to the States and Territories.
- In other respects, the Australian taxation system looks very familiar, although it places greater proportional reliance on income taxes compared to indirect taxes than is so in the OECD on average.[1]

1.3 The influence of theoretical analysis and empirical research

I turn now to make some brief observations on the roles of economic theory and empirical research in the Australian tax reform experience.

Whereas some areas of economic policy have been significantly influenced by strongly empirical approaches, notably studies of the broader economic effects of

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[1] In 2000, income tax collected from individuals was 11.6 per cent of GDP in Australia compared with 10 per cent on average in the OECD. General consumption taxes in Australia, mainly the GST, were 3.9 per cent of GDP compared with the OECD average of 6.9 per cent.

industry assistance and border protection policies and some aspects of competition policy,[2] Australian taxation policy has a relatively limited quantitative research basis. The revenue effects of alternative policies are estimated, of course, usually through partial first-round analysis, but wider economic effects are much more often adduced by theoretical analysis than empirical study.

The main exceptions to this have been research into income distribution questions, which has often been extensive and included development of a range of simulation models for retirement income policies (including demographic components).[3] Beyond this, the relatively limited recourse to empirical estimation of economic effects reflects a range of factors. These include the difficulty in obtaining sufficiently reliable data to support such research, high research costs often with relatively limited or unreliable results, and long lead times.

However, while reliable empirical measures are often not available, standard economic theory has for some years been highly influential in discussions of public policy, including tax policy, in Australia. Australia has undertaken many economic reforms over the past two decades based largely on theoretically based expectations of potential net gains.

The role of standard economic theory has been reinforced by widespread perceptions that the various institutional arrangements that had built up in Australia in earlier times under different conditions needed considerable adaptation or reform to restore Australia's relative position in the world. Relatively poor economic performances in the Seventies and early Eighties created an appetite for reform and greater acceptance of economic disciplines. Overall national productivity had fallen relative to many other developed nations and there was increasing concern that many Australian industries were not well positioned for global competitiveness.

1.4 Taxation reforms in Australia

The main goal of taxation reform is to reduce the adverse effects of taxation on economic activity and growth. A closely related concern is to ensure that the tax revenue base is robust over time. Consistent with standard economic theory, the main areas of emphasis for such reforms are typically:

- broadening the tax base so that there is less welfare-reducing tax distortion of investment, transaction and consumption choices (these reforms often also meet horizontal equity and revenue security and integrity objectives);
- reducing adverse tax impacts by reducing tax rates (with revenue effects offset by broadening the tax base); and

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[2] The Productivity Commission or its predecessors have undertaken most of this research. Over time, this research has underpinned the substantial dismantling of import tariff and other border protection measures.

[3] This includes considerable published research by the Retirement and Income Modelling Unit of the Treasury's Tax Analysis Division.

- balancing the mix of direct and indirect taxation to enable the burden of each to be minimised (these approaches are often also aimed at reducing "double tax" on savings and securing tax compliance benefits).

At times tax reform has also paid attention to the cost of tax administration and compliance (effectively transaction costs which are a deadweight loss to economic welfare measured by consumption possibilities). It is commonplace however, that the base broadening measures so central to most tax reforms can involve increases in the overall cost of tax system administration and compliance. Optimising tax reform, therefore, often requires some trade-off between allocative efficiency and transaction cost issues. These trade-offs are difficult to judge as they are very rarely reliably informed by comprehensive empirical studies.

The overwhelming emphasis of Australian tax reform over the past two decades has been base broadening and rate reduction. More recently, greater attention has been given also to the need to reduce transaction costs, especially by streamlining tax collection arrangements.

Australia has had several waves of major tax reform as outlined below.

1.5 The reforms of the Eighties

In the Eighties, the main reforms were to the income tax base and rates. In that period, the main income tax innovations were:

- Introduction of a full imputation system for dividends (reducing effective rates of tax on distributed company income);
- Introduction of more comprehensive taxation of long-term capital gains and employee non-cash fringe benefits (broadening the income tax base);
- Other measures to broaden the capital taxation base, removing longstanding special exemptions and reducing concessions for plant and equipment investments;
- Reductions in income tax rates, with the company tax rate falling from 46 per cent (after a short period at 49 per cent) to 36 per cent and the highest personal tax rate from 60 to 49 per cent.

Attempts to reform indirect tax bases were largely unsuccessful in this period, although some limited broadening of the base was achieved.

1.6 Introduction of General Consumption Tax and large income tax cuts

In 1998, the Government proposed new reforms that were ultimately introduced successfully with effect from 1 July 2000. The cornerstone of these reforms was the replacement of former narrowly based indirect taxes with a broadly based Goods and Services Tax (GST). The GST is essentially a value-added tax and was introduced at the single rate of 10 per cent on a broad base (the main

exemptions being health and medical goods and services, education and childcare, fresh or certain lightly processed foods and charitable activities).

At the rate of 10 per cent, the GST accounts for only about 12 per cent of total taxation revenues in Australia. Accordingly, its introduction, after offsetting revenues from abolition of wholesale sales taxes and some other inefficient taxes, facilitated large personal tax cuts without fundamentally changing the considerable role of the income tax. The changes in tax schedules, which took effect on 1 July 2000, are set out in Table 1.

The changes to the personal rate scale were fully concentrated on incomes below $60,000 with no reduction in the highest personal tax rate.[4] The Government also increased government pensions, income support allowances and family assistance arrangements in order to fully compensate households for the price effects (estimated at less than 2 percentage points) of the indirect tax reforms.

Table 1

Personal Tax Schedules

Old Scale	
Taxable Income($)	Tax rate (%)
0 - 5,400	0
5,401 - 20,700	20
20,701 - 38,000	34
38,001 - 50,000	43
50,000 +	47

New Scale	
Taxable Income($)	Tax rate (%)
0 - 6,000	0
6,001 - 20,000	17
20,001 - 50,000	30
50,001 - 60,000	42
60,000+	47

1.7 Business tax reform

Soon after the introduction of the GST and associated personal taxation reductions, the Government also implemented a substantial business tax reform. The business tax reform had as its centrepiece a further reduction in the company tax rate from 36 to 30 per cent. This was aimed at giving Australia a company tax rate that was more competitive in its broader economic region (particularly the Asia/Pacific regions).

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[4] This scale may be compared against annual average full-time ordinary earnings currently of approximately $46,000. At the time of writing $A1 was approximately equivalent to 66 US cents or 57 Eurocents.

The business tax reform also involved a significant change in approach to the taxation of capital gains. The capital gains tax introduced in the Eighties had provided for price indexation of the cost base, but otherwise the real capital gain was assessed as income at full marginal tax rates.

The indexation arrangements were complex. In their place, and at a greater overall level of concession, the Government introduced a capital gains regime based on nominal measures of gains, but with the rate of tax halved under the personal tax system.[5]

Substantially offsetting the revenue costs of these measures were further measures to broaden the business income tax base. In particular, write-off provisions for investments in plant and equipment were modified to remove concessions and (with limited exceptions) write-off rates were aligned with estimates of the effective economic lives of assets.

The business tax reforms also encompassed a number of other areas with lesser revenue implications. These include "consolidation" arrangements whereby groups of companies with common ownership can be treated as a single taxpayer. Intra-group transactions may in general (upon group election) be ignored for tax purposes. These provisions are expected to bring tax integrity benefits, simplify tax compliance, facilitate commercial choices about business structures and restructures, and provide easier utilisation of both tax losses and dividend imputation credits otherwise accumulating within separate companies within a company group.

1.8 Retirement savings and retirement income reforms

Australia does not have a national social security scheme and there are no social security taxes levied either on employees or employers. A base level of retirement income is provided on a means tested basis from general government revenue sources: as a safety net for those who retire without adequate, or any, private means of support. The single person age pension is set effectively at about one quarter of the average weekly male ordinary time wage, and reduces as access to private means increase.

Rather than introduce a national social security system, Australia has supplemented its budget-financed age pension system with a "compulsory" system of private retirement savings for employees. This is not strictly compulsory, but operates by imposing a tax penalty on employers if they fail to make contributions to occupational superannuation (pension saving) funds equivalent to 9 per cent of wages or salary. Generally, these funds accumulate with the employee member taking the investment risk of the scheme (a relatively small number of employers

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[5] This is achieved by including only half of the gain in the tax assessment. For superannuation funds, 1/3 of the gain is excluded giving an effective tax rate of 10 per cent The realised capital gains of companies are taxed at the standard rate of 30 per cent, so that for companies there is no difference in the treatment of ordinary income and capital gains.

provide contributions to defined benefit plans). There is no obligation imposed on the self-employed.

The superannuation arrangements have rapidly accumulated large funds since these arrangements commenced in the late Eighties. Superannuation funds may accumulate amounts either compulsorily contributed by employers or additional amounts (up to statutory limits) which may be contributed voluntarily. Thus, both the compulsory and voluntary retirement savings schemes are conducted through the same funds.

The taxation arrangements for these superannuation funds are concessional against an income tax benchmark, generally with a 15 per cent tax rate applying to deductible contributions and investment earnings, although not fully tax-exempt as in most other countries. The benefits paid from such funds are taxed at low rates. Although often controversial, these tax arrangements have the effect of generating some current revenues from superannuation schemes, which reduces their current cost to the budget.

2. Taxation and labour market issues

The main concern about the impact of the taxation system on the labour market is the disincentive to labour force participation associated with high marginal tax rates. Secondary concerns relate to the effect of such high rates on choices between participation in the formal (taxpaying) economy and the informal (tax evading) or so-called "cash" or "shadow" economy. A third concern, which is becoming more prominent, is that high personal tax rates may influence choices of domicile particularly for high-income, high-skilled workers or executives, many of who are increasingly mobile in international labour markets.[6]

Reflecting distributional themes, Australia's taxation system is weighted to income taxes and these are imposed on a progressive basis.

To the extent that income tax is imposed on labour income, the tax system can generate disincentives to workforce participation. In Australia, although there are no national social security contributions in addition to income tax, the means tests in the various elements of the social security and family assistance systems can operate to further increase effective marginal income tax rates.

Social security arrangements in Australia provide means tested entitlements funded by general government revenues. There is no separate social security fund or social security taxation. Pension and family support payments are made on a needs basis – pensions or benefits for the unemployed, disabled, sole parents and the aged and payments to families for children. Virtually all of these payments are means tested, so that amounts are withdrawn as private incomes increase.

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[6] In Australia's case, being English-speaking and the proximity within the region of other large English-speaking financial centres probably exacerbate this.

As a result, Australians engaged in the labour force typically face two effective tax rates – one from the progressive income tax and one as a result of the income-linked withdrawal of income support or family assistance.

Recent tax reforms have reduced to some extent both the personal tax rates and the withdrawal rate for social security and family payments. For pensions, the withdrawal rate as private incomes increase was reduced from 50 to 40 per cent, and over relevant ranges the rate for family payments is typically 30 per cent.

In recent years, there have been ongoing debates about the conflicting effects of these arrangements. On the one hand, tax progressivity and benefit means testing achieve vertical distributional goals (that is, greater vertical redistribution at given fiscal cost). On the other hand, they generate disincentive effects for labour force participation (and savings, to the extent the taxes apply to capital income as well) and are sometimes seen as unfair in their impact on working people.

2.1 Approaches to reducing marginal tax rates

There are both specific and broader strategic approaches to tax design that can influence effective marginal tax rates. Specific measures can be used to target particular problems such as workforce participation (or job location) incentives for jobless families, highly skilled internationally mobile workers or the mature aged. More generally, strategic influences on tax rates include the extent to which expenditure tax features are introduced into income tax systems, the comprehensiveness of income tax bases and the balance of direct and indirect taxes in the overall tax mix. Brief illustrations of each of these in the Australian context are now outlined.

2.2 Jobless families

A particular focus in recent years has been on increasing incentives for workforce participation by members of jobless families. One in six Australian families with children have no family member engaged in the workforce. Earned-income tax credits have been suggested as a possible means of dealing with this, but this is fiscally expensive, difficult to tightly target and under means testing, creates new points at which higher effective marginal tax rates are imposed. It has also been suggested that an earned-income tax credit could be linked with reducing real wages for the unskilled (to promote their employment) but it is not clear that effective wage reductions could be achieved. These issues remain open to discussion and the Government currently has a work and family taskforce considering workforce participation issues.

2.3 Top personal tax rate and the internationally mobile

At the other end of the scale, Australia's top personal tax rate (effectively 48.5 per cent including the medicare levy) is often criticised as too high and as having too low a threshold. Some express concern that increasing numbers of professionally qualified young Australians, particularly in the financial and business services sectors, appear to be attracted to jobs in the major Asian capitals where substantially lower personal tax rates can apply. Despite these concerns, there also remain strong political pressures from other quarters against tax relief at higher income levels, and it is unclear at present how these competing viewpoints will be reconciled.

2.4 Workforce participation by older workers

There has been considerable focus in Australia on the fiscal and social pressures likely to result from the ageing of the population. The fertility rate in Australia has long been below replacement level and the population is expected, even with current net immigration levels, to stabilise by around 2040.[7] At this time the proportionally larger older population and higher health funding costs are projected to require, on current trends and policies, an increase in public spending and taxation of about 5 per cent of GDP.

One response is to facilitate or encourage extended workforce participation by those in older age groups. There has been a trend for some years in Australia to earlier retirement, with significant proportions of workers retiring or otherwise leaving the workforce after reaching the age of 55. A range of policy issues including early access to superannuation may be relevant to these decisions.

For those at or greater than the age pension retirement age (65 for males) there is now less tax disincentive for partial workforce participation. Recent policy adjustments raised the effective tax-free threshold for those aged 65 or more to $20,500 (compared with $6,000 under the general tax scale).

Further policy work is continuing on the issues and policies impacting on the participation decisions of older workers.

2.5 Income and expenditure taxation strategies

Income tax is not, of course, exclusively imposed on labour income. It also applies to the returns to capital and this is often seen as contributing to a disincentive to save. Most countries introduce "expenditure tax" features to their income tax systems to provide for a relatively lower tax wedge on capital income and hence to

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[7] The Government in May 2002 published an Intergenerational Report setting out demographic, economic and fiscal projections to the year 2042.

reduce the impact of income taxes on saving incentives.[8] While these features have the effect of reducing the tax burden on income that is devoted to savings as opposed to consumption, at the same time for a given revenue yield they require higher primary rates of tax. Expenditure tax features usually thereby increase the effective tax rate on most labour income.

Australia has some expenditure tax features in its income tax arrangements but has sought to limit their impacts on overall revenue raising. For example, superannuation (pension) funds are subject to a 15 per cent tax on receipts of deductible contributions and on investment earnings (substantively offset by lower taxes on final benefits when paid from funds). This has the effect of bringing forward tax revenues without substantively changing the overall tax wedge on superannuation savings. Also to facilitate lower tax rates, Australia has sought to maintain a comprehensive base of personal income taxation. For example, it introduced a comprehensive tax on employee fringe benefits (that is, non-cash forms of income such as the provision of accommodation or motor cars as part of the salary package) when weaknesses in tax coverage emerged in this area. These features of the taxation arrangements have assisted in preventing a need for higher rates of taxation, and to that extent may operate to reduce the adverse disincentive effects of labour income taxation.[9]

3. Taxation and fiscal policy

3.1 Stabilisation and the medium-term framework

The Australian Government is strongly committed to a fiscal policy of budget balance on average over the economic cycle. As Australia has had largely uninterrupted economic growth for the past decade, this fiscal objective has been met with small budget surpluses in nearly all years since 1996-97.

A very small budget deficit was incurred in 2001-02, following a slight economic slowing in 2001, while current forecasts suggest a quick return to small surpluses in 2002-03 and following years. The small movements between these recent years reflect appropriate operation of the automatic stabilisers intrinsic to the fiscal system.[10]

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[8] The aim of the "expenditure tax" broadly is to impose tax on income expended on consumption, and to prevent or reduce the so-called "double tax" effect that arises if tax is imposed also on returns to saved income. Expenditure tax features can be introduced into income tax arrangements to relieve this bias (another strategy is to shift the weight of tax in the overall tax mix to consumption taxes).

[9] Fringe benefit and capital gains taxes introduced in the mid-Eighties were associated with a reduction in the top personal tax rate from 60 to 49 per cent, since further reduced to 47 per cent exclusive of the medicare levy.

[10] There is probably less focus on automatic stabilisers in Australia than in some other countries, because the fiscal position is very sound, the independent monetary authority retains a strong role in the context of a floating currency; and the rate of economic growth has been consistently strong for a prolonged period. That said, it is likely that the tax component of the automatic fiscal stabilisers in Australia has become

(continues)

The ongoing surplus means that the Australian taxation system fully meets the cost of Government on a year-by-year basis.

Underlying this fiscal policy is a strong belief that the Government sector should not contribute structurally to Australia's net borrowing requirement. Australia for many years has experienced net capital inflow averaging about 4 per cent of GDP per annum. This inflow now relates entirely to transactions in the private sector as the Government has eliminated its annual net borrowing requirement.

As a result of the succession of budget surpluses since the mid-Nineties, along with asset sales by government, the level of central government net debt has fallen to very low levels – currently about 5 per cent of GDP.

The robust financial positioning of the Australian public sector (broadly matched by the State and Territory governments) has been seen as assisting the national saving effort as well as underpinning a stable, low-interest rate environment notwithstanding continued strong economic growth.

In this setting, there has been relatively little recent use made of taxation policy (or fiscal policy in general) for discretionary economic stabilisation purposes (although there have been several instances where specific expenditure decisions have been matched by revenue measures to maintain the fiscal balance). The fiscal stimulus associated with net tax cuts introduced as part of tax reform in 2000-01 was seen as fortuitously providing some stimulus at the time of economic uncertainty and downturn in late 2000 and early 2001. However, the tax cuts were committed in 1998 and were not explicitly designed for stabilisation reasons.

To date in 2002-03, the Australian economy has shown few signs of slowdown, despite the relative weakness experienced in many international markets, the drought in much of rural Australia and the long expected (but still largely awaited) downswing in the housing cycle. In these conditions, it is likely that Government policy will continue to emphasise medium term fiscal stability and budget balances (small surpluses) rather than active pursuit of stabilisation policy through discretionary fiscal instruments.

3.2 Longer term considerations

Australia published its first Intergenerational Report in the 2002 Budget. This document projected 40 years forward demographic, economic and fiscal outcomes under current policy settings and trends. Legislation provides that an intergenerational report will be published every 5 years.

Whereas the methodology used generated results suggesting that government spending would increase as a share of GDP by about 5 percentage points (mainly on

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more efficient in recent years as tax reforms have involved making tax payment obligations more contemporaneous with underlying economic developments.

the health sector), taxation receipts were simply assumed to be constant as a share of GDP. It is difficult to make meaningful forward projections of taxation receipts, as the Australian taxation system is not indexed for inflation, and so regularly experiences discretionary adjustments.

That said, there has been concern that some elements of the tax base in Australia may risk decline relative to the level of GDP. The Goods and Services Tax (GST) introduced in 2000 (a single 10 per cent rate value added tax) was partly motivated by concerns that the former multiple-rate wholesale tax imposed only on specified goods had experienced, and would continue to experience, relative base decline. The inclusion of most services in the GST base provides a more robust tax base, although health expenditures are excluded and these are generally expected to continue to trend towards an increasing share of aggregate consumption spending.

It is also apparent that on current trends and policies the relative yield of excises on petroleum (both crude oil and fuel products) will fall over time.

The long-term projected trend to higher public spending (on current policies) and, at the margin, risks to some existing taxation bases, presents a potentially considerable tax policy challenge. It is not yet clear how this will be met, or whether the preferred course will be to restructure the relative public and private sector roles to remove the need for a higher public expenditure share. Fortunately, current trends do not identify these as major pressures for at least the next 15 years or so.

Apart from changing tax or expenditure levels, a third way to prevent a structural increase in the relative size of government is to achieve higher rates of GDP growth. Trends in spending or taxing as a share of GDP are driven not only by projections of the numerators (spending or taxing) but also trends in growth of the denominator, GDP.

The combined effects of growth in population, participation and productivity drive GDP growth. The level of GDP attained in an economy can be expressed as follows:

$$GDP = P\ \alpha\ \rho\ (\ 1 - u\ )\ h\ \pi$$

Population	P is total population
	α is the proportion of population of working age (age structure factor)
Participation	ρ is the participation rate (of the working age cohort)
	u is the unemployment rate (*i.e.* (1–u) is the employment rate)
	h is average hours worked (by those working)
Productivity	π is average labour productivity (of those working).

There is considerable debate and focus in Australia now on whether there is scope to increase GDP growth rates by policy mixes (including tax policy mixes) which encourage growth in any or each of these “three Ps”.

As noted in the previous section, policy is currently being reviewed in areas where the taxation system is thought unduly to restrain workforce participation. At this stage, there has been little support for attempting to use tax or other policies to increase population growth (essentially fertility). The last "P" (productivity) remains, as it long has been, a major focus for policy-makers across a wide field of public policy including tax policy.

4. Tax competition and harmonisation

This subject essentially encompasses most of the issues that arise when considering the international context for taxation policy design.

The traditional focus of international taxation policy is the set of rules to apply to cross border transactions. In particular, it has been recognised that the assertion of both source and residence taxation rights creates the risk of double taxation of income. Similarly, there is a strong case for ensuring that consumption and other sales taxes mesh effectively without creating commercial or economic biases when cross-border transactions are involved.

Added to this has been a long-term concern to prevent the tax advantages often afforded to international transactions, particularly by tax havens, from inappropriately eroding the domestic tax base.

In more recent times however, some new international taxation concerns have become more prominent. There is now greater interest in the economic effects of the more fundamental differences between countries in their taxation structures and arrangements. These differences are now sometimes seen as part of an international competition for globally mobile investment and people.

Australia has become increasingly conscious of taxation competition issues in recent years.

The continued economic advancement of countries in the Asia-Pacific region has increased their attractiveness for investment in fields where previously Australia may have had greater underlying advantages. Advances in communications technology have reduced the barriers to more global approaches to investment and economic activity generally.

4.1 Treatment of international transactions

Given its small relative size, Australia has maintained a robust international taxation regime with full provisions for taxing controlled foreign corporations and for preventing tax benefits on passive income accumulation in foreign investment funds.

To some extent, these provisions have unduly high compliance costs or disadvantage Australia's competitive position for corporate financial headquarter

activities, or for funds management. Following a review of international tax arrangements, the Government has announced in the 2003 Budget a package of measures to reduce the burden of these provisions.

The GST, like other value-added taxes, provides an exemption for exports. Its introduction in 2000 enabled the abolition of several single-stage indirect taxes that had a cascading impact on inputs to the export sector.

4.2 Tax rates

As recently as 1988, the company tax rate in Australia was 49 per cent. It is now 30 per cent. Reductions in the company tax rate have been motivated by a desire to provide a company tax environment more competitive with the rates of tax common in the Asia Pacific region and with other countries generally.

Relatively few taxation policy initiatives have been aimed at reducing specific tax wedges on activities in Australia merely because they face international competition. One example is the special regime for offshore banking introduced in the face of considerable competition from regional centres for financial services business. Australia sees this as a defensive move and not as creating harmful tax competition. Australia does not offer bank secrecy arrangements and actively supports exchange of tax information protocols. While tax holidays and special tax concessions are common within the Asia Pacific region, Australia has generally avoided these arrangements in the wider context of its capital taxation arrangements.

As noted earlier in the discussion of labour income tax issues, there is now also some concern about the impact of the top personal tax rate on international competition issues. The Government has put forward legislative proposals to ameliorate aspects of the personal tax system on persons working in Australia on a short-term basis (particularly to remove taxation on certain foreign source capital income). More comprehensive changes to the personal tax rate scale for reasons of international competition have yet to find substantive support, but remain controversial. There is, however, no foreseeable prospect that reductions in rates could match the lowest tax regimes within the Asia-Pacific region (such as in Hong Kong).

4.3 Dividends and corporate income

Australia introduced a full dividend imputation system in 1987. Under this system, full credit is given to resident shareholders for the underlying Australian company tax paid on income distributed as dividends. No credit is given for foreign taxes, and if there is otherwise no Australian company tax paid the dividend is fully taxable without credit. Franked dividends paid to non-residents carry no credit, but are exempt from dividend withholding tax.

This system removes the main double-tax bias against equity relative to debt, and against company structures relative to unincorporated or flow-through vehicles. As well, imputation improves tax system compliance and integrity, as much of the benefit of any scheme to avoid Australian company tax is lost when the income is distributed to shareholders.

At the same time, from the point of view of resident shareholders, these features create a tax bias in favour of domestic income over foreign source income. This feature has been the subject of considerable debate in recent times. There is a view that the less favourable treatment of distributed foreign source income creates a bias against globalisation by Australian companies. There is also a view that the cost of capital of these companies could be reduced if imputation-style benefits were granted in respect of foreign source income. Others hold the view that these are not significant factors constraining the international growth of Australian businesses.

The treatment of dividends sourced out of foreign income was among the issues considered by the Review of International Taxation Arrangements, but no changes to these arrangements have been made at this time. It is of interest that varied practice and trends are in evidence across different countries. Different countries have classical, exemption and imputation systems. Some allow full income pass-through in particular cases. Some European countries with imputation arrangements appear to be moving away from such schemes, while the United States has recently adopted limited dividend relief proposals.

Global economic welfare may be advantaged by a more uniform and consistent approach to dividends, but it would appear at this stage that there is little consensus, or perhaps even understanding, on the best direction to follow.

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TAX AND WELFARE REFORMS: STABILISATION AND INCENTIVES EFFECTS

Marco Buti[*] *and Paul van den Noord*[**]

Introduction

Taxation inevitably impinges on most aspects of economic activity, and thus careful consideration must be given to its design – in addition to its level and hence the level of related expenditure. So long as taxation affects incentives it may alter economic behaviour of consumers, producers or workers in ways that reduce the amount or utilisation of physical, human and knowledge capital, and thus growth. Therefore, to the extent the tax system matters for economic efficiency, its costs are likely to rise with the level of taxation. The widespread perception that in many European countries the tax burden is too high and the tax system unduly distortive has led to calls for tax reforms. Empirical research suggests that a cut in the tax share in GDP by 1 percentage point raises output per working-age person in the long run by 0.6 to 0.7 per cent (OECD, 2000).

While policy makers' efforts to streamline the welfare state and enact tax reforms that aim to bringing down the tax burden may thus pay off in terms of better efficiency, this may come at a cost in terms of weaker fiscal automatic stabilisation. This trade off between stabilisation and efficiency would be particularly unpalatable in EMU countries, since they already have lost national monetary policy and the exchange rate as adjustment mechanisms to country-specific shocks. Indeed, EMU members would ideally aim for both stronger fiscal stabilisation and higher economic efficiency, and a trade-off between the two would be quite unwelcome.

Fortunately, this difficult trade-off may not always be relevant. In other papers (Buti *et al.*, 2003a and b) we have shown that here may be a level of the tax burden beyond which reducing it may not only yield better efficiency, but, depending of the nature of economic shocks, also render fiscal automatic stabilisers more effective. If supply shocks tend to prevail, a reduction in the tax burden might carry a "double dividend" of efficiency gains and better fiscal stabilisation properties. This conclusion draws on evidence that lower taxation improves the terms of the short-run inflation-unemployment trade off (*i.e.* makes the Phillips

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The opinions expressed in this paper are the authors' only and should not be attributed to the institutions they are affiliated with.

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curve flatter) by reducing the wedge between the marginal cost of labour and the marginal take-home pay. This is encouraging for countries with high tax burdens that are considering a reduction in the size of the public sector.

The present paper takes this analysis further, by introducing a distinction between the "optimal" tax burden at which, under supply shocks, the automatic stabilisers are most powerful and beyond which favourable stabilisation properties decline, and a "critical" tax burden above which stabilisation properties become perverse. Beyond the latter point, taxes and benefits have destabilising effects on output in the event of supply shocks and destabilising effects on inflation in the event of supply and demand shocks, thereby increasing the likelihood of a policy conflict with the central bank. Numerical simulations show that several euro area countries – especially the very open ones – may well have a tax burden above this critical level, while most countries will have a tax burden that exceeds the "optimal" level.

The paper is organised as follows. In section 1, a model of wage setting incorporating the effect of taxes is developed. The basic mechanisms are then incorporated in section 2 in simple macroeconomic model to analyse the stabilising effects of taxation. In section 3, the two concepts of "threshold" tax rates are derived. Section 4 provides some numerical simulations of such tax rates. The final section concludes.

1. A model of wage setting with wage resistance

The basic tenet of this paper is that automatic stabilisers operate not only on the demand side through their impact on disposable income, but also on the supply side through their impact on *ex ante* profitability. Distortionary taxes and benefits affect the level of equilibrium unemployment and potential output.[1] What is important in our analysis, however, is the impact of distorting taxes and benefits on the reaction of aggregate supply to unexpected inflation, that is the slope – not the position – of the aggregate supply curve.

We assume that workers pass through the cyclical variations in their tax burden at least partly onto employers. This implies that there is "real wage resistance" in an imperfect labour market.[2] This is illustrated in Figure 1, which depicts the downward sloping labour demand schedule and an upward sloping wage formation curve. It shows that the wage formation curve is steeper for higher tax and benefit rates. This is based on the following mechanism. As demand for labour

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1 See, e.g., Kneller, Bleaney and Gemmel (1999), Van den Noord and Heady (2001) and OECD (2002).

2 Evidence of "real wage resistance" in continental Europe is found by Daveri and Tabellini (2000), but not by Layard (1997) who finds that in the long-run tax neutrality holds. Notice, however, that what is crucial for our analysis is real wage resistance in the short run. Hence the results below are not incompatible with long run neutrality of taxes. In OECD (1990), a simple test based on time series regressions of 16 OECD countries shows that while total taxes have no long run effects on labour costs, they have a substantial short run. For an overview of the debate, see Carone and Salomäki (2001) and Daveri (2001).

increases, employers will bid up real wages. The higher the tax rate, the higher will be the increase in the tax bill for a given *ex ante* pay rise. Given that the labour market is tightening, workers may be able to recover some of that extra tax from their employer via a real wage increase on top of the initial "scarcity premium". Thus, the higher the tax rate, the more compensation workers will seek to obtain from their employer for a given *ex ante* increase in employment and real wages.[3] To the extent benefits can be considered as negative taxes (*i.e.* are means tested), this will prompt workers to seek extra compensation to top up the scarcity premium as well. The higher the (initial) benefit the larger this compensation will be and the steeper will be the wage formation function.

The panel in Figure 1 depicts an increase in the demand for labour, represented by an outward shift of the labour demand schedule. With low taxes and benefits this is shown to raise employment from L^* to L_1 and the real producer wage from w^* to w_1. In order to obtain the same result in terms of after-tax wages if taxes and benefits are higher, however, the real employer wage needs to increase by more, from w^* to w_2, and employment would increase by less, from L^* to L_2. This implies that the deviation of employment from the initial equilibrium is smaller. In line with the results of Auerbach and Feenberg (2000), the tax and benefit system thus operates as an automatic stabiliser also on the labour market.

However, the opposite holds in the case of a shock to labour supply. This is illustrated in Figure 2, which shows that, following a negative supply shock – e.g., a wage push following a rise in unionisation – taxes and benefits drive employment further away from the initial equilibrium. The higher the tax burden and the generosity of the benefit system (i.e. the higher the marginal effective tax rate), the stronger the destabilising effect.

To convert these notions into a formal relationship we postulate the following wage formation function:

$$w = f(L) + \gamma(T - G) \tag{1}$$

where w is the real producer wage, L is employment and T is the real revenue of distorting tax per worker and G is the real (means-tested) benefit per worker. We assume the first derivative of the function f with respect to L to be positive, in line with the graphical representation in Figure 1. γ is the coefficient of wage resistance: it varies between 0 (all tax increases or benefit losses are borne by labour) and 1 (tax increases or benefit losses are passed through entirely to employers). Rewriting in rates of change (denoted by a dot over a variable) yields:

$$\dot{w}[1-\gamma(\frac{\Delta T}{\Delta w}-\frac{\Delta G}{\Delta w})] = [1-\gamma(\frac{T}{w}-\frac{G}{w})]\rho\dot{L} \tag{2}$$

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[3] Note that this assumes that the government fails to provide such compensation via incomes policy. This assumption is consistent with the starting point of our analysis that governments rely on automatic stabilisers, hence do not modify the tax and spending parameters in response to cyclical fluctuations in economic activity.

Figure 1

The Impact of Taxation on Wage Formation: Labour Demand Shock

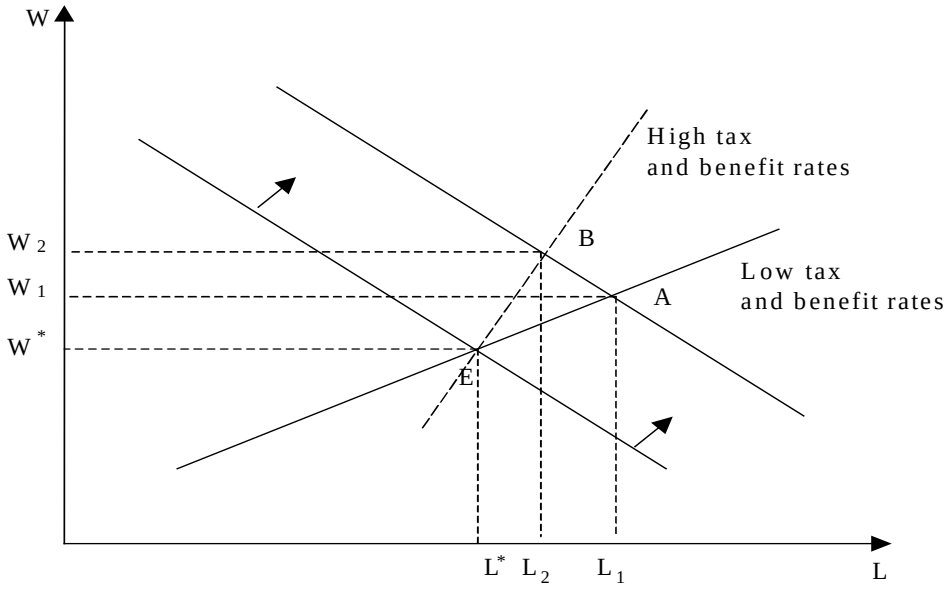
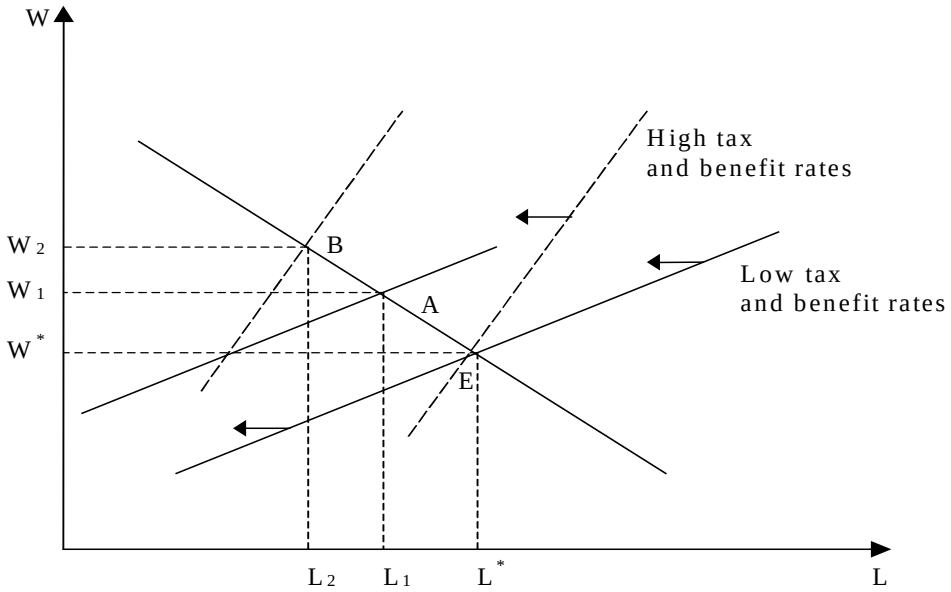


Figure 2

The Impact of Taxation on Wage Formation: Labour Supply Shock



in which ρ = *(df/dL)(L/f(L))* is the elasticity of the real wage with respect to (cyclical variations in) employment.

Next, we define the average and marginal rates of the distortive tax and benefits as, respectively, $t = \frac{T}{w}$ and $t' = \frac{\Delta T}{\Delta w}$, $g = \frac{G}{w}$, $g' = \frac{\Delta G}{\Delta w}$. These are all positive, except for the marginal benefit rate *g'* which is negative due to means testing.

By replacing *t* and *t'* in (2) and defining the tax elasticity with respect to wage earnings ξ_t as the ratio between the marginal and average tax rate and ξ_g as the ratio between the marginal and average benefit rate, after some manipulations, we obtain:

$$\dot{w} = \frac{(1-\gamma(t-g))}{[1-\gamma(\xi_t t - \xi_g g)]}\rho\dot{L} \tag{3}$$

Equation (3) can be easily transformed into an output supply function of the Lucas-Phillips type. In order to do so, we assume the nominal rate of change of the producer wage to be equal the expected rate of inflation (π^e) plus the rate of change of the real producer wage and that wages are fully passed into prices (*i.e.* $\pi = \dot{w} + \pi^e$). We assume the *ex ante* tax and benefit rates *t* and *g* to be the same (*i.e.* in equilibrium taxes are just sufficient to finance benefit expenditure, hence $t = g$). This is consistent also with the fiscal rule in EMU that the budget should be balanced over the cycle.[4] Finally, we assume that output supply is proportional to labour input. Under those assumptions the output supply function becomes:

$$y = (1-\gamma\xi t)\omega(\pi - \pi^e) \tag{4}$$

where ω and $\xi = \xi_t - \xi_g$ are constant, positive parameters.

Hence, if there is some degree of wage resistance (*i.e.* γ is positive), the reaction of output to an inflation surprise is smaller the larger the value of *t*. In other words, in countries with bigger governments and higher taxes, a value of inflation larger (smaller) than expected will lead to a smaller (larger) reaction of output, which corresponds to a steeper supply function in the output-inflation space. The intuition for this result is clear. Take the case of a positive inflation surprise: as employers demand more labour to increase production, they will have to pay higher wages to cover not only for the higher prices but also on account of the fact that the real production wage moves up; this tends to limit the rise in production.[5]

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[4] We assume furthermore that the tax and benefit system is neutral with respect to capital and labour, *i.e.* exactly the same average and marginal rates apply to capital income and, for that matter, total value added.

[5] For this to hold true it must be assumed that governments fail to provide an offsetting tax break to moderate wage demands, *i.e.* do not pursue an incomes policy. But this is consistent with the basic assumption of our analysis: governments solely and fully rely on automatic stabilisers, hence do not modify the tax and spending parameters in response to cyclical fluctuations in economic activity.

A progressive tax system (that is $\xi_t > 1$) accentuates this effect, although it is not a necessary condition for it to occur.[6] At first sight this contradicts the standard finding in union-wage models that progressive taxation moderates wage claims because it reduces the loss associated with a fall in wage income per worker without affecting the gain in wage income associated with increased employment. However, these models are based exclusively on the behaviour of unions, look only at taxation as opposed to the tax and benefit system and ignore the impact of taxation and benefits on search efforts, consumption-leisure trade-offs and efficiency wages. Taking these mechanisms into account may be shown to change the sign of the impact of a progressive tax and benefit system on wage claims from negative to positive (Naess-Schmidt, 2003).

2. Taxation and stabilisation in a simple macroeconomic model

We now consider a version of the standard AD-AS model of a country belonging to a monetary union which is closed *vis-à-vis* the rest of the world.[7] The IS aggregate demand and Lucas-Phillips supply curves for the home country are written as:

$$y^d = \phi_1 d - \phi_2 \left(i - \pi^e\right) - \phi_3 \pi - \phi_4 y + \varepsilon^d \tag{5}$$

$$y^s = (1 - \gamma\xi t)\omega\left(\pi - \pi^e\right) + \varepsilon^s \tag{6}$$

where y is output, d is the budget deficit, π is inflation ('^{e}' reads 'expected'), i is the nominal interest rate and t is the tax rate. y, d and t are expressed in terms of potential (baseline) output. ε^d and ε^s represent, respectively, uncorrelated temporary demand and supply shocks of zero mean. All the variables are percentage points deviations with respect to the baseline. ϕ_1, ϕ_2,ϕ_3 are ϕ_4 are non-negative parameters.

Equation (5) assumes that fluctuations in aggregate demand depend on (changes in) the budget deficit, the real interest rate, competitiveness, absorption and a shock. Equation (6) is equivalent to equation (4) with an exogenous shock term added.

Aggregate demand and supply equations are complemented with the policy rules followed by the fiscal and monetary authorities. The central bank aims at stabilising inflation and output of the currency area as a whole. We posit a simple Taylor rule of the form:

$$i = \lambda(\alpha\pi + \beta y) \tag{7}$$

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[6] A sufficient condition is that $\xi > 0$, hence $\xi_t > \xi_g$, *i.e.* the tax an benefit system as a whole is redistributive.

[7] The more explicit microfoundations of the supply curve and the focus on a single country within a monetary union are the main changes compared to the model in Buti *et al.* (2003a).

where λ captures the weight of the domestic country in the currency area, and α and β are the preferences of the monetary authority over inflation and output, respectively. For a conservative central banker, we have $\alpha>\beta$. We assume that the monetary authority sets interest rates so as to maintain inflation on a fixed target in the "medium run", which, in this simple setting, means in absence of shocks. Since shocks – regardless of whether they are symmetric or country-specific – are serially uncorrelated with zero average, this implies $\pi^e = 0$.

For the fiscal authority, we assume that, in line with the Stability and Growth Pact, the government pursues a neutral discretionary policy, which implies that it sets a target for the structural budget balance and let automatic stabilisers play symmetrically over the cycle.[8] The deviation of the actual budget balance from the baseline (the latter being structural balance in absence of shocks) is approximated by:

$$d = -(\xi_t - 1)ty + (\xi_g - 1)gy = -\xi ty \tag{8}$$

We capture the size of automatic stabilisers via the interaction of the elasticity ξ and the parameter *t*, with the latter in equilibrium assumed to be equal to the government expenditure ratio *g*.

Equating (1) and (2), after substitution of equations (7) and (8) in (5) and (6), the whole system can be solved for *y* and π:

$$y = \frac{(1-\gamma\xi t)\omega\varepsilon^d + (\phi_2\lambda\alpha + \phi_3)\varepsilon^s}{(1-\gamma\xi t)(1+\phi_1\xi t + \phi_2\lambda\beta + \phi_4)\omega + \phi_2\lambda\alpha + \phi_3} \tag{9}$$

$$\pi = \frac{\varepsilon^d - (1+\phi_1\xi t + \phi_2\lambda\beta + \phi_4)\varepsilon^s}{(1-\gamma\xi t)(1+\phi_1\xi t + \phi_2\lambda\beta + \phi_4)\omega + \phi_2\lambda\alpha + \phi_3} \tag{10}$$

We turn now to the analysis of shocks. We are interested in analysing the effects on the degree of stabilisation in the event of shocks for different tax burdens *t* (or the elasticity ξ since the two terms enter in the expression as a product, the effect on the response to shocks is the same).

The standard model which neglects the effect of taxes and benefits on supply predicts that automatic stabilisers stabilise output and inflation in the event of demand shocks and stabilise output, but destabilise inflation under supply shocks (Blanchard, 2000, Brunila, Buti and in't Veld, 2002, and European Commission, 2001). In this standard model, automatic stabilisers operate only on the demand side. Higher stabilisers imply a lower effect of inflation on demand. In the output-inflation space, the aggregate demand schedule is steeper and displays smaller shifts in the event of shocks. The basic difference in our model is that, as

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[8] This is the definition of a well behaved" fiscal authority, according to Alesina *et al.* (2001). For more sophisticated reaction functions of fiscal authorities in EMU, see Buti, Roeger and in't Veld (2001) and Buti and Giudice (2002).

Figure 3

The Effects of a Positive Demand Shock under Alternative Tax Rates

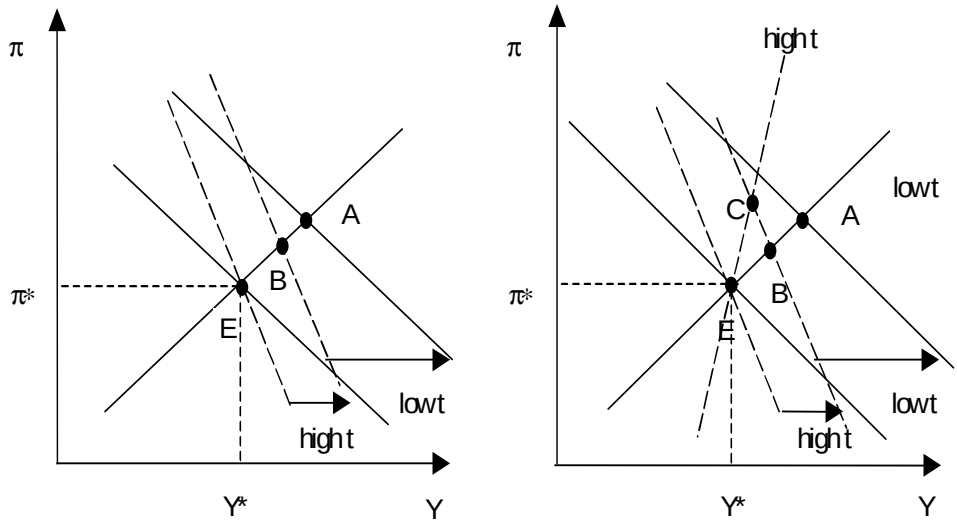
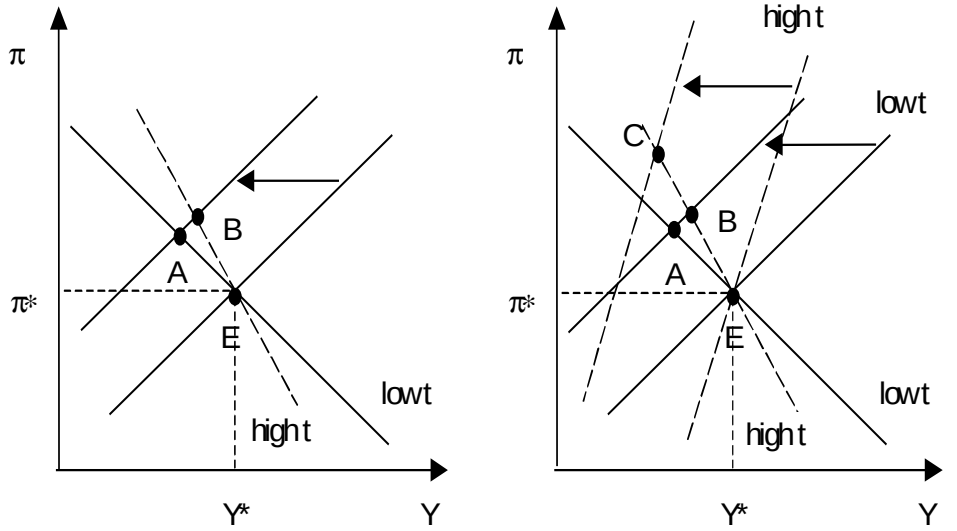


Figure 4

The Effects of a Negative Supply Shock under Alternative Tax Rates



stressed earlier, automatic stabilisers operate not only on the demand side, but also on the supply side: higher stabilisers – which means a higher level of taxes – make the supply schedule steeper.

The left panel of Figure 3 pictures the case of a positive demand shock under a "low" and "high" tax rate (or a low and high budget elasticity) according to the standard model. The slope of the demand curve is higher (in absolute terms) with a high tax rate than with a low one. The reason is that the higher the tax rate, the stronger will be the cushioning effect of automatic stabilisers on demand after an economy has been hit by rise in inflation. A rise in inflation will lead to a fall in demand on various accounts, most prominently a weakening in international competitiveness, a decline in real disposable income and a tightening of monetary policy. Note that the latter effect, in an EMU context, is strongest in the largest economies whose weight in the central bank's reaction function is biggest. Automatic stabilisers provide an offset, and hence reduce the impact of inflation on demand and make the demand curve steeper.

The initial equilibrium, E, corresponds to target levels of output (Y^*) and inflation (π^*).[9] A positive demand shock induces a shift of the demand curve to the right.[10] The new equilibrium points when only the steeper demand curve is considered (left panel) are now at A with a low tax rate and at B with a high one. The new equilibrium level of output is closer to the optimal level with a high tax rate than with a low one. A similar picture emerges for inflation. Hence, in this case an increase in the tax rate is both output and inflation stabilising.

Taking into consideration the possibility of the supply curve becoming steeper as well, automatic stabilisation may become, however, inflation destabilising. From the second panel in Figure 3, one can notice that this will still lead to a closer output to its optimal level but to a higher inflation. Hence, in this case an increase in the tax rate risks becoming inflation destabilising beyond a certain point if the slope of the supply curve is more sensitive to the tax burden than the slope of the demand curve.

We turn now to the analysis of a supply shock. As shown in the left panel of Figure 4, an adverse supply shock induces a shift of the supply curve to the left. The new equilibrium point is now at A with a low tax burden and at B with a high tax rate. One can easily notice that the new equilibrium level of output is further away from the initial level with a low tax rate than with a high one. The reverse emerges for inflation. Hence, in this case an increase in the tax rate from a low value to a high one is output stabilising but inflation destabilising.

The increase of the tax rate may become, however, output destabilising if the supply curve also becomes steeper due to high taxation, as shown in the second

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[9] Notice that the initial equilibrium E is the same with low and high taxes only for reasons of expositional convenience because we want to focus on the slope of the curves trather than their position.

[10] Note that the horizontal shift is smaller for higher tax rates as the impact of the demand shock is muted by the automatic stabilisers.

panel of Figure 4. The new equilibrium point is now at C with a high tax burden. It is clear from the graph that the new equilibrium level of output is further away from the initial level with a high tax rate than with a low one. Inflation is always further away from its optimal level with a higher tax rate. Hence, in this case an increase in the tax rate from a low value to a high one is both output destabilising and inflation destabilising.

3. "Critical" levels of taxation

The previous analysis shows that the changes of taxation to become output-destabilising rise with the supply curve becoming steeper.[11] On the other hand, the output destabilising-effect diminishes as the demand curve become steeper. Since the slope of both curves depends on the tax rate, the threshold level for the tax rate beyond which further increase of taxation is destabilising for output in the event of a supply shock depends on the relative sensitivity of demand and supply to taxation. This, in turn, depends on the openness of the economy: the more open the economy, the lower will be the fiscal demand multiplier and therefore the steeper will be the supply curve relative to the demand curve for a given tax burden. Therefore, open economies are more likely to face adverse fiscal stabilisation properties in the face of a supply shock than relatively closed economies for a given level of taxation (and progressivity).[12]

It is also easy to show that always $\frac{\partial y}{\partial t} < 0$ for a positive demand shock ($\varepsilon^{d} > 0$) and $\frac{\partial \pi}{\partial t} > 0$ for an adverse supply shock ($\varepsilon^{s} < 0$). As was shown in the graphs in the previous section, this implies that a higher t (or ξ) unambiguously increases the stabilisation of output in the event of demand shocks and destabilises inflation in the event of a supply shock.

However, in the case of a response of output in the case of supply shocks or inflation in the case of demand shocks, the initial level of t matters. In line with the intuition, we show a higher t to entail stronger output stabilisation in the event of demand shocks while it is inflation-destabilising in the event of demand shocks. The crucial result concerns output-stabilisation in the event of a supply shock and inflation stabilisation in the case of a demand shock. In the traditional model in which taxes do not affect supply, higher taxes tend to stabilise both variables. In our model, instead, there exists a threshold level of taxation beyond which a further increase in taxes has perverse stabilisation effects.

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[11] In the extreme case where the supply curve becomes vertical the shock would not be smoothed at all and output would fall by the same extent of the supply shock.

[12] However, it should be recognised that, due to stronger competition, wage resistance is likely to be smaller in more open economies. In our analysis, we do not consider this interaction.

We consider two concepts of the threshold tax level: the "optimal" t, call it t^*, which maximises output and inflation stabilisation in the event of supply and demand shocks, respectively; and the "critical" t, call it t^{**}, which corresponds to the level of taxation resulting in zero fiscal stabilisation (*i.e.* the same level of stabilisation arising when $t=0$).

t^* is obtained by taking the derivative of the coefficient of ε_d in π or the coefficient of ε_s in y to t and equating the result to zero:

$$t^* = \frac{\phi_1 - (1 + \phi_2 \lambda\beta + \phi_4)\gamma}{2\phi_1\gamma\xi} \tag{11}$$

Hence, for $t>t^*$, a rise in t reduces the degree of output stabilisation in the event of supply shocks and inflation stabilisation in the event of demand shocks.

t^{**} is obtained by equating the coefficient of ε_d in π or the coefficient of ε_s in y to the same coefficient under $t=0$:

$$t^{**} = \frac{\phi_1 - (1 + \phi_2 \lambda\beta + \phi_4)\gamma}{\phi_1\gamma\xi} \tag{12}$$

So:

$$t^{**} = 2t^*$$

Some intuitively appealing conclusions can be drawn from this result.

First, it appears that there exists a trade-off between the redistributive thrust of the tax and benefit system (ξ) and the tax burden (t): the less redistributive taxes and benefits are, the higher will be the critical tax rate, and hence the wider is the range of tax rates whereby automatic stabilisers are effective.

Second, the same applies to the degree of wage resistance (γ): the higher it is the lower will be the optimal (and critical) tax rate, because the more the level and redistributive thrust of taxation and spending matter for wage formation and hence the bigger will be its impact through the supply channel.

Third, the threshold level of the tax rate above which automatic stabilisers become destabilising depends on the responsiveness of demand to the fiscal impulses stemming from the automatic stabilisers (ϕ_1). The weaker this responsiveness (e.g. because of Ricardian behaviour) the lower tax rate can be "afforded" without risking declining or perverse stabilisation properties.

Fourth, the threshold varies inversely with the weight of output stabilisation in the central bank's reaction function (β). A dovish central bank will choke off the output effect of automatic stabilisers and thus weaken their effectiveness. Interestingly, this implies that the incentives to reform the tax and welfare

system are lower under a hawkish central banker,[13] although incentives to reform the tax system on efficiency grounds would obviously be decisive.

Fifth, a greater openness of the economy (ϕ_4) reduces the threshold level of taxation. The reason is that the demand effects of automatic stabilisers leak out via foreign trade, implying that the negative supply effects predominate more quickly, i.e. even at a lower level of taxation. This is analytically similar to the third point above, but may be usefully highlighted separately. This is so because while trade leakage is related to the openness of the economy, policy transmission may be weak even in a closed economy. Open economies in the EMU are thus facing stronger incentives to reform their tax systems than the relatively closed ones.

4. How large are *t** and *t***? Some numerical simulations

The typical tax burden in EMU countries is in the range of 40 to 50 per cent of GDP. Is this exceeding the optimal level and would a reduction in the fiscal size thus work out favourably for stabilisation? Is it empirically possible or even likely that the tax burden exceeds the critical tax burden?

While a fully-fledged analysis is well beyond the scope of this paper we can nonetheless provide some tentative indication of the possible values of *t** and *t***. It goes without saying that our computations are purely illustrative and that one should refrain from drawing policy conclusions from the simple comparison of the estimated *t** and *t*** with the actual tax burden in euro-area economies. Nevertheless, these estimates are helpful in exemplifying our reasoning.

In Table 1 we report the chosen baseline values of the coefficients. With regard to the demand equation we assumed that $\phi_1 = 1$ *and* $\phi_2 = \phi_3 = \phi_4 = ½$, which is broadly in line with the short-run elasticities reported in ready-reckoners of the OECD's INTERLINK model (Dalsgaard *et al.*, 2001). The budget elasticity – encompassing both spending and revenue – is set at $\xi = 1¼$ based on van den Noord (2000). We assume a hawkish banker, i.e. $\alpha = 1½$ and $\beta = 0$, with the country's weight in the monetary policy reaction function set at $\lambda = ¼$. Concerning the supply equation we assumed that $\omega = 3$, which corresponds to the mid range of estimates of the price elasticity of aggregate supply reported in Clarida *et al.* (1998).[14] To gauge the degree of wage resistance we proceeded somewhat differently. Rather than making a prior assumption for γ we fixed the incidence of labour taxation on profits at one half, *i.e.* $\gamma.\xi = ½$. This implies that $\gamma = 0.4$. This is consistent with the evidence

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[13] From a different perspective, this result is consistent with the view of those who see an expansionary monetary policy going hand in hand with structural reforms. See, e.g., Bean (1998) and Saint-Paul (2002).

[14] Note, however, that the value of ω, as well as those of ϕ_3 *and* α, has no impact the *t** and *t***. Even though they do affect the degree of fiscal stabilisation across levels of *t*, they are irrelevant for *t** which is obtained via the solution of the optimisation problem set out above.

Table 1

Baseline Parameters

$\phi_1 = 1$	$\xi = 1.25$
$\phi_2 = 0.5$	$\omega = 3$
$\phi_3 = 0.5$	$\lambda = 0.25$
$\phi_4 = 0.5$	$\alpha = 1.5$
$\gamma = 0.4$	$\beta = 0$

of Alesina and Perotti (1997) which estimate a coefficient of 0.4 for countries in continental Europe in the relation between labour taxes and unit labour costs in manufacturing in a sample of annual data from 14 OECD countries.

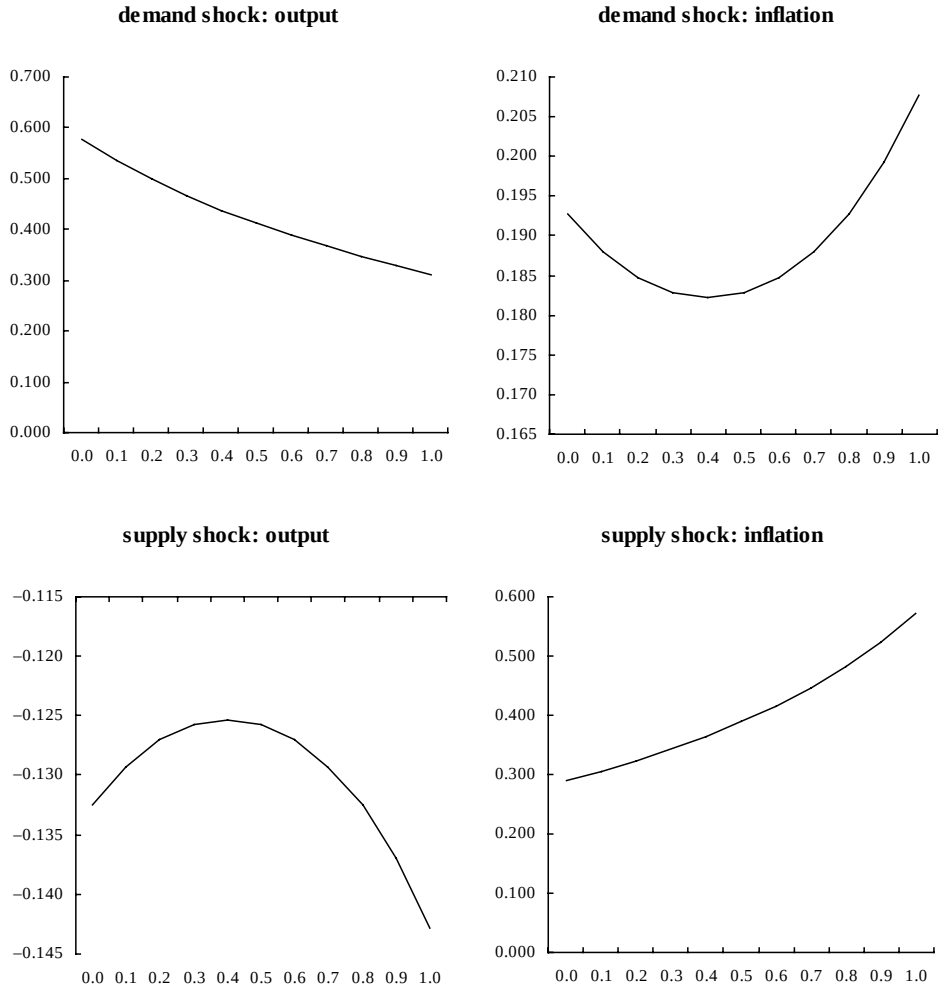
On the basis of these assumptions we find that $t^* = 0.4$ and $t^{**} = 0.8$, which suggests that for countries in the upper end of the range the tax burden would be sub-optimal, but well below the critical level (see Figure 5). This implies that a country with an initial tax burden of 50 per cent who would cut it by 10 percentage points realises a slight improvement in the output stabilisation properties after an adverse supply shock. The same holds true for the impact on prices after a positive demand shock.

However, these results may be expected to be rather sensitive to the numerical assumptions and hence, if this proves true, the structural features of the economies in EMU. This is confirmed by sensitivity analysis. As shown in Table 2, a reduction in the budget elasticity from 1¼ to 1 raises the value of t^* to ½ and t^{**} to 1. In other words, a tax burden equal to one half of GDP may still be optimal from a stabilisation point of view if the tax and benefit system is proportional. By contrast, a greater openness of the economy (ϕ_4 =¾), a less effective fiscal policy (ϕ_1 = ¾) and greater wage resistance (γ = ½) all push t^* into a range of 0.2 to 0.3 and t^{**} into a range of 0.4 to 0.6. Under those conditions slashing the size of government would pay substantially in terms of the gains in fiscal stabilisation properties that would be realised.

From Table 2 can be inferred that a similar scope for reductions in the size of government results if the central banker turned dovish to an extent where it gives a positive weight to output and inflation in its policy reaction function (β is set equal to 1). This effect is even more pronounced for larger countries who have a bigger weight in the reaction function (for example λ = ½). Interestingly, this result runs

Figure 5

Baseline Simulation



Note: the horizontal axes indicate the tax burden (t) and the vertical axes the impact of a shock (normalised at unity) on the output gap or inflation.

somewhat counter to the general perception that a hawkish central banker would be more successful in raising incentives for structural reform than a dovish one.

Our results are broadly in line with recent empirical investigations which have found evidence of a non linear relationship between the size of the government and macroeconomic stability.

Table 2

Sensitivity Analysis

	t^*	t^{**}
Base line	0.4	0.8
$\xi = 1$	0.5	1
$\beta = 1$	0.35	0.7
$\phi_4 = 0.75$	0.3	0.6
$\phi_1 = 0.75$	0.2	0.4
$\gamma = 0.5$	0.2	0.4
$\beta = 1, \lambda = 0.5$	0.3	0.6

Martinez-Mongay and Sekkat (2003) test whether the structure of the tax system affects the impact of tax changes on output volatility. In a sample of 25 OECD countries over the period 1960-99, they find that the composition of tax and expenditure, in particular the tax mix, matters for output and price volatility: distorting taxes, namely taxes on labour and capital, tend to have negative effects on macroeconomic stability. Cuaresma, Reitschuler and Silgoner (2003) find that the smoothing effect of fiscal stabilisers may revert at high levels. In a panel of 14 EU countries over the period 1970-99 the stabilising effect changes sign at a level of government expenditure of about 38 per cent of GDP. According to their results, for a country displaying a public expenditure ratio around the median value of the distribution (40.6 per cent of GDP), an increase in spending by 1 per cent of GDP will raise the standard deviation of output growth by 0.02 points. The destabilising effect is higher (0.04 per cent) for a country with an expenditure ratio of 44.1 per cent. However, this study is not entirely comparable to ours as it focuses solely on government spending and does not distinguish between automatic stabilisers and discretionary policy reactions.

5. Conclusions

Conventional AD-AS models imply that high and progressive tax systems are efficiency-decreasing but enhance output stabilisation in the event of shocks.

Large and progressive tax systems lead to a lower budget deficit (contraction of fiscal policy) in good times, while the deficit would increase in recessions (fiscal expansion). Moreover, large and progressive tax systems usually go hand in hand with more generous systems of social protection. Although social benefit programmes mainly have an equity role, as well as potential efficiency effects when they correct market failures, most of them also act as automatic stabilisers. Unemployment benefits make up the clearest example, but more generally the relative robustness of expenditure programmes to cyclical fluctuations serves to smooth economic activity, and this smoothing effect is likely to increase with the size of government. However, since distorting taxes and benefits have a pervasive impact on potential growth, a trade-off between stabilisation and efficiency seems to arise within the standard AD-AS framework. If there is a positive relationship between the size of automatic stabilisers and distortive taxation, any tax reform aiming at lowering distortions and enhancing efficiency will come at the expense of macroeconomic stability.

This issue is at the heart of macroeconomic policy design in EMU. If, as suggested by the standard model, there were a trade off between stability and flexibility, EMU members – having given up national monetary independence – would not dispose of enough policy instruments to deal with idiosyncratic shocks.

However, this paper suggests that, in the event of supply shocks, such a trade-off might not exist. Within our model, under the assumption of at least partial wage resistance, cutting tax rates reduces market distortions and enhances the output stabilisation in the event of supply shocks and inflation stabilisation in the event of demand shocks. So, if our conclusions are right, unless there is a clear predominance of demand over supply shocks, one should not worry about the possible adverse effects on stabilisation of the tax reforms that across the EU are lowering marginal and average tax rates across the whole income scale (European Commission 2000*a* and *b*, 2001).

It goes without saying that the analysis in this paper is only a first step into the analysis of the relations between efficiency and flexibility, on the one hand, and cyclical stabilisation, on the other hand. Obvious improvements concern the theoretical model (which is overly simple and static in nature) and the description of the behaviour of policy makers. Moreover, the numerical simulations are only indicative and should be supplemented by more thorough econometric investigation.

An issue that arises naturally is the apparent contradiction between our conclusion that adverse stabilisation effects may arise at lower levels of taxation in smaller economies and the finding that small, open economies tend to have larger governments (see the seminal contribution by Rodrick, 1998 and, recently, Martinez-Mongay, 2002). Two explanations can be offered. First, whatever their

initial level, higher taxes are output-stabilising in the event of demand shocks. Hence, if output stabilisation is the main goal of fiscal authorities and demand shocks (are expected to) prevail, larger governments would ensue. However, EMU may bring a change in the composition of shocks by increasing the relative frequency of supply compared to demand shocks.[15] If so, large automatic stabilisers may no longer be optimal. Second, to the extent the tax burden remains below the critical tax burden, a rise in it is stabilising, although increasingly less so. This, coupled with a higher exposure to shocks, may imply larger governments in small open economies. Econometric analyses based on past data may capture this effect. However, in recent years, the actual tax burden may have reached or even exceeded the critical one. Fresh empirical evidence tend to lend support to our results.

Our analysis indicates that tax reforms aiming at lowering marginal effective tax rates and the tax burden, under supply shocks, may enhance the stabilisation properties of automatic stabilisers, especially in small euro area economies. Hence they face a lesser dilemma between structural reform and stabilisation policy. This may contribute to explain their greater reform efforts and better performance compared with the big "laggards". However, if EMU brings about greater trade integration, the incentives to step up reform efforts would increase also in the large euro area countries.

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[15] Buti, Pench and Sestito (1999) argue that EMU's macroeconomic framework could lead to less policy-induced demand shocks while the increase in market competition brought about by the euro could entail more supply-related shocks.

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TAX REFORMS AND FISCAL STABILISATION IN ITALY

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Introduction

The goals and responsibilities of European fiscal policy underwent a number of significant changes in the course of the Nineties. In particular, the introduction of the single monetary policy on 1st January 1999, has resulted in a clear division of labour between monetary and fiscal policies. Monetary policy, being conducted at a supranational level, was assigned to dealing with shocks that are common to the whole euro area. Idiosyncratic shocks, by contrast, are to be tackled by national fiscal policies, which have thus become the sole instrument available for country-specific cyclical stabilisation measures.

The stabilisation features of fiscal policy depend on a number of factors, the most relevant ones being: the government size; the degrees of progressivity of taxes; the sensitivity of the tax bases with respect to the business cycle.

The tax reforms enacted in a number of European countries in the last few years are likely to have had a significant impact on all of those factors, and hence on the degree of automatic stabilisation of the government budget. One may think, for instance, of the Italian tax reform of 1998, that partially shifted the financing burden from relative stable revenues (state tax on health contributions) to more cyclical ones (regional tax on business activities).

The policy debate has not paid much attention to these issues, as the discussion has tended to focus instead on the implications of those tax reforms for overall economic efficiency, and on their effects on income distribution and government deficit financing.

By contrast with the prevailing focus in the existing literature, this paper investigates the relationship between recent tax reforms and the stabilisation properties of fiscal policy in Italy. To do so, we develop and use an econometric-model-based approach that, in a nutshell, relies on quantifying the (unconditional) variance of output fluctuations associated with different tax structures.

To anticipate the main empirical result, recent tax reforms in Italy are found to have had only a modest impact on the stabilisation properties of fiscal policy.

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The paper is organised in five sections. Section 1 briefly surveys the existing literature on automatic fiscal stabilisation. Section 2 describes the approach for the appraisal of the stabilisation properties of tax structures adopted in this paper. Section 3 illustrates the main features of the model used in the empirical application. Section 4 describes the main results and performs a number of sensitivity exercises. Section 5 concludes. The effects of recent changes in the Italian personal income tax structure on the sensitivity of tax revenue to cyclical fluctuations are appraised in the Appendix, using micro data collected in the Banca d'Italia Survey on Household Income and Wealth.

1. A review of the literature

The empirical literature on automatic fiscal stabilisers has flourished since the Maastricht Treaty came into force and the Stability and Growth Pact was adopted. Most of the studies find that output fluctuations are significantly reduced when automatic stabilisers are allowed to operate freely.[1] However, the measurement of the capacity of automatic stabilisers to smooth cyclical fluctuations is not uncontroversial. The results vary depending also on the techniques employed in evaluating the impact of the automatic stabilisers and on the shocks considered.

The approaches that have been proposed so far in the literature can be grouped into four main categories: macroeconometric model simulations; simulation of simple AD-AS models; vector autoregressions; analysis of microdata.

Macroeconometric model simulations take a (possibly very) large number of interrelations among economic variables into account. Differences in the empirical results that may be found in the literature depend on both the characteristics of the models and the sources of the shocks.[2] In many cases only demand shocks are taken into account determining results biased towards larger stabilisation effects, since automatic stabilisers work through disposable income. Sometimes the limited number of deterministic simulations run in the exercises also enhances the bias. The main result of this stream of the literature is that automatic stabilisers are expected to do their job in case of demand shocks (especially on private consumption) but not in case of supply shocks.

In Meyermans (2002) the model of the Belgian Federal Planning Bureau (NIME) is used to appraise the effects of a temporary real demand shock (a drop in private consumption), a permanent monetary shock (an increase in nominal money

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1 See, among others, OECD (1993), Barrell and Sefton (1997); Buti and Sapir (1998); Auerbach and Feenberg (2000); Barrell and Pina (2000); van den Noord (2000).

2 Brunila *et al*. (2002) compares the results obtained by INTERLINK model of the OECD (van den Noord, 2000) and by NiGEM of the NIESR (Barrell and Pina, 2000). Van den Noord finds, on average, a smoothing effect of automatic stabilisers between 20 and 30 per cent for the euro area, as opposed to Barrell and Pina, who measure an effect of 11 per cent using NiGEM. Differences in the results depend on the fact that simulations with NiGEM focus not only on demand disturbances but also on other sources of uncertainty, which reduce the effectiveness of the automatic stabiliser.

supply) and a permanent supply shock (a decline in trend productivity). In the first two cases, characterised by the absence of permanent real effects from the shocks, the impact on output is smaller if automatic stabilisers are allowed to work freely. On the contrary, in case of real permanent shocks additional discretionary measures are required to reduce the impact on output. In Barrell and Pina (2002) similar results are drawn using NiGEM. The role of automatic stabilisers is discussed for an economy subject to both demand and supply shocks, assuming financial markets are forward looking and monetary policy makers are reactive. Automatic stabilisation is assessed identifying the revenue and expenditure items that are dependent on the cycle and quantifying their dependence by constant elasticities with respect to the output gap. The stabilising effect is evaluated comparing the outcomes of two policy regimes: one where taxes and unemployment benefits are determined according to the elasticities and another where these items are set to their structural trajectory levels. No fiscal feedback mechanism operates to stabilise the economy. In Brunila *et al.* (2002) the European Commission quarterly model (QUEST) is used to simulate demand shocks (to private consumption, private investment and export demand) and supply shocks (labour productivity). Tax revenues have unitary elasticity with respect to their tax bases so that their sensitivity to output fluctuations reflects the sensitivity of the tax base to output shocks. The conclusion is that in case of supply side shocks automatic stabiliser are largely ineffective and the reduction of the impact on output calls for structural adjustments. In van den Noord (2000) the INTERLINK model was used to conclude that automatic stabilisers may raise long-term economic performance and avoid frequent changes in spending or tax rates. However, they should be employed symmetrically over the cycle in order to avoid costly debt accumulation. Using FRB/US model Cohen and Follette (2000) show that demand shocks have small effects on GDP multiplier and supply shocks have no effects whatsoever.

AD-AS model has been used recently in Buti *et al.* (2002) to show that there might be a critical level of the tax burden beyond which a reduction in taxation may render fiscal automatic stabilisers more effective depending on the nature of the economic shock. The conclusion draws on the evidence that lower taxation improves the short-run inflation/unemployment trade-off, *i.e.* it makes the Phillips curve flatter, by reducing the wedge between the marginal cost of labour and the marginal take-home pay. Buti and van den Noord (2003) go beyond this result by introducing a distinction between, on one side, the "optimal" tax burden at which, in case of supply shocks, automatic stabilisers are most powerful and beyond which favourable stabilisation properties decline, and, on the other, a "critical" tax burden beyond which these properties become perverse (destabilising effects on output in case of a supply shock and on inflation in case of supply and demand shocks).

Recently, vector autoregression techniques have been used to estimate short-term and long-term fiscal multipliers. The sign of these multipliers are generally in line with Keynesian theory but sometimes their size is much smaller, signalling that sizeable fiscal expansion may produce modest impact on economic activity. Examples of this body of literature are Blanchard and Perotti (1999), Perotti (2000), Fatás and Mihov (2001), Perotti (2002). The last paper evaluates the effects

of fiscal policy on GDP and its components, on price level and on short-term interest rate for five countries. The main conclusions are that the size of estimated effects is small and that they have become weaker in the last twenty years.

Results based on microdata analysis have been presented, among others, in Auerbach and Feenberg (2000) and Kniesner and Ziliak (2002). In the first paper the authors computed individual tax elasticities simulating a model based on a file of actual tax returns (NBER TAXSIM model). They find that in USA automatic stabilisers through income and payroll taxes together would offset about 8 per cent of any initial shock to GDP. Kniesner and Ziliak (2002), using the Panel Study of Income Dynamics, argue that across the eighties the progressivity of income tax has stabilised household consumption by 15 per cent in response to a given reduction in gross income.

Another source of differences among the results of the existing studies arises from the methods that can be used to measure the sensitivity of budget items to the cycle. In particular, there are four different approaches.

In the first one, elasticities are estimated running regressions of tax proceeds and public expenditure on discretionary changes in tax and benefit parameters, a trend and a cyclical term (Bismut, 1995). This approach requires a big effort to collect detailed information on policy changes over the years and makes international comparisons very difficult.

In the second approach, tax and expenditure elasticities are directly derived from macroeconometric model estimations.

The third approach is used, among others, in van den Noord (2000). It requires three steps. In the first one the elasticities of tax bases and unemployment with respect to economic activity are computed by means of regression analysis. In the second step, the elasticities of tax proceeds and transfers to the relevant bases are either extracted from the tax code or set to other meaningful values. In the last step the two elasticities are combined in "reduced-form elasticities" that link the cyclical components of taxes and expenditure to the output gap.

The last approach consists of dividing the budget items in three components: a trend, a cyclical and an irregular component, the latter capturing the dynamics not explained by the first two. The parameters associated to each component are estimated by maximum likelihood methods (Cuaresma *et al.*, 2002).

2. The approach: stochastic-simulation-based appraisal of the unconditional variance of target variables

As described in the previous section, an approach often adopted to investigate the stabilising properties of fiscal mechanisms consists of appraising the effects on the economy of a variety of shocks over a fixed time horizon. This is the case, for instance, of Brunila *et al.* (2002) and Barrell and Pina (2002). Usually, only the reactions to a limited number of shocks are computed over a relatively short time

horizon. The results delivered by this approach tend to indicate that the performance of automatic stabilisers crucially depends on the nature of the shocks: automatic stabilisers are by and large effective in the wake of demand shocks, while they are not desirable if shocks are prevalently supply-side ones.

Notwithstanding the useful and sharp insights that such simple approach has provided, it has at least three relevant limitations.

First, the state of the economy hardly ever corresponds, at any given point in time, to equilibrium. By contrast, this is the implicit assumption formulated in the works mentioned above, where only the effects of single-period shocks are investigated. Rather, the state of the economy reflects the cumulated effects of all current and lagged shocks that have hit the economy since the (infinite) past.

Second, the effects of different shocks are usually examined in isolation from one another. This raises the following practical issue: suppose, as indeed is often the case, that one finds that supply and demand shocks are found to have rather different (and in fact, as it turns out, opposite) implications regarding the optimal degree of automatic stabilisation. To draw any firm conclusion, one needs to know the relative size of the various shocks as well as their covariances.

Third, basing one's conclusions on a limited number of multipliers for the first so many periods may be dangerous. It may indeed well be the case that policy mechanisms that appear to perform best if one's assessment is based on their short-to-medium run effects only turn out to be relatively under-performing if their very long-run effects are also taken into account. It may even be the case that marginally unstable eigenvalues (and hence explosive paths) cannot be detected on the basis of the first few multipliers, whereas such instabilities are obviously of the utmost relevance. A more suitable approach should thus simultaneously take the whole infinite sequence of multipliers into account.

A possible way to overcome those three limitations consists of casting the problem of assessing the stabilisation properties of different fiscal schemes in a framework similar to the one routinely used to appraise the performance of competing monetary policy rules. A large body of literature has been developed that selects the optimal monetary policy reaction function on the basis of the unconditional variance of the variables of interest associated with all competing rules.

More formally, suppose that the following model of the economy is to be used to appraise the performance of a number of competing policy rules:

$$y = C_1 y_{-1} + C_2 x_{-1} + e \ , \qquad e \sim (0, \Xi)$$

where the vector y includes all model variables (in deviation from their respective equilibrium values), x is the policy instrument (e.g., the policy-controlled interest rate), e is a vector of disturbances, all the rest are parameters.

Suppose next that one is interested in appraising the performance of simple feedback rules of the form:

$$x = \gamma\, y$$

on the basis of a (pre-defined) welfare loss function, whose arguments may be both endogenous variables and the instrument (typically, its volatility over time). In the context of the optimal monetary policy rule literature, if y only includes current inflation and the output gap, then the rule above belongs to the popular Taylor-type family, first introduced in Taylor (1993). A number of variants to the basic output-dependent feedback rule above have been proposed in the literature, including lagged-information dependent and forward-looking rules.[3]

The system above may be written more compactly in state-space form as follows:

$$\underline{z} = Az_{-1} + v \ , \qquad v \sim (0, \Sigma)$$

where: $z' = (y', x')$ $\qquad v' = \begin{pmatrix} I & 0 \\ -\gamma & 1 \end{pmatrix}^{-1} (e', 0) = B(e', 0)$

$$A = B\begin{pmatrix} C_1 & C_2 \\ 0 & 0 \end{pmatrix} \qquad \Sigma = \begin{pmatrix} B\Xi B' & 0 \\ 0 & 0 \end{pmatrix}$$

The policy-maker is typically assumed to be interested in minimising the fluctuations of a limited set of variables of interest around their respective equilibrium value over the infinite future. Under certain conditions, the period loss function will be a function of the elements of the unconditional variance-covariance matrix Ω of the variables z,[4] which can be computed by solving the following expression:

$$\Omega = A\Omega A' + \Sigma$$

This expression may be solved either by vectorisation or, more efficiently, by means of some iterative algorithms. It is clearly a pre-requisite for the expression above to be computable that all the eigenvalues of the matrix A be smaller than 1 in absolute value; in other terms, an optimal rule must satisfy the basic requirement that it eliminates all explosive roots of the matrix C_2, if any. The (period) loss

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[3] For a general overview, see the papers collected in Taylor (1999).

[4] See, e.g., Rudebusch and Svensson (1999).

function associated with various rules may then be easily computed by weighting and combining the elements of Ω.

In this paper we propose to suitably adapt the scheme sketchily described above for the purpose of investigating the stabilising properties of different fiscal mechanisms. It should be emphasised that we by no means set ourselves the (arguably overly ambitious) target of defining the fiscal policy-maker's objective function and thus compute the corresponding optimal fiscal policy rule. Rather, our much more limited goal is that of using that framework to compute, for different fiscal mechanisms, the resulting volatility of various macroeconomic variables.

With a small linear model, the approach sketchily outlined above may be used as is; this is done in Momigliano *et al.* (2003), where a small model of the euro area is used for the purpose of appraising the performance of fiscal stabilisers. As in virtually all the literature on optimal monetary policy rules, the model is linear and specified in terms of deviations from equilibrium.

By contrast, the Banca d'Italia's quarterly model of the Italian economy (BIQM) – which our analysis is based on – is of medium-to-large size and nonlinear. Moreover, it is not specified in terms of deviations from equilibrium. Given these features of the model, the standard approach described above cannot be applied as is.

The solution adopted to deal with the unwieldy size of the original BIQM consists of using a reduced-scale version of it (so-called *maquette*); a brief description of the *maquette* and of the way it relates to the original model is given in the next section.

As to nonlinearity, two alternative routes seem feasible. First, one could compute a linearisation of the *maquette* around its steady-state growth path. This approach, however, is demanding and some of the sources of model nonlinearities that would be ignored as a result of linearizing the model could well be of relevance. As a second alternative, one may retain the nonlinear model as is, and compute the variance-covariance matrix of the endogenous variables by means of (suitably long) stochastic simulations around an equilibrium growth path. This is the option adopted here. The practical aspects relating to the implementation of this approach are described in Section 4.1.

3. The tool: a modified version of the Banca d'Italia's Quarterly Model

3.1 A brief description of the Banca d'Italia's Quarterly Model of the Italian economy

The BIQM is a medium-to-large scale model, comprising, in its standard version (*i.e.*, in the version usually employed for forecasting and policy analysis purposes), over 900 endogenous variables. The standard version of the BIQM provides a fair deal of detail on government budget items and their interaction with the rest of the economy.

The current version of the BIQM shares many of the characteristics of the previous one, released in 1986.[5] Its long-term properties are consistent with a neoclassical model postulating exogenous growth, in which full employment of factors is accompanied by a constant rate of inflation, hence constant relative prices. The levels of output and of the employment of capital and labour are consistent with the parameters of the aggregate production function and with relative factor costs. The steady-state growth path of the model, stemming from technical progress and the accumulation of real and financial wealth, interacts with the dynamics of the adjustment process to determine short-term characteristics. The short-term adjustment processes that are super-imposed to the exogenous growth skeleton essentially reflect three factors: the stickiness of prices and wages, which prevents their instantaneous adaptation to the situation of full resource utilisation; the non-malleability of installed physical capital, which limits the short-term modifiability of the relative composition of productive factors; and the possibility that expectations and outcomes may not coincide. In the short run, therefore, given these rigidities, the characteristics of the model fit the Keynesian framework in which the level of output is determined by aggregate demand, in a situation of oversupply in both the goods and the labour market.[6]

The aim of providing a detailed description of the most relevant institutional features of the Italian economy and the need to produce reliable projections on a variety of aspects of the economy have resulted in the model being of relatively large size, which makes it rather unfit for our purposes in this paper. The solution we adopted is presented in the following section.

3.2 The core version of the BIQM

Due to the maze of feedback relationships that are typically at work in a medium-to-large size model, it is often impossible to identify the key causal links among the model variables; hence, the theoretical underpinnings of the model structure cannot be easily grasped. A solution to these drawbacks that has been proposed in the literature consists of building a reduced scale (or core) version of an original model, that retains the latter's basic properties while at the same time being more transparent as to the model's theoretical framework.[7]

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5 See Banca d'Italia (1986) for a full documentation of the previous version.

6 For a more detailed description of the main properties of the standard model, see, in addition to Banca d'Italia (1986), Galli *et al.* (1989). A discussion of the latest versions of some of the main equations is in Siviero and Terlizzese (1997); an up-to-date description of the main equations in the supply block of the model can be found in Parigi and Siviero (2001) and in Altissimo and Siviero (2002), where extensive simulation experiments are also presented. It is worthwhile noting that the coexistence of a neoclassical macroeconomic equilibrium framework with Keynesian short-to-medium-term adjustment processes – which, as described in the text, is one of the foremost properties of the BIQM – is a feature shared by most existing macroeconometric models (see, e.g., Church *et al*., 2000).

7 See, e.g., Deleau *et al.* (1988) and Masson (1998) for two different approaches.

A core version of the BIQM (also called *maquette*) was originally built by Terlizzese (1994); a more recent version of the *maquette* is presented in Locarno (2002). As shown in those papers, the *maquette* mimics the most relevant features of the parent model. However, its structure is much more transparent than that of the BIQM. Moreover, it is far easier to use. Thus, a number of exercises that cannot be carried out with the original model are relatively simple to perform with its core version. Most notably for our viewpoint, the equilibrium steady-state growth path of the *maquette* may be computed in a comparatively easy way.

Given these features, the reduced-scale version of the BIQM appears to be the ideal candidate tool for our purposes: once the *maquette*'s steady-state growth path is computed, one may examine the stabilising features of various fiscal mechanisms by investigating the extent to which they succeed, or otherwise, in limiting the oscillations of various macroeconomic variables around their respective steady-state equilibrium values, in the wake of a variety of shocks.

While a full description of the *maquette* is beyond the purpose of this paper, it may be useful to discuss briefly the strategy underlying its construction and to discuss its main features.[8]

The key characteristic of the *maquette* is that it was built with the explicit goal of reproducing the main properties of the original BIQM. Given that goal, the following building strategy was adopted: (1) pseudo-data were generated by means of stochastic simulations of (selected blocks of) the BIQM; (2) those pseudo-data underwent a double process of aggregation: (i) as the degree of sector aggregation of the *maquette* is much higher than that of the BIQM (e.g., the latter separately describes the demand for a relatively large number of investment goods, while only one investment good is considered in the former), the BIQM-consistent pseudo-data were aggregated according to the chosen degree of detail of the *maquette*. As a result, the version of the *maquette* used in this paper comprises about 100 endogenous variables, thus being in scale 1:10 (approximately) with respect to the original model; (ii) the choice was made to use annual, rather than quarterly, data, so as to simplify the lag structure of the *maquette*; (3) the aggregate data were used to estimate the structural relationships of the reduced-scale model. Thus, the *maquette* tends to mimic the BIQM by construction, as indeed suggested by evidence presented in Terlizzese (1994) and Locarno (2002).

Notwithstanding the general principle that the *maquette* should reproduce the features of the BIQM, a few differences exist between the two models. Most importantly from our viewpoint, while the relationships of the original model are not always homogeneous of degree 1 (most often because of the need to match some institutional features), all such non-homogeneities were eliminated in the process of building the *maquette*, so that the latter's equilibrium may be computed. By contrast, all violations of dynamic (or super) non-homogeneities that can be found in the BIQM were retained in the *maquette* as well, as they appear to be a key feature of

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[8] For more details see Locarno (2002).

the data (the corresponding parameter restrictions are always sharply rejected). This implies that the equilibrium of the *maquette* is not independent of the growth rate assumed for the exogenous driving variables.

The concept of long-run equilibrium that best applies to the BIQM, and hence to the *maquette*, is that of a steady-state growth path. Along such a dynamic equilibrium, all variables grow at a constant rate. Hence, all intensive variables are constant. In other words, the ratios between variables that are characterised by similar equilibrium dynamics are independent of the point in time in which they are computed. This implies that the steady-state of the *maquette* is driven solely by the following three growth factors: (i) rate of growth of technical process; (ii) rate of growth of population; (iii) rate of growth of prices. The steady-state growth rates of all exogenous and endogenous variables are thus given by different combinations of those three basic growth rates.

Since the equilibrium dynamics of all model variables is known a priori, the easiest way to compute its steady-state equilibrium is to write a static version of the original *maquette*, replacing all dynamic terms by an appropriate function of the three basic growth rates listed above.[9] Simulating the resulting model for just one period delivers a set of steady-state starting values that are also a solution of the original dynamic *maquette* and ensure that the latter does not depart from equilibrium if the system is not hit by any shocks.

Turning now to more practical issues pertaining to the computation of the steady-state equilibrium, it remains to be specified what was assumed regarding the starting values of the exogenous variables and the dynamic-equilibrium-driving exogenous growth rates.

Since the *maquette* could have multiple steady-state solutions, the choice of the initial conditions for the exogenous variables is most important. In general, the choice was made to fix those starting values at their respective averages in the recent past (usually, the second half of the Nineties).

As to the three basic growth rates, the following values were assumed:

(i) rate of growth of technical process = 2 per cent;

(ii) rate of growth of population = 0.2 per cent;

(iii) rate of growth of prices = 2 per cent.

These are the values underlying the benchmark experiment discussed below. An analysis of the sensitivity of the results with respect to the choice of the steady-state growth path will be presented in the Section 4.3.

The steady-state solution of the *maquette* resulting from the assumptions listed above is presented, for a few key intensive variables, in Table 1, along with the corresponding historical averages in the 5 years from 1997 to 2001. On the whole, the computed steady-state growth path seems to be plausible: first, all

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[9] For a detailed description see Siviero (1995) and Locarno (2002).

Table 1

Steady-State and Historical Values for Some Key Intensive Variables

	SSGP	Average 1997-2001
Private consumption/GDP	0.63	0.60
Investment/GDP	0.20	0.20
(Exports-Imports)/GDP	0.02	0.02
Fixed capital/GDP	3.34	3.16
Public deficit/nominal GDP	0.02	0.02
Current accounts/nominal GDP	0.00	0.01
Private sector labour share	0.62	0.61

intensive variables assume sensible values; second, a number of comparative statics exercises documented in Locarno (2002) indicate that if the exogenous assumptions on which the steady-state hinges are modified, then the steady-state solution changes in a way consistent with what theory predicts, with a few limited exceptions due to violations of dynamic homogeneity constraints.

Finally, Locarno (2002) points out that the steady-state solution of the model, while easily computable, is not dynamically stable. If the system is hit by shocks, it drifts away from the steady-state growth path and eventually becomes explosive, unless the *maquette* is supplemented with stabilising policy rules. Locarno (2002) further finds that a Taylor rule is per se not enough to guarantee stability, and that a fiscal rule is also needed. In the next two sections we discuss how those rules were specified in the *maquette* used in this paper.

3.3 Added maquette *features: monetary policy reaction function*

For the purpose of performing the experiments presented below, the *maquette* was supplemented with a simple monetary policy reaction function, similar to the one originally proposed in Taylor (1993).[10] Thus, the policy-controlled interest rate

[10] Various authors have proposed variants to Taylor's original formulation. On the one hand, it has been shown that Taylor's formulation may be seen as an optimal monetary policy reaction function within an inflation targeting strategy (see, e.g., Rudebusch and Svensson, 1999); in this context, it is usually found

(continues)

only reacts to departures of the current inflation rate and output gap from their respective targets. In addition, we allow for the possibility that the lagged value of the instrument is also taken into account in setting monetary policy, inducing a smoother dynamics of the short-term interest rate. Thus, the monetary policy reaction function inserted in the *maquette* was the following:

$$i_t = \gamma_0 + \gamma_1 \cdot (1-\gamma_3) \cdot (\pi_t - \pi_t^*) + \gamma_2 \cdot (1-\gamma_3) \cdot gap_t + \gamma_3 \cdot i_{t-1}$$

where i_t is the short-term (policy-controlled) interest rate, π_t and π_t^* are, respectively, current and target inflation (changes in annual consumption deflator) and gap_t is the output gap. In the benchmark experiments below, the following parameter values were assumed: $\gamma_1 = 2$; $\gamma_2 = 2$; $\gamma_3 = 0.5$. γ_0 must be set consistently with the assumed exogenous growth rate of prices.[11] Section 4 also reports a number of sensitivity experiments with respect to these parameters.

Inserting a Taylor rule in the *maquette* poses one further problem. The policy interest rate is no longer controlled by the national central bank, but by the Governing Council of the ECB, whose decisions are taken on the basis of the economic conditions of the euro area as a whole. Thus, the inflation and the output gap terms in the expression above should refer to the euro area, rather than to Italy only. However, the *maquette* does not include a description of the former. In order to partially tackle this problem, the following expedient was adopted: we computed the (historical) variance of the difference between the Italian and the euro area average inflation rates, and similarly for the output gap, and supplemented the *maquette* with two additional equations:[12]

$$\begin{aligned} \pi_t^{Euro} &= \pi_t^{Italy} + \varepsilon_\pi \\ gap_t^{Euro} &= gap_t^{Italy} + \varepsilon_{gap} \end{aligned} \tag{1}$$

Of course, those two equations are not to be interpreted as determining the euro area inflation and output gap: rather, they are meant to mimic the fact that,

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that the optimal reactions to both the inflation rate and the output gap are likely to be considerably larger than the values postulated in Taylor (1993). On the other hand, several authors have tried to enrich the original framework in several ways: for instance, in some works current inflation has been replaced by future expected inflation (which, in turn, has raised the issue of the optimal degree of forward-lookingness of the monetary policy authority: on this point see, e.g., Batini and Haldane, 1999). Forward-looking behaviour is obviously justified by the considerable lags with which changes in the policy-controlled instrument affect the economy: see, on this issue, the recent results reported by van Els *et al.* (2001), as well as earlier evidence in BIS, 1995); furthermore, in a number of papers the interest rate has been allowed to react smoothly to the changes in inflation and in the output gap.

[11] The chosen Taylor rule parameters are higher than in Taylor's (1993) original formulation of the rule, but are close to the optimal ones that are typically found in the literature.

[12] Note that, given the single currency, for the steady-state to exist it must be assumed that, in equilibrium, the average error in equation (1) be zero, which is not the case in history.

while on average appropriate, the single monetary policy may, at any given point in time, differ from what would be best from a strictly Italian perspective.

By modifying the variances of ε_π and ε_{gap}, one can assess how they impact on the optimal result, which is done in Section 4.3 below.

3.4 Added maquette *features: modelling of the public sector*

The public sector in the original *maquette* is modelled in a very sketchy way. Government contributes to aggregate demand through public consumption and investment, raises revenue and issues debt to finance expenditure. Public debt is included in the private sector's financial wealth; net public transfers are included in disposable income.

Given that the focus of this paper is on the stabilising features of the fiscal mechanisms, it was deemed appropriate to amend the original public sector block of the *maquette*. In the latter, the following expenditure side items are modelled separately: government consumption (*GC*), compensation of employees (*W*), investment (*GI*) and interest payments (*INT*). On the revenue side, in order to adequately capture the effects of indirect taxes (*IT*) on prices, *IT* is modelled with a finer degree of detail: for each component of the aggregate demand an implicit tax rate was considered, under the assumption that all indirect taxes are ad valorem. As for the rest of current tax revenue, net direct taxes (*NDT*) – the sum of direct taxes and social security contributions net of public transfers to households and firms – are endogenised assuming a proportional relationship between net revenue and a base, represented by GDP plus the real return on financial assets. A variable, indicated as "other net expenditure" (*OtherNExp*), collects the residual items of the general Government account. The general government deficit is thus given by the following expression:

$$DEF = INT + GC + GI + W - IT - IDN + OtherNExp$$

The modified version of the *maquette* used in this paper makes use of a further decomposition of *NDT*. In order to capture the features that one needs to describe if the stabilisation properties of taxes are to be appraised, we distinguish between the following main components: direct taxes (*DT*), social security contributions (*SSC*), transfers to households (*Tr_H*) and transfer to firms (*Tr_F*). These are endogenised separately in the model. The *OtherNExp* has been modified accordingly. Government deficit now reads as:

$$DEF = INT + GC + GI + W + \mathbf{TR\_F} + \mathbf{TR\_H} - IT - \mathbf{DT} - \mathbf{SSC} + OtherNExp$$

In what follows we focus on the changes to the *maquette* (the bold variables in the deficit expression above). Some of these changes, in particular those concerning direct taxes, are immediately relevant to the assessment of the stabilising

effects of the model; others are only indirectly so, and have been introduced mainly in light of future developments of the work presented here.

The expenditure items we disentangled from the previous *NDT* expression are current government transfers to firms and to households. Both items are endogenised to nominal GDP. Transfers to households are mainly represented by social protection expenditure. A relevant fraction is covered by pensions, which we need to single out as part of the personal income tax (*PIT*) base.

Social security contributions paid by employers and employees are modelled separately as functions of gross of tax wages. Following the BIQM, we use implicit rates in the case of employers and a statutory rate in the case of employees. The implicit rates are computed on the basis of total labour cost and gross of tax wages. Moreover, a distinction is kept between public and private sector employers.

The most relevant amendments to the *maquette* obviously concerned direct taxes. In order to isolate the stabilising effect of direct taxes, we modelled with greater detail personal income tax (*PIT*), corporate tax (*CT*) and other direct taxes on households (*OtherDT*), which include withholdings on interest income and capital gains.

As far as the *PIT* is concerned, we distinguished between withholding taxes on labour income of dependent workers and self-assessed payments on other sources of income (independent labour income, unincorporated business income, etc.). The main reason relies on differences in the tax collection systems that influence the income elasticities of the tax.[13]

The general structure of the *PIT* and *CT* equations is similar. Tax revenue is modelled by applying an elasticity to the relevant tax base (gross of tax wages and pensions for dependent workers and pensioners, gross operating surplus of households for *PIT* on other incomes and gross operating surplus of firms for *CT*). The elasticities (η) have been estimated to be historically around 1.2-1.3 for *PIT* on dependent workers, 1.06 for *PIT* on other incomes and 1.07 for *CT*, over a period of nineteen years. They give a summary measure of the more complex tax structure underlying *PIT* and *CT*.[14]

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[13] Dependent labour incomes are subject to monthly withholdings; therefore, the collected receipts respond almost instantaneously to changes in the tax base. On the other hand, taxes on the other sources of income are collected through self-assessed payments (an account paid in two instalments and a settlement payment). The amount of the payment due on account is a fraction of the previous year tax liability, but it can also be computed as a fraction of the same year liability in case this is expected to decrease. The settlement payment is due in June of the following year. Note that the account payment reacts asymmetrically to changes in the year tax base: it does not fully adjust to the change when income increases or statutory tax rates are raised, while it can be reduced when income decreases or statutory tax rates are lowered.

[14] As far as the *CT* is concerned, the elasticity in this specification entails stabilising effects other than those induced by a progressive structure of the tax rates. In particular, it captures the responsiveness of profits to GDP, which is often expected to be higher than that of other GDP components. However, by allowing some carry-over of losses (4 years ahead, in the Italian case), the tax scheme tends to reduce the overall response of *CT* to the economic cycle (one issue for possible future work is to embed into the equation

(continues)

Clearly, elasticities different from 1 cannot in principle be tolerated, as a steady-state equilibrium only exists if all variables in the model grow at constant rates. Taxes increasing more than their tax bases would generate an explosive path for revenues. Therefore, an appropriate device is needed to reconcile values of the elasticities that may be greater than 1 at some point in time with the underlying unity elasticities in steady-state.

One way to solve the problem is to compute tax burden as the product of the relevant tax base and an implicit average tax rate, multiplied by an expression that modifies the elasticity along the cycle. The changes in the elasticity must ensure that when the system is in steady state equilibrium, the implicit tax rate coincides with the effective average tax rate (meaning that when the cycle is neutral the elasticity of tax revenues with respect to the corresponding tax bases must be unitary).

By doing so, it is implicitly assumed that in the long run the dynamics of tax revenues is corrected by some discretionary measures to avoid an indefinite increase in the tax burden due to the operating of the fiscal drag.[15] This is modelled in the *maquette* by introducing a fiscal rule that calls for continuous automatic corrections over the economic cycle, rather than for discrete corrections, as it happens in reality. In particular, in the case of the Italian system,[16] while corrections to re-absorb nominal fiscal drag have been often carried out explicitly (even by automatic rules in the late Eighties), real fiscal drag has been amended *de facto* by periodic adjustments in the tax schemes or by tax reforms.

We thus model direct taxes as follows:

$$T = \eta' \, \tau_0 \, Y$$

$$\tau_1 = T / Y$$

where τ_0 is the steady-state-consistent tax rate, Y is the tax base, T is the tax revenue, η' is the elasticity of taxes with respect to income, and τ_1 is the effective tax rate, which differs from τ_0 if the economy is outside the steady-state growth path. As to η', a basic requirement is that it has to be modelled in such a way that it be 1 all along the steady-state, where it must be $\tau_1 = \tau_0$.

The behaviour of the tax elasticity along the cycle is described by a bounded function of an indicator of the cyclical position of the economy, given by the distance between the effective rate of unemployment and the *NAIRU*. The function must be chosen in such a way that:

(i) $\eta' = 1$ when unemployment is at the *NAIRU*;

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some mechanism for losses carry-over, using data from tax returns). Finally, income elasticity ends up collapsing also the changes occurred in income distribution, which is modelled in the *maquette* in a very simplified way.

15 This is something that is periodically done in the actual tax systems.

16 On the evolution of the Italian tax system see Ceriani *et al* (1990).

(ii) η' tends to η as unemployment drifts increasingly away from the *NAIRU* from above,

(iii) η' falls as unemployment is below the *NAIRU*; specifically, we require η' to tend to $2-\eta$ as the cyclical situation worsens.

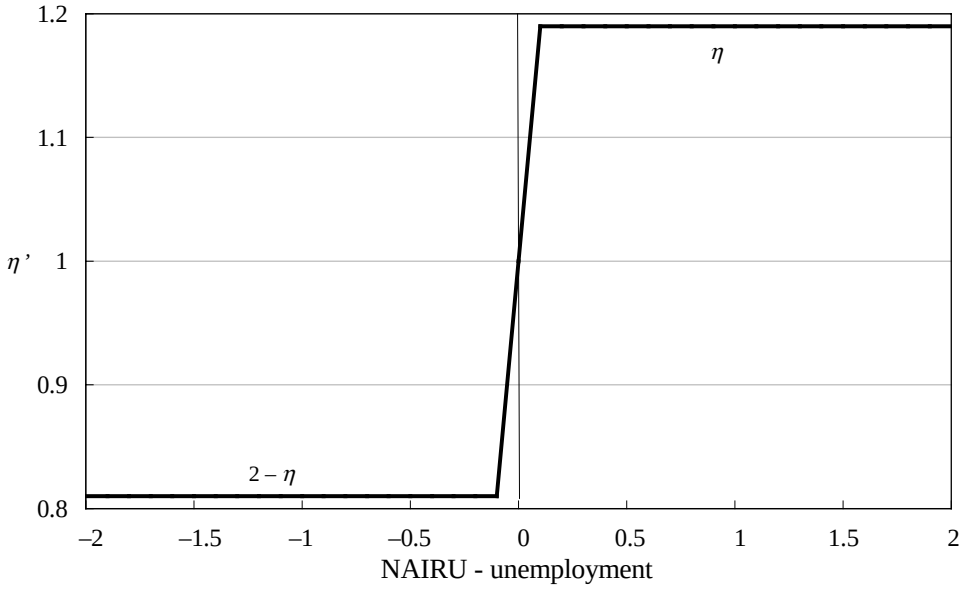
A function that conveniently allows for all these conditions is the following:

$$\eta' = A\left[\frac{\exp[\alpha+\beta(NAIRU-unemployment\ rate)]}{1+\exp[\alpha+\beta(NAIRU-unemployment\ rate)]}-B\right]$$

where the parameters *A*, *B* and α are to be set consistently with the choice of η and with the constraint that η' = 1 when unemployment is equal to *NAIRU*. The parameter β measures the sensitivity of the elasticity with respect to cyclical positions, *i.e.* the discretionary correction enacted to amend the fiscal drag effect; the higher β, the faster η' approaches η when the cycle is positive ("above" the steady-state), and analogously for negative cycles. Therefore, the higher β, the prompter the policy response. The function η' underlying the benchmark results presented below is shown in Figure 1, for η being approximately 1.2, and for the discrepancy between unemployment and the *NAIRU* ranging from –2 to 2 per cent; as shown by the figure, the tax elasticity quickly approaches the theoretical η as the economy moves away from equilibrium.

Figure 1

Tax Elasticity Along the Cycle



This methodology applies to each of the main components of *PIT* and to *CT*. Through calibration of the relevant parameters it is thus possible to mimic different dynamics of the elasticities.

Other direct taxes on households are endogenised as a function of the gross operating surplus of the households. Since they are not modelled through elasticities like the other direct taxes components, they do not contribute to the stabilisation capacity of the tax system. The same is true for the social security contributions, which interact only in so far as they influence the PIT base.

4. The results

4.1 The experimental design

As described in Section 2, the approach adopted here to appraise the stabilising properties of different tax schemes consists of comparing, for a number of variables of interest, the unconditional variance of the oscillations around the equilibrium steady-state growth path that result if the model is simulated under various fiscal mechanisms.

Given the non-linearity of the BIQM *maquette*, the unconditional variance-covariance matrix cannot be computed analytically and thus needs to be estimated by means of (long-horizon) simulations.

The operational design underlying the basic experiment is the following:

(1) compute the deterministic steady-state growth path of the *maquette*;

(2) for each value of the tax elasticity parameter within the feasible range, extract 200 antithetic replications[17] for each of the 24 error components[18] of the model, using their historical joint distribution. Each replication comprises 400 realisations of the disturbances;

(3) simulate the model, for each replication of the residuals, over a 400 period timespan;

(4) compute the variance-covariance matrix of the variables of interest, using the average of the variance-covariance matrix computed, period by period, on the basis of all replications, using only the last 200 simulated values for each replication. The first 200 results are discarded because the simulations start from an initial equilibrium situation; it may thus take a while before the

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[17] Antithetic replications are well known to be relatively effective in concentrating the mean outcome of stochastic simulations. See Calzolari (1979).

[18] We consider 24 possible sources of errors, belonging to the following three categories: (i) behavioural equations of the *maquette*; (ii) error terms referring to the less-than-perfect synchronicity between Italy's inflation and cyclical position and those of the area; (iii) the main 7 exogenous variables of the model (including, among others, foreign prices and world demand). For the latter, the disturbances are computed on the basis of the distribution of the residuals of a regression of the logarithm of the variables on a linear trend. For the time being, autocorrelation of residuals has been neglected; a way to deal with autocorrelated residuals is discussed in Siviero (1995).

variance of outcomes provides a reliable estimate of the corresponding unconditional value. It was found that the variance of outcomes is indeed stable (so that it may legitimately be interpreted as a good proxy of the unconditional variance) if the last 200 results are used.

4.2 Stabilisation properties of different tax structures

Figure 2 reports the main results for the benchmark experiment (β = 300; Taylor rule parameters set as specified above). The figure was obtained by letting the maximum elasticity of withholding tax on labour (η) vary between 1.18 and 1.85 (on the x-axis in the chart);[19] for each value in a grid in that interval, the procedure described in the previous section was applied to compute the corresponding value of the variance of the output gap, which is depicted on the y-axis (as a ratio with respect to its minimum value).

Figure 2 shows that the variance of the output gap has a minimum for $\eta = 1.27$; for values of the elasticity that lie to the right of the minimising one, the variance increases gently, remaining relatively flat for at least some interval (for instance, for η = 1.55, the variance is still less than 5 per cent higher than the minimum one). By contrast, as the maximum elasticity of withholding taxes is made to decline, the variability of the output gap around its equilibrium value increases very sharply (for η = 1.23, the variance of output is about 10 per cent higher than at its minimum, and increases very rapidly as one moves further to the left, being 30 per cent higher than at its minimum for η = 1.18).[20]

It would be premature to identify, on the basis of this evidence, the value of the tax elasticity that delivers the smallest variability around the equilibrium. However, a first interesting conclusion seems to emerge: the risks implied by "too high" a value of the maximum elasticity of taxes with respect to cyclical conditions are relatively limited, at least in a rather wide range, while, by contrast, "too low" values of the elasticity may quickly result in a sharp loss of stabilising properties of the tax system.

During the last decade, in most countries tax reforms moved towards a flattening of tax schedules and a widening of the tax bases, as the main focus was on removing the distortions induced by taxation. This is sometimes seen also as one cause of loss in the stabilisation properties of the tax systems. The results above suggest that the trade-off between efficiency and stabilisation might not prove to be relevant, depending on the starting point, *i.e.* on the initial elasticity of the tax system. Indeed, it may well be the case that a tax structure is characterised by a "too high" elasticity, setting the system outside the variances-minimising interval. In this

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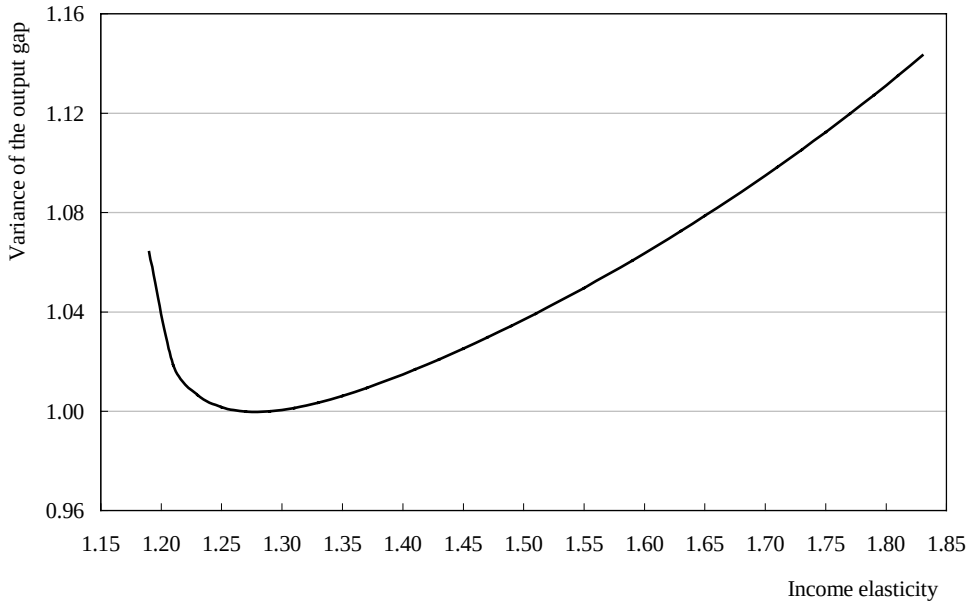
[19] In this experiment it was assumed that the elasticity of self-assessed payments related to personal and corporate income taxes move in accordance with the elasticity of the withholding taxes on labour income.

[20] The picture would be basically the same, at least qualitatively, if the variance of the rate of growth of output or that of unemployment were considered.

Figure 2

The Output Gap Variance Curve(1)



(1) Horizontal axis: income elasticities of the withholding tax on dependent labour income; vertical axis: ratio of the output gap variance to its minimum value.

case a reduction in the progressivity may result both in an improvement of the stabilising properties and in an efficiency gain.

How does the actual estimated elasticity fit into this picture?

The *PIT* elasticity estimated for the entire period 1981-1998 is slightly below the value that minimises the variance of the output gap, and, given the speed of adjustment of the elasticity along the cycle (β), it is actually rather close to the area in which instability increases significantly.

Since the end of the Nineties, however the Italian tax system has been subject to two major reforms. The first was enacted in 1998 and revised the *PIT* scheme, while the second is still underway. Both may have changed the value of the income elasticity, but it is not easy to predict how this may have affected the macro elasticity of the *maquette*. Some indications about the direction of the changes may be drawn from other sources of data. In particular, using data collected in the Banca d'Italia Survey of Household Income and Wealth (BISHIW), simulations have been carried out to assess the effects of the tax structures in force in single years, inside

and outside the period 1981-1998 (see the Appendix). Simulation results were than used to compute an aggregate elasticity of *PIT* from the population sample, to be compared with the one resulting from the macro model.[21]

This analysis suggests that the aggregated micro income elasticity associated with the tax structures in force from 1998 onwards is higher than that of 1989,[22] which is a central year in the regression period used to estimate the macro elasticity but could be characterised by a below average elasticity compared to the overall period.[23] In particular, the micro elasticity increases in 1998 and decreases in 2001, also as a result of discretionary changes in the tax structure. It rises again in 2003 when the first step of the new reform came into force, implementing only the part of the measures enhancing *PIT* progressivity.

In light of these results, the macro elasticity may have grown in the last years, moving the Italian tax system towards the right-hand-side of Figure 1, in a direction for which the probability of having poorer stabilisation properties tends to be limited. Nothing can be obviously said, however, about the dimension of these changes or the specific position along the curve of the macro elasticity corresponding to the simulated micro one.

4.3 Sensitivity analyses

4.3.1 Effects of changing the sensitivity-to-cycle parameter

In the appraisal of the automatic stabilisation properties of the tax system a relevant role is played by the choice of the discretionary fiscal rule we super-imposed to the tax structure (synthesised by β). As a first sensitivity check, we therefore explored how the results are modified if the speed with which the actual elasticity adjusts decreases (for example, from $\beta = 300$ to $\beta = 250$). This amounts to assuming that small deviations from the cycle are less quickly followed by a change in the elasticity of taxes with respect to the tax base than it is the case in the benchmark experiment. As shown in Figure 3, the picture remains qualitatively unchanged. As expected, the value of the elasticity that minimises the variance of output is now somewhat higher than before (1.33), since more automatic stabilisation is needed when less discretionary stabilisation applies. The rest of the

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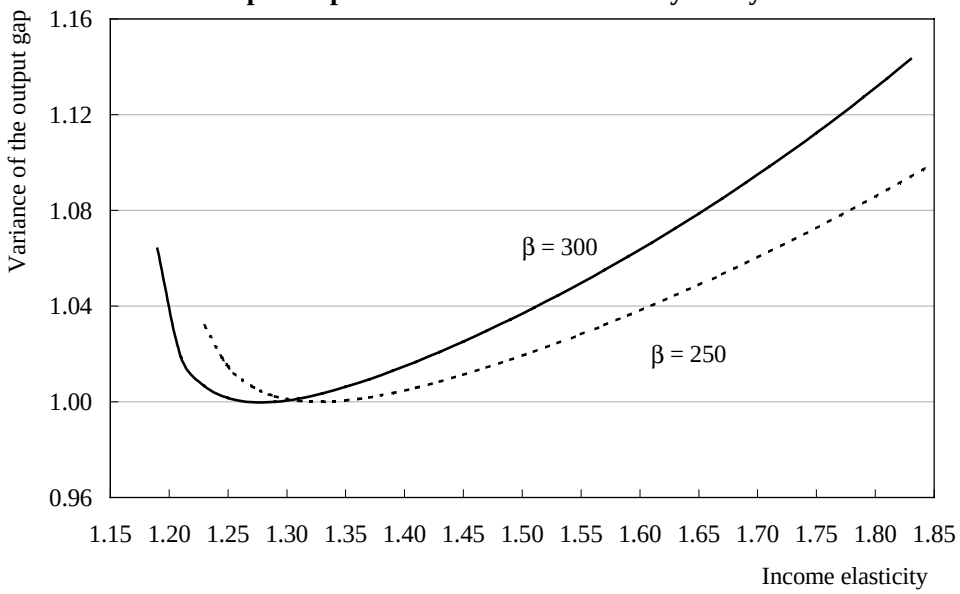
[21] The intention is to carry out future work to estimate a relationship between the two elasticities, in order to tie the results obtained from the application of tax structures in all their relevant details at the micro level with the aggregate elasticity describing the system over time in the macro model. This relationship would allow, in principle, to create a direct correspondence between any tax structure simulated using micro data (e.g. a tax reform proposal) and the elasticity used in the macro model to assess the stabilising effects. For the time being, however, the comparison can only be impressionistic and should be considered with care.

[22] In 1989 a revision of the tax structure was enacted in order to counterbalance the fiscal drag effects from previous years. As a consequence, the aggregate elasticity implicit in the micro data may be low relative to those characterising the years between 1981 and 1998; therefore, also in the macro data 1989 could be a below average year within the estimation period of the elasticity.

[23] The ending year of the microeconomic analysis is 2003. At present it is not possible to evaluate the stabilising effect of the reformed tax system envisaged by the recently approved enabling law.

Figure 3

The Output Gap Variance Curve: Sensitivity Analysis 1



remarks made earlier still apply here, so that the choice of β does not seem to affect our results in a significant way.

4.3.2 Effects of less-than-perfect syncronicity with the Euro area

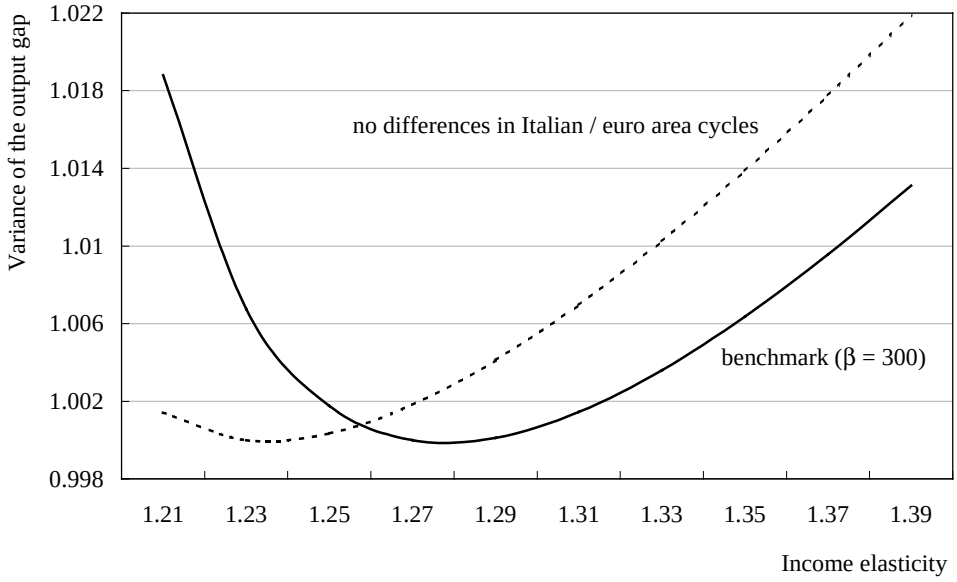
As described above, our experimental design is such that monetary policy reacts, in accordance with the single monetary policy established in 1999, to the euro area inflation and cyclical position, rather than to the corresponding Italian variables. Euro area variables are modelled in an admittedly crude way, as the assumption is made that the discrepancy between Italian inflation (output gap) and euro area inflation (output gap) is completely accounted for by a white noise disturbance. In other words, the assumption is implicitly made that there do not exist fundamental structural differences between the Italian and the euro area economies, but that accidental discrepancies do arise period after period.

How would our results regarding the optimal elasticity be modified, should those discrepancies become nil? Figure 4 provides an answer to this question: in the figure, the benchmark results are compared with those that we find when the difference between the Italian and the euro area inflation rates and output gaps is systematically set to zero.

The value of the tax elasticity that minimises output gap fluctuations is now somewhat lower than before (1.23, as opposed to 1.27 in the benchmark case). Such

Figure 4

The Output Gap Variance Curve: Sensitivity Analysis 2



result should be expected, as in this variant experiment monetary policy is made to react to domestic economic conditions only, and is not "disturbed" by the need of pursuing area-wide objectives. As a consequence, it is reasonable to expect that fiscal policy does not need to make as large an effort as in the benchmark case, where monetary policy was assumed to be set on the basis of area-wide developments.

4.3.3 Sensitivity with respect to monetary policy rule parameters

A number of experiments were also conducted to assess the impact on the benchmark results of changing the assumptions regarding the numerical values of the parameters in the Taylor-type monetary policy rule included in the BIQM for the sake of the experiments carried out here.

The results are as expected: if the reactivity of monetary policy with respect to the output gap (*i.e.*, with respect to the cyclical conditions) is lowered, then the optimum tax elasticity moves to the right (Figure 4). In other words, as monetary policy becomes less aggressive in countering output gap fluctuations, fiscal policy must somewhat "fill the gap", by becoming more sensitive to the cycle. Similarly, if the parameter of the lagged interest rate is raised, so that the current interest rate become more inertial (*i.e.*, it depends relatively more on past history and less on current conditions), then the optimum tax elasticity is higher than in the benchmark case.

4.3.4 Sensitivity with respect to the sources of stochastic disturbance

The literature on fiscal stabilisers has long emphasised that whether automatic stabilisation is desirable or not from the viewpoint of dampening cyclical fluctuations depends in a key way upon the nature of the shocks. In particular, it has been consistently found that automatic fiscal stabilisers tend to help keeping cyclical fluctuations under control if the shocks are prevalently demand ones, whereas they are less effective, or even counter-productive, if supply shocks prevail.

The same finding seem to emerge in our set-up. We separated all sources of stochastic disturbance in the *maquette* of the BIQM in two categories – supply-side disturbances and demand-side ones – adopting the standard criterion of classifying as demand shocks those shocks whose effects on prices and output have the same sign (being both positive, or both negative), and as supply shocks the disturbances that affect prices and output differently.

If only demand shocks are retained, the tax elasticity for which the output gap variance reaches a minimum moves considerably to the right with respect to the benchmark case (Figure 5). While in the latter the optimum tax elasticity is just below 1.3, here it becomes larger than 1.5. Thus, as in the rest of the literature, a high responsiveness of the budget balance, or of one of its components (as is the case here), to the cyclical position seems to be more desirable the larger is the role played by demand shocks in driving the fluctuations of the economy.

A further feature is worth noting in Figure 5: once supply shocks are set to zero, the variance of the output gap not only moves to the right, but also becomes considerably flatter. Indeed, the stabilising performance of the tax elasticity remains acceptable for a rather wide range of the latter. This seems to suggest that supply shocks are a key factor when it comes to establishing the exact numerical value of the optimum elasticity. In other words, these results indicate that when the shocks originate prevalently in the supply side of the economy it becomes comparatively more difficult to contrast cyclical fluctuations. The correlations between supply and demand shocks do not seem to play any significant role.

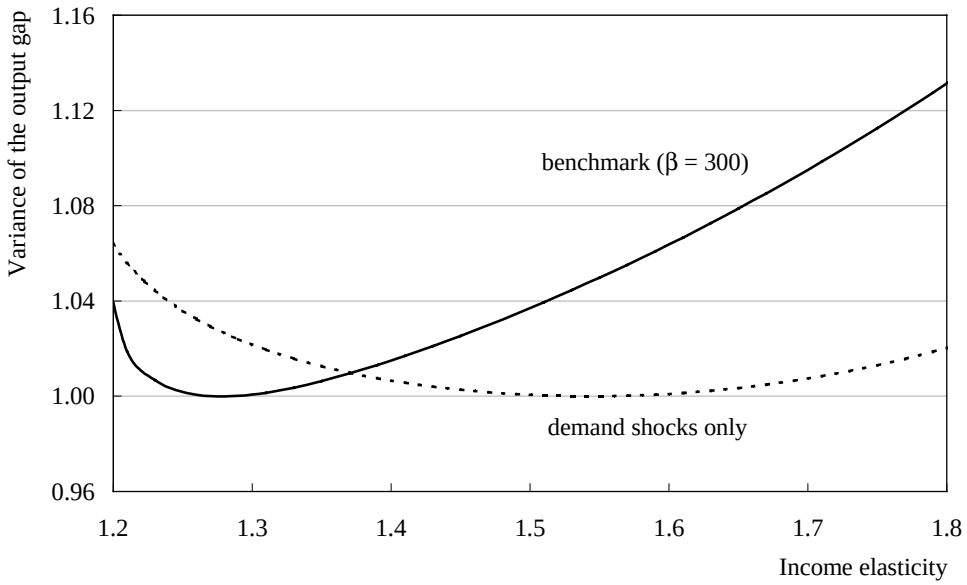
5. Conclusions

This paper proposes to assess the automatic stabilisation properties of different tax structures using a suitably adapted version of the approach routinely employed to select optimal monetary policy rules. In a nutshell, the approach relies on comparing the unconditional variances of the variables of interest associated with different values of the tax elasticity parameters.

An empirical application is presented that relies on a core version of the Banca d'Italia Quarterly Model of the Italian economy. The results suggest that, if one's goal is that of stabilising the output gap, then the elasticity of taxes with respect to cyclical fluctuations should be in the neighbourhood of 1.3. Sensitivity

Figure 5

The Output Gap Variance Curve: Sensitivity Analysis 3



exercises show this result to be rather robust with respect to changing a number of accessory assumptions.

The results also suggest that values of the tax elasticity parameters higher than the optimum one do not considerably worsen the stabilisation properties of the tax system, at least as long as those elasticities are not pushed "too far to the right". By contrast, a sharp loss of stabilising properties of the tax system quickly emerges if the elasticity lies below the optimum, even if only by a small amount. Recent reforms seem not to have significantly modified the stabilisation properties of the Italian tax system.

Our results are qualitatively consistent with those from other studies, despite non-trivial methodological differences between the latter's approaches and ours.

First, there may be no trade-off between output stabilisation and efficiency, provided that one starts from a tax system whose sensitivity to the cycle is sufficiently high. In particular, if the tax structure is characterised by "too high" a degree of cyclical elasticity (*i.e.*, the system is "to the right" of the output gap variance-minimising point), a reduction in the progressivity may result both in an improvement of the stabilising properties and in efficiency gains.

Second, a comparatively high degree of automatic fiscal stabilisation tends to do a good job in keeping cyclical fluctuations under control when demand shocks prevail, whereas the opposite applies in the case in which supply shocks prevail.

APPENDIX

A BRIEF OVERVIEW OF THE ITALIAN PERSONAL INCOME TAX STRUCTURE

One of the main factors determining the stabilising effects of fiscal policy is progressive taxation, through its elasticity to income and the tax bases sensitiveness to the cycle. The PIT is undoubtedly, for its own characteristics, the main instrument of automatic stabilisation.

The progressivity of the PIT is determined by the working of both tax rates and income brackets and the tax credits recognised to employees and self-employed and for dependent people. PIT has been deeply modified in the last fifteen years. Income brackets and legal tax rates have been reduced from seven to five between 1989 and 1998[24] and are planned to become two at latest in 2006, along the lines laid down in the recently approved enabling law establishing the guidelines for the reform of central government taxation.[25] The unification or enlargement of some income brackets, the increase in the lowest tax rate (from 10 to 23 per cent) and the decrease in the highest rate (from 51 to 45 per cent) determined a reduction of the tax progressivity, which was more than compensated by modification to tax credits intervened in the same period.

Tax credits for dependent spouse have been maintained constant in real terms from 1989 to 1995; since 1996 the amount has been diversified with respect to income and significantly increased for low-income classes. Also tax credits for dependent children and other dependent people have been raised, in particular from 1998. Tax credits for employees and self-employed became inversely related to income in 1993 and are in proportion much higher for low level of incomes.

In 2003 a first module of the mentioned tax reform has been implemented. Income brackets have been changed, as well as the first three tax rates. The transformation of tax credits into deductions from the tax base is under way. In particular, a new allowance has been introduced to ensure the progressivity of the tax schedule. It establishes a no-tax area, *i.e.* an income threshold below which no tax is due regardless of the nature of income (3,000 euro). The threshold is raised

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[24] Between 1989 and 1991 tax rates were left unchanged and the limit of the income brackets were increased on the basis of the inflation rate. After a one-percentage point increase of the rates of the five highest income brackets, the personal income tax structure was left unchanged up to 1998. For a more detailed description of the evolution of the personal income tax structure between 1989 and 2001, see Marino and Rapallini (2003).

[25] The reform aims at simplifying the tax system, increasing its neutrality and supporting the competitiveness of the economy. The new tax system will be based on five taxes: income tax, corporate income tax, VAT, tax on services and excise. The reform will radically change the structure of the *PIT*. The tax rates are to be reduced to two (23 per cent for incomes up to 100 thousand euro and 32 per cent above). The current tax credits are to be replaced by deductions from the tax base for tax-payers with incomes up to a certain ceiling. The structure of the deductions and their amount have not been specified yet.

depending on the source of income: to 4,500 euro for self-employed, to 7,000 for pensioners and to 7,500 for employees. Beyond these levels of income the allowance is inversely related to income and becomes zero for incomes higher than 30,000 euro (inclusive of tax credits and net of deductible items).[26]

Using data from the BISHIW conducted in 1998[27] it is possible to measure the income elasticity of the *PIT* on earnings from dependent labour simulating different tax structures.[28] This tool allows the measurement of income elasticity of the tax for different segments of the income distribution and for different sources of income.[29] Such information could than be used to compute an aggregate elasticity which is tied, through an appropriate relation still to be find, to the one estimated on tax proceeds and used in the macroeconometric model. In this way, it would be possible to evaluate the effects of proposed tax reforms on the income elasticity of the tax and consequently assess the stabilisation properties of the resulting new tax.

The analysis of the microdata aimed at investigating in which direction the Italian tax system is moving, *i.e.* towards higher or lower elasticities. The tax structures taken into consideration in this analysis are those in force in 1989, 1998, 2001 and 2003.[30] The exercises are conducted using the population recorded in the 1998 BISHIW and the gross income distribution consistent with the reported net income,[31] so that the results are unaffected by changes in demography and in the allocation of income. The different tax structures are applied to 1998 gross incomes after deflating or inflating the relevant parameters on the basis of the inflation dynamics between each year and 1998.

The comparison of the different tax regimes shows that after a slight reduction in the income elasticity of the tax in 2001 there was an increase in 2003, which brought the elasticity to a level above that registered in 1998 (Figure 6). However, behind these results there are much more complex considerations to make if the income distribution is taken into account.

The line representing the income elasticity of the tax resulting from the different structures per gross income deciles became flatter from 1998 to 2003. The tax elasticity in 2003 is always higher than that resulting from the structures in force in 1998 and 2001 except, respectively, for the second and for the second, eighth and ninth decile (Figure 7). In correspondence with the second decile, there has always

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[26] For a more detailed description of the first module of the personal income tax reform see Banca d'Italia (2003).

[27] Banca d'Italia (2002a).

[28] The utilisation of these surveys has the advantage that institutional details of the tax schemes are taken into account. Clearly, it is not possible to implement some minor mechanisms of deductions and tax credits when provided on the basis of information not collected in the survey.

[29] Moreover, these microdata can be used also to assess the effects on tax proceeds stemming from changes in the income distribution and in demography.

[30] Between 1989 and 1993 the personal income tax scheme did not change significantly.

[31] For more details on the procedure adopted to calculate gross incomes see the methodological appendix in Marino and Rapallini (2003).

Figure 6

Income Elasticity of Personal Income Tax Structures in Selected Years

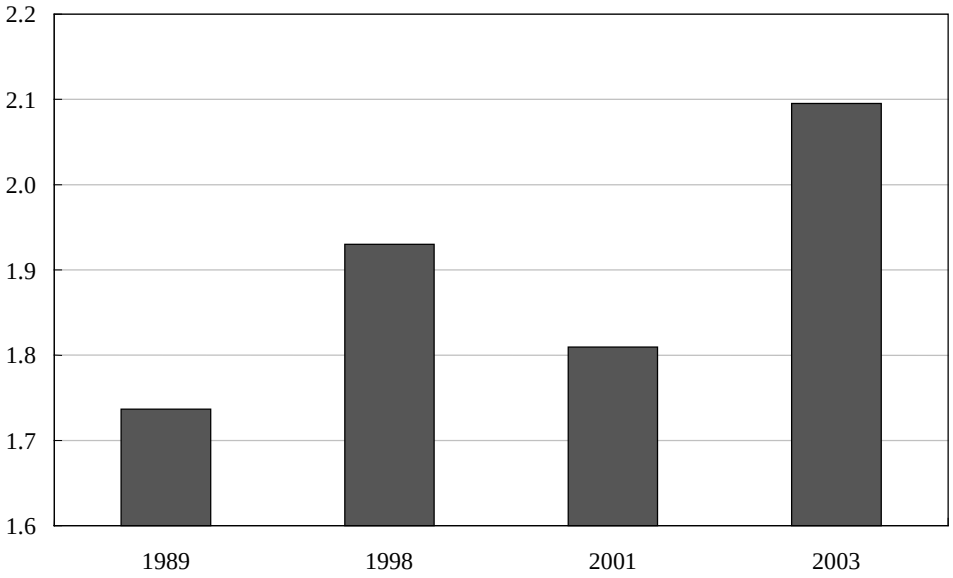
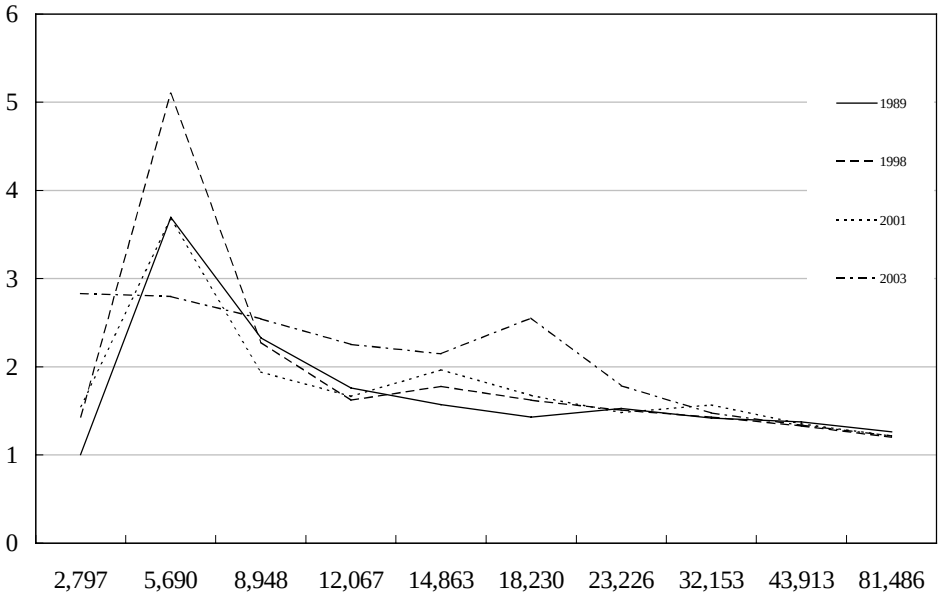


Figure 7

Income Elasticity per Gross Income Deciles



been before 2003 a pick in the elasticity. This was attributable to the existence of tax credits for employees and self-employed which where inversely related to income in a discontinuous way. These tax credits have been abolished in 2003. The difference in the eighth and ninth decile is quite marginal and due to changes in income brackets and tax rates.

Given that the income elasticity of the tax is higher in 2003 from the third to the eighth decile, we would expect that recent personal income tax changes and the planned tax reform would increase the tax reactivity to income. Using the macroeconometric model described in the text it is shown that this higher elasticity will not necessarily determine higher stabilisation. In fact, as argued in Section 4.1, there exists a range of income elasticities that minimise the variance of the output gap, so that for high enough level of elasticities the stabilisation properties of the tax scheme could in principle decrease.

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EMPIRICAL TAX POLICY ANALYSIS AND EVALUATION

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Introduction

The main objective of our paper is to formulate an agenda for empirical tax policy analysis and evaluation. We will set the background for this by sketching a framework for how to approach empirical tax policy analysis in Sweden. Our idea is to present an agenda for tax analyses on the borderline between what is done in economic research and what is done by ministries of finance and other government bodies. The program is more of a way to organize our thoughts than to present novelties. There are many individual efforts in different areas of empirical tax policy analysis. But there is also a need to think about the overall picture. When doing this there is a lot to learn for empirical tax analysis from empirical labor economics. Our discussion is nearsighted in the sense that Swedish experiences and needs will very much be in the center.

The fundamental questions are: What do we need to know? What do we know? What do we have to find out?

On the way we will cite some of the available empirical and theoretical evidence. Our ambitions are, however, limited. We will by no means provide a complete survey.

Our starting point is the following: Suppose that the ambitions concerning public sector activities are given. This yields a public sector tax revenue requirement (including a possible budget surplus). When designing the tax system there are several policy *instruments* available. Some of the important instruments are:[1]

- tax rates
- bracket limits
- tax expenditures: exemptions, deductions, reductions, credits.

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The opinions expressed in this paper are our own and are not those of the authorities with which we are affiliated.

[1] We do not consider fiscal federalism issues here.

Tax rates are direct policy instruments while tax bases are both directly and indirectly affected by policy. Tax expenditures, for example, exemptions, affect the tax bases.

There are several, often conflicting, normative *criteria* for the tax design. As always, any normative statement will, of course, depend on the value judgments about what is socially desirable. The traditional Musgravian roles of the public sector are:

- *distribution*, in tax policy analysis, equity considerations are focused on the incidence of the tax burden,
- *efficiency*, the excess burden of taxation is the crucial efficiency issue in tax policy analysis, there also exist Pigouvian taxes which, contrary to other fiscal taxes, improve efficiency,
- *stabilization*, an important issue here is how well the taxes work as automatic stabilizers.

In the end there is no one else except the households that pay taxes. Either households pay taxes as wage earners and consumers or they pay in their role of final owners of capital. The question is how the tax burden is distributed among households. There is, however, not a one-to-one correspondence between Swedish tax revenue and Swedish households. Some of the Swedish tax revenues are paid by foreign households and some of the tax payments of Swedish households go abroad.

The more fiscal taxes affect the patterns of consumption and production, the more efficiency is reduced thus creating excess burdens of taxation. Taxes may also be levied to improve economic efficiency, so called Pigouvian taxes. This may, for example, concern taxes that make economic agents internalize environmental costs and negative externalities.

It is not, however, necessarily the case that fiscal taxes should be uniform in the sense that tax rates should be the same. The excess burden of a fiscal tax depends on demand and supply elasticities. If taxes do not affect incentives much, elasticities will be low. A low elasticity implies that the tax base is stable and the excess burden low.

There also exist several constraints that affect the possible tax design. Some of what we might call *taxation failures* are:

- tax rates usually affect tax bases
- tax competition between countries
- some goods and services are not possible to tax, for example, leisure and household production
- information costs, collection costs, enforceability
- social norms
- tax avoidance and tax evasion
- compliance costs of the tax payers

- political economy, interest groups
- international agreements.

This introduction, so far, suggests what we need to know. Our method in the paper is, first, to exploit the tension from our own differing experiences. This is the tension between the academics desire to simplify and the practitioner's wish to find useful help for actual tax design.[2]

Second, we will frequently refer to the recent report by the Official Swedish Government Committee on Tax Base Mobility, SOU 2002:47 (2002). This suggests what presently is on the political agenda in Sweden. The objective of this committee was to study how to design the Swedish tax system when the Swedish economy becomes more integrated with other economies. New technologies also affect tax design. In addition, demographic trends put new pressures on the tax system.

The proposals of the committee can be viewed as a follow-up to the major Swedish tax reform 1990/91. The main principles of the tax reform were to broaden the tax bases by removing deductions, exemptions, etc. and to make taxation more uniform. The possibilities of tax arbitrage were, therefore, reduced. This made it possible to reduce tax rates. Agell *et al.* (1996) presents the major aspects of the reform.

The paper is organized as follows: The paper continues with Section 1 where we present some stylized facts concerning taxes. The academics approach to tax analysis meets the discussion in SOU 2002:47 (2002) in Section 2. In Section 3 we present the practitioner's agenda for tax analysis. Section 4 concludes the paper by trying to find areas where the two approaches can be synthesized.

1. Some stylized facts

Table 1 reports the aggregate tax revenue in some OECD countries. As is clear from the table, Sweden had the highest total tax revenue as percentage of GDP in 2000. The share was more than 54 per cent. A high tax pressure in Sweden has been the case for several decades. It is, of course, a gigantic task to collect such a high share of GDP as tax revenue.[3]

The (unweighted) average aggregate tax share in the OECD was about 37 per cent in 2000, see Table 1. If we only focus on the EU countries, the corresponding average was almost 42 per cent. Still the Swedish tax pressure is considerably higher than the tax pressure in the other EU countries.

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[2] Kay (1990) contrasts the evolution of ideas concerning taxation with the evolution of policy.

[3] The tax revenue during a year may not, of course, measure the actual revenue requirements. There may exist deficits or surpluses. We will not, however, take this into account here. We also refrain from discussing other intertemporal issues.

Table 1

Total Tax Revenue
(percent of GDP)

	1965	1985	2000
Sweden	35.0	48.5	54.2
Denmark	29.9	47.4	48.8
France	34.5	43.8	45.3
Germany	31.6	37.2	37.9
Italy	25.5	34.4	42.0
UK	30.4	37.7	37.4
USA	24.7	26.1	29.6
OECD, total	25.8	33.9	37.4
EU	27.9	38.8	41.5

Source. OECD Revenue Statistics.

It was a general trend that taxes increased during the Sixties, Seventies and Eighties. The picture is much more mixed during the last decades. The aggregate tax share increases in some countries whereas it stays more constant in others.[4]

It is, however, difficult to compare aggregate tax shares across countries. The political choices in Sweden to select transfers instead of deductions and make transfers taxable obviously inflate the aggregate tax share as compared to if deductions had been chosen instead. Still, even if adjustments are made to make countries more comparable, the Swedish aggregate tax share is among the highest, if not the highest.

GDP is the main tax base in the sense that flow-based taxes can be related to GDP. At the tax collection level of firms, the labor share of value added is subject to payroll taxes, whereas the capital share of value added (partly) is subject to corporate income taxation.[5] At the tax collection level of household, labor income and capital income are subject to income taxation. And, finally, at the tax collection level of final consumption, there are value added taxes (VAT).

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[4] Kay (1990) argues that there is a trend towards more emphasis on transaction based taxes.

[5] Returns to borrowed capital are not taxed.

There exists important interrelationship between the aggregate tax share and GDP. Higher GDP usually increases the aggregate tax share because of, for example, tax progression.[6] There is also an extensive discussion in the economic literature whether a higher aggregate tax share reduces economic growth. Temple (1999), however, summarizes the literature by concluding that it is difficult to find such a link.

There is also a literature discussing a possible relationship between the aggregate tax share and stability in economic activity. Galí (1994) and Fatás and Mihov (2001) find such a link. A high aggregate tax share works as an automatic stabilizer. There is a positive relationship between the size of the public sector and the exposure to international trade. Rodrik (1998) finds evidence that governments reduce external risks.

Widmalm (2001) shows that the composition of the tax pressure is important. The proportion of tax revenue raised by taxes on personal income seems to have a negative effect on growth.

Table 2 shows the tax structure in the selected countries. Sweden is compared to the neighboring Denmark, the four largest European economies, and the US. More than half the tax revenue in Denmark is collected by personal income taxes. France, in contrast, collects less than 20 per cent of the revenue by personal income taxes.

The UK has the highest share of taxes on corporate income among the countries in Table 2. Germany and France is the country with the highest share collected by social security contributions and payroll taxes. Almost 40 per cent of the tax revenue in these countries comes from this source.

Property taxes constitute high shares of total revenue on both the UK and the US. Denmark is the country with the highest share of general consumption taxes, almost 20 per cent. The highest share of revenue from specific consumption taxes can be found in the UK.

Compared to the EU averages, Sweden has higher shares of personal income taxes and social security contributions/payroll taxes and lower shares on consumption taxes in any case.

There exist several attempts to calculate the tax revenue of different types taxes in relation to the tax bases for these taxes. This way we get measures of the average effective tax burdens. European Commission (2003) reports recent calculations for the EU countries.[7] The implicit tax rates are based on macro data on

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[6] Lindh and Ohlsson (2000) estimate the elasticity of Swedish central government revenue with respect to GDP to 1.3 within the current year run and to 2.5 within a two-year period. This means that central government revenue as share of GDP is increasing in GDP.

[7] Any calculation of this kind rests on a number of assumptions. See, for example, de Haan *et al.* (2003) for a discussion of the choices to make when calculating implicit tax rates.

Table 2

Tax Revenue of Major Taxes (2000)
(percent of total tax revenue)

	personal income	corporate income	social security, payroll	property	general consump-tion	other consump-tion	other
Sweden	35.6	7.5	32.4	3.4	13.4	7.3	0.1
Denmark	52.6	4.9	5.0	3.3	19.6	12.9	1.4
France	18.0	7.0	38.4	6.8	16.9	8.9	3.8
Germany	25.3	4.8	39.0	2.3	18.4	9.8	0.0
Italy	25.7	7.5	28.5	4.2	15.8	12.7	5.6
UK	29.2	9.8	16.4	11.8	18.4	13.9	0.0
USA	42.4	8.5	23.3	10.1	7.4	8.3	0.0
OECD, total	26.0	9.7	25.8	5.4	18.3	13.2	2.5
EU	25.6	9.2	28.4	5.0	18.2	11.8	1.2

Source: OECD Revenue Statistics.

actual tax revenues and estimates of tax bases. Table 3 presents the average effective tax burdens for our selection of countries.

The implicit tax rate on labor is 37 per cent on (unweighted) average in the EU. Tax revenue is computed as the sum of personal income taxes, payroll taxes, and social security contributions of employees and employers raised on labor income. This is divided by the tax base computed as the total amount of compensation of employees in the economy.

The implicit average tax rate on labor in Sweden – 49 per cent – is the highest in the EU. This is almost twice the rate in the UK. The other countries in the table have implicit rates around 40 per cent.

The average effective tax burden on capital and business income is 24 per cent in Sweden. This is slightly higher than the (unweighted) EU average. In this case, the tax revenue is income earned from savings and investments by households and corporations whereas the tax base is the potentially taxable capital

Table 3

Implicit Tax Rates (2001)
(average effective tax burdens)

		capital:		
	labor	capital and business income	total	consumption
Sweden	49.1	24.5*	34.5*	28.0
Denmark	41.5	17.6	30.2	33.0
France	43.3	22.0	39.1	21.9
Germany	39.9	18.4	22.6	19.1
Italy	41.6	21.7	28.3	16.7
UK	25.8	24.4	35.1	21.0
EU	37.3	21.0	29.5	23.3

* 2000.
Source: European Commission (2003).

and business income according to the national accounts. The implicit rate in the UK is as high as that in Sweden while Germany has the lowest rate among the countries reported in the table.

Adding revenue from capital taxes related to stocks of capital from savings and investments previous years and transactions related to these stocks yields the total implicit tax rate on capital. The (unweighted) average tax burden on capital now increases to 30 per cent. The implicit rate in France increases by 17 percentage points.

Denmark has the highest implicit tax rate on consumption: 33 per cent. In this case the implicit rate is measured as taxes on transactions between final consumers and producers and on final consumption goods in relation to the tax base final consumption expenditure of households. The implicit rate in Sweden is lower than in Denmark, 28 per cent, but well above the (unweighted) EU average of 23 per cent. Italy has the lowest rate among the countries reported in the table.

The measured implicit rates are affected by, among other things, the extent of tax evasion. This is an important issue, see Schneider and Enste (2000). SOU

2002:47 (2002) estimates the Swedish revenue loss because of tax evasion to 4 per cent of GDP or 8 per cent of total tax revenue. According to the committee these shares are not increasing over time. The committee, however, points out four areas where internationalization and new technologies create problems for raising tax revenue because across the border activities:

- financial assets held abroad by households,
- VAT evasion by false exports,
- tax havens used by corporations,
- illegal imports of alcohol, tobacco, fuel.

To summarize, there are large variations in tax design across countries. The fact that we do not find convergence suggests that there is room for national tax policies.

It is, however, important to stress that the implicit tax rates and other measures of tax design reported in this section do not take behavioral effects into account. This means that the incidence of the different taxes is not captured. Tax incidence is the starting point for the following section.

2. The academic and the government report

We will start this section by presenting a simple model to illustrate how taxes on labor, capital, and consumption might affect behavior. With the help of the model we can identify the crucial factors determining the incidence of the taxes and the efficiency effects of the taxes.

Incidence. Suppose that firms have production technologies with constant returns to scale. In addition, let us assume that the markets for inputs and outputs are competitive. If markets are organized this way, firms will be price takers. Assuming Cobb-Douglas technology, we can write the relationship between input prices and output price as:

$$d \ln p_p = (1-\alpha)\, d \ln r_p + \alpha d \ln w_p \tag{1}$$

where p_p = producer price of output, r_p = producer price of capital input, w_p = producer price of labor input, and α = the elasticity of output to labor input, which also equals the wage income share of value added.

The producer price of capital input will be related to a value tax on capital according to:

$$d \ln r_p = \frac{\eta_{kr}}{\varepsilon_{kr_p} + \eta_{kr}} \frac{r}{1-t_r}\, dt_r \tag{2}$$

where η_{kr} is the supply elasticity of capital with respect to the price of capital, ε_{krp} is the demand elasticity of capital with respect to the producer price of capital, and t_p is the value tax on capital.

Analogously, the producer price of labor input will be related to a value tax on labor according to:

$$d \ln w_p = \frac{\eta_{lw}}{\varepsilon_{lw_p} + \eta_{lw}} \frac{w}{1 - t_w} dt_w \tag{3}$$

where η_{lw} is the supply elasticity of labor with respect to the price of labor (wage), ε_{lwp} is the demand elasticity of labor with respect to the producer price of labor, and t_p is the value tax on labor.

Finally, the consumer price of output will be related to a value tax on output according to:

$$d \ln p = \frac{\eta_{qp_p}}{\varepsilon_{qp} + \eta_{qp_p}} \frac{p}{1 - t_p} dt_p$$

where η_{qpp} is the supply elasticity of goods with respect to the producer price of goods, ε_{qp} is the demand elasticity of goods with respect to the consumer price of goods, and t_q is the value tax on goods. However, the assumption of constant returns to scale technology assumption implies that the supply is infinitely elastic with respect to the producer price, $\eta_{qpp} \rightarrow \infty$. The incidence of a tax on goods will, therefore, exclusively be on consumers according to:

$$d \ln p = \frac{p}{1 - t_p} dt_p \tag{4}$$

But the consumer price will also depend on the extent at which taxes on capital and labor will affect producer prices on capital and labor. Changes in these prices will be shifted forward on consumers of goods. Combining (1) – (4) yields a relationship between the consumer price of goods and all three taxes.

$$d \ln p = (1 - \alpha) \frac{\eta_{kr}}{\varepsilon_{kr_p} + \eta_{kr}} \frac{r}{1 - t_r} dt_r + \alpha \frac{\eta_{lw}}{\varepsilon_{lw_p} + \eta_{lw}} \frac{w}{1 - t_w} dt_w + \frac{p}{1 - t_p} dt_p \tag{5}$$

From (5) it is clear that the tax incidence on goods consumers depends on demand and supply elasticities, and on the output elasticity.

Efficiency. Economists prefer taxes on fixed tax bases on efficiency grounds. The efficiency comes from the fact that the tax is unavoidable. The reason why economists like them is exactly why people hate them.

There is a tension between the proponents of uniform taxation and the proponents of optimal taxation. It is claimed that uniform taxes counteract special interests and reduces tax avoidance.

Suppose that we study a household with the budget constraint:

$$wl = pq + s \tag{6}$$

where w = wage rate, l = hours worked, p = price vector, q = consumption vector, and s = savings. We also assume that the household has no capital income.

Now suppose that savings are unaffected by taxes on labor and consumption. In addition suppose that goods supply and labor demand are perfectly elastic ($\eta_{qp_p} \to \infty$ and $\varepsilon_{lw_p} \to \infty$). A proportional labor income tax (t_w) is then equivalent to a uniform consumption tax (t_p).

Can uniform taxation be optimal? Suppose, in addition, that there are no effects of taxes on the time allocation of the household. This means that the supply of labor and the demand for leisure are not affected by taxes, ($\eta_{lw} = 0$). The budget constraint can be rewritten to:

$$wT = pq + s + wl \tag{7}$$

where T = total time and l = leisure. A proportional labor income tax remains equivalent to a uniform consumption tax. But in addition a uniform consumption tax is optimal in this case. If the tax bases total time, leisure, and savings are unaffected by taxes, any taxes on these bases will, therefore, be of lump-sum character. But uniform consumption taxes will also be of lump-sum character and, therefore, optimal.

2.1 Personal income taxes

Starting with personal income taxes we will now use this framework to discuss the actual Swedish tax system and present the suggestions in SOU 2002:47 (2002). For each type of tax we will discuss incidence (burden), efficiency (excess burden), and automatic stabilization.

2.1.1 Labor income

The labor supply in a country is affected by the number of inhabitants (and, therefore, migration), labor force participation, and the number of hours supplied by each worker. It is the wage bill, not the number of hours, which is the base for labor income taxation.

The conventional wisdom is that the incidence is on labor supply in the short and the long run. Labor demand is assumed to be perfectly elastic. The sensitivity of the tax base will, therefore, depend on the (uncompensated) labor supply elasticity.

Note that even if the supply effects are small, excess burden may be large is it depends on the compensated labor supply elasticity.

Fuchs *et al.* (1998) reports survey evidence of economists' beliefs about different key parameters and values. The uncompensated (*i.e.* Marshallian) elasticity of labor supply for men aged 25-54 is on average 0.10 according to this study. They report the uncompensated (*i.e.* Marshallian) elasticity of labor supply for women aged 25-54 to be 0.45. This is considerably higher than for men. Fuchs *et al.* (1998) also reports compensated (*i.e.* Hicksian) labor supply elasticities. For men aged 25-54 the number reported is 0.22. They report the compensated (*i.e.* Hicksian) elasticity of labor supply for women aged 25-54 to be 0.59.

The labor income tax system in Sweden has two brackets; 31 per cent and 55 per cent for incomes above a bracket limit. This tax is collected at source. It is problematic to split the income of self-employed between labor income and capital income.

SOU 2002:47 (2002) discusses migration and participation but says very little about the supply of hours. The committee suggests that the ceilings in the social security system should be increased. This will increase the actuarial element of the social security system. The incentives to participate in the labor force will be strengthened this way. It is an application of the benefit principle of taxation. The committee, however, writes that the tax rate in the upper bracket of the labor income tax system should be decreased if possible.

2.1.2 Capital income

The conventional wisdom is that the incidence is on capital supply (savings). The internationally determined interest rate will results in a perfectly elastic capital demand. The sensitivity of the tax base will, therefore, depend on the capital supply (savings) elasticity. Note that even if the supply effects are small, excess burden may be large.

Suppose that all capital income taxes were replaced by a wage tax yielding as much tax revenue. Which would the effects be?[8] Fuchs *et al.* (1998) reports an estimated of 0.35 percentage point increase in the average GDP growth rate over the next ten years.

Sweden has uniform capital income taxation except for unrealized capital gains and tax deferred pension savings. This tax is collected at source except for realized capital gains. The rate is 30 per cent.

SOU 2002:47 (2002) suggests that the system with tax deferred pensions savings shall be removed.

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[8] Bernheim (2002) is a recent survey discussing the effects of capital income taxation on total savings. The effects of capital income taxation are surveyed by Poterba (2002).

2.2 Corporate income taxes

The conventional wisdom is that the incidence is on capital demand (investment). In a small open economy the rate of return requirement is internationally determined. This is equivalent to a perfectly elastic capital supply. The sensitivity of the tax base will, therefore, depend on the capital demand (investment) elasticity. Note that even if the demand effects are small, excess burden may be large.

Suppose that firms were allowed to write off capital investment immediately and that this was compensated by an increase in the corporate income tax rate yielding the same tax revenue as before. According to Fuchs *et al.* (1998), economists believe that this would give an 11.7 percentage increase in investment in plant and equipment over the next five years. According to the same source the percentage of the current corporate income tax in the United States that is ultimately borne by capital is 41.3 per cent.

The corporation income tax rate in Sweden is 28 per cent. It is collected ex post.

SOU 2002:47 (2002) suggests that Sweden prepares to decrease the rate to 25 per cent. The reduction shall only be put in effect if key European countries reduce their rates. The committee also proposes that the possibilities for firms to put profits in periodization funds shall be removed.

2.3 Social security and payroll taxes

The conventional wisdom is that the incidence is shared in the short run but on labor supply in the long run. This is equivalent to a perfectly elastic labor demand in the long run. The sensitivity of the tax base will, therefore, depend on the (uncompensated) labor supply elasticity in the long run. Note that even if the supply effects are small, excess burden may be large.

Fuchs *et al.* (1998) reports a number of 25.6 per cent as the percentage of payroll taxes that is borne by employers in the long run. They also report a total wage elasticity of labor demand of –0.63, and an output-constant wage elasticity of labor demand of –0.42.

The social security and payroll tax rate (mark-up) in Sweden is ca. 34 per cent.[9] It is collected at source.

Payroll taxes are reduced for small firms up to a wage bill corresponding to about EUR 100,000. SOU 2002:47 (2002) suggests that this reduction shall be removed.

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[9] In addition, there are contribution to pension systems, etc., based on the wage bill decided by collective agreements between employers and employees.

2.4 Property taxes

Sweden taxes net wealth, property, inheritances, and *inter vivos* gifts. The Swedish net wealth tax is inconsistent and regressive. Not all assets are included, the most rich are exempt.

SOU 2002:47 (2002) suggests that the tax base should be broadened and the rates reduced. If this is not possible, the net wealth tax should be removed. The committee also suggests that the inheritance and gift taxes should be removed for within-family transfers.

2.5 Consumption taxes

2.5.1 General consumption taxes

The Swedish value added tax rate (mark-up) is 25 per cent. The VAT is collected at source. The VAT rate can be changed during the fiscal year. Lower VAT rates are applied for food, books, etc. The reductions make the Swedish system one of the least effective VAT systems; see van den Noord and Heady (2001).

SOU 2002:47 (2002) suggests that the VAT base should be broadened, the lower rates removed, and the normal rate reduced.

2.5.2 Specific commodity taxes

Some of the specific commodity taxes are the taxes on:

- emissions,
- energy,
- fuels,
- alcohol,
- tobacco.

Most taxes have whole or parts of value added as their bases. Some commodity taxes differ from this as also input use in production (intermediate goods) are affected. Are fiscal taxes on production (input use) more distortive than taxes on consumption? Productive efficiency is desirable even in second best situations, see Diamond and Mirrlees (1971a,b).

Fuchs *et al.* (1998) report the compensated (*i.e.*, Hicksian) price elasticity of demand for gasoline in the United States over a horizon of two to five years to be –0.53.

Peat, firewood, and garbage are exempt from fuel taxation. SOU 2002:47 (2002) suggests that taxation of fuels should be made uniform. The committee also suggest that tax rates on alcohol should be reduced as it will become possible for

households to bring much larger quantities alcohol to Sweden from abroad. New technologies may make road charges more feasible.

Recently the Official Government Committee on Energy Taxation in the Business Sector published the report SOU 2003:38 (2003). The objective of the suggested tax changes is to conform to the rules within the EU.

3. The practitioner

3.1 Efficiency vs. distribution, political economy

In a country with ambitious welfare policies, it is necessary to find a reasonable tradeoff between efficiency and distribution. But this presupposes knowledge about the effects of different taxes on the income distribution. Initial focus should primarily be on the static distribution of tax payments. The issue is the different taxes contribution to the existing income distribution.

But it can also be of interest to look at the distribution of excess burdens that arises because of marginal increases of different taxes. Also the efficiency properties of the tax system need to be further illuminated. The principle of uniform taxation was a cornerstone of the Swedish tax reform 1990/91. The objective was to minimize the efficiency losses of the tax system. A uniform tax system will, however, maximize efficiency only under certain conditions. It is an important task to find out if these conditions apply.

The political system is continuously exposed to different interest groups' demands for special treatment and exemptions. To promote a tax system with so few distorting effects as possible, it is necessary to have more empirical knowledge about the effects of different types of special treatments. It may, for example, concerns cost-benefit analyses of tax expenditures of different types.

3.2 Behavioural effects – demand and supply elasticities

There is a great need of empirical estimations of demand and supply elasticities. This concerns consumption demand and labor supply as well as firms' investments. The estimates can provide a crucial basis for analyses of the effects of different types of taxes and changes in taxes. It would be important to build a model for repeated estimations of consumption demand elasticities.

Regarding labor supply we lack knowledge about the differences in wage elasticities, and, therefore, effects of tax increases, for different groups – age groups, income groups, ethnic groups, etc.

A special issue in this context is how the labor supply is affected by changes in consumption taxes. According to theory it does not matter if labor taxes are levied on income, on consumption, or the employer's wage bill provided that savings are unaffected. Empirical results also show that these taxes in the long run are shifted

onto wages in similar ways. But how are the incentives affected? Do increased consumption taxes only imply that the average tax rate increases? Or does the marginal tax rate also increase? This is probably very much an empirical question. The answer varies between different groups and different types of consumption taxes.

On the production side we need to know more about the price elasticities of factor demand – both own and cross elasticities. This concerns, in particular, the demand for energy and the relationship between this demand and labor demand.

3.3 Tax avoidance and tax evasion

In the discussion it is assumed that the problem with tax evasion, in the form of working off the books, could be limited by tax decreases that reduce the tax wedge between the labor costs for employers and the take-home pay of employees. This argument is also supported by theory. Empirical evidence on the importance of the tax wedge for the extent of working off the books is, however, lacking.

Suppose that there existed estimations of the extent of working off the books in different industries. It would then be possible to study the relationship between the size of the tax wedge and the extent of working off the books. With such estimations it would also be possible to study the importance of other factors. How important are, for example, the ceilings in the social security system? This could be analyzed by studying if annual incomes corresponding to the benefit ceilings are more frequent in occupations where working off the books is common.

Another crucial question is the tax evasion problems associated with different VAT rates. How important are these problems empirically?

4. The synthesis: concluding remarks

There are large variations in tax design across countries. The lack of convergence suggests that there is room for national tax policies.

When designing a tax system the objectives of equity, efficiency, and stabilization have to be balanced against each other. In Sweden, there are three important areas where there are permanent needs to learn more all the time. These area the effects of taxes on household and firm behavior, the effects of taxes on income distribution, and the effects of taxes on tax evasion and tax avoidance.

First, there is a need for continuously updated empirical estimations, using micro data, of households' and firms' behavior.

For households this concerns consumption demand, factor supply, savings, and time use. The empirical studies may focus on, for example:

- estimation of expenditure systems, own and cross price elasticities,

- cross effects of factor prices on consumer demand,
- cross effects of consumption prices on factor supply,
- estimation of time use system.

For firms it is important to learn more about technology, returns to scale, dynamic factor demand, and investment.

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COMMENTS ON SESSION II: TAXATION AND FISCAL POLICY

José A. Herce[*]

1. On different ways to discuss one (or more) paper(s)

Let me start by thanking the Banca d'Italia for inviting me to this exciting and comprehensive conference on taxation and fiscal policy. Mr. Chairman, this is the first time I have to discuss five papers in a row, something I thought to be impossible until now that I am about to do it. Let us see how it goes.

However, I am rather used to tours de force like this. I remember participating recently in a conference in The Hague where I had to discuss a paper in the standard way. I had prepared my discussion with rather an excitement for the author was a well known European labour economist. Then, we were told by the organisers that our colleague was ill and that he would not come. In his place the organisers had included someone else at the very last minute and asked me to listen carefully to what he had to say in order to comment on that later on, for our improvised speaker had not written his paper yet. I agreed but insisted in saying also something about the paper I was supposed to discuss in the first place. Thus I saw myself, for the very first time in my academic life, discussing a paper without a speaker and discussing a speaker without a paper.

This said, trying to say something that makes justice to the effort of so many authors that is not a mere list of issues addressed by them in their respective papers in no more than fifteen minutes is just not easy at all. Moreover, as I would like to set some sort of common ground to place all of them in it then the task seems to me even more complicated. At least, I am not alone in this conference at this kind of performance.

My intention then is to share with you the reflections these five papers have inspired me at several levels.

First, when reading about taxes one immediately tends to think about governments, their expenditure policies, fine tuning, fiscal activism, moral hazard by strategic citizens or firms, tax evasion, distortions and government failures, etc. Too many aspects that surround taxes and that have to be addressed in partial equilibrium formal setups. Reading all these papers has forced me to organise my general ideas about taxes before extracting their basic contents in order to put them to my own judgement.

Second, the fact is that every author addresses different cases in different countries or world regions where policy priorities and actual economic

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circumstances vary considerably. However, looking at the mere list of issues addressed by the authors one finds either some common ground or at least a common frame where to put the pieces that each author has laid up.

Third, even if too selective a survey, some trends can be discerned from the arguments set out by the authors here discussed and that will be my concluding task in undertaking the challenge the organisers have put before me.

2. General ideas on taxation, tax reforms and tax policy

Taxes are one of the most pervasive elements in modern economies. So pervasive and yet so mysterious that few people realises that they are paying taxes several times out of every euro or dollar earned. To be sure, tax policy is responsible for this fact and also for the ultimate fact that taxpayers display distorted behaviours – as much as they can – in order to avoid the corresponding burden. Tax reform then should be viewed as an opportunity to mend this although it is not necessarily the case. Let us see what general views can be formed on taxes that lend some base for the discussion of the five papers in this session.

2.1 Taxes are levied in order to…

Rise revenues to pay for public consumption, investment, transfers and debt servicing or repayment. They are also used to change or orientate incentives for private agents. Were markets perfect or complete a good deal of government interventions and thus taxes would not be justified and people would be expending their cents in goods and services (or saving) of their primary choice. But they are not and everybody understands that taxes need to be high even if at the same time retreating their shoulders to avoid the burden or advancing their hands to get the relief.

2.2 Tax reforms are enacted so that…

The effects of tax policy can be enhanced or limited. Or to implement new visions of (more or less limited) government. Or to help other reform packages aimed at making an structurally ailing economy to take off at once again. But constantly retouching the tax code may be costly both in terms of exacerbated strategic behaviour or credibility of the tax authority. On the other hand many tax reforms are just a propaganda screen to hide more substantive inaction on certain tax figures (inflation tax).

2.3 Enhancing tax policy helps to better…

Stabilise the economy in the short-term, reach long-term fiscal sustainability

and increase economic efficiency. Of course, as long as reforms are properly designed and implemented.

2.4 Still, some hard facts about taxes…

In the real world should be addressed. Indeed, (i) there are lots of double taxation cases, as the fact that the sum of all tax bases amounts to several times GDP indicates, (ii) tax structures, that are historically determined, are too complex everywhere, (iii) tax base mobility implies an almost zero optimal tax rate levied on that base unless there is some form of coordination among countries that is little by little gaining ground, (iv) taxing (the purchasing power of labour) income more heavily (than capital income) implies less private consumption and less savings. To quote just few cases.

3. Five papers with different backgrounds and objectives

Bearing the previous discussion in mind let me now just describe briefly what are the contents of the papers. Latter I will focus on the major issues addressed by their authors.

The *Nagaosa* paper describes with detail the Japanese tax system and addresses the issue of putting fiscal policy to the task of taking the Japanese economy off after a decade long stagnation. Although the point here is that successive tax cuts have not helped much in the past, while the monetary margin is nonexistent, the government seems still inclined to keep taxes even lower in the short run and rise them progressively in the medium and longer run.

The *Smith* paper is very informative on the basic features of the Australian tax system, its major institutional determinants and the role history and politics has played in shaping it. An important aspect this one that we often forget to take into account. The complexity of tax codes is after all, also, the result of a thick superposition of specific treatments for specific groups. Anglo-Saxon countries however, have succeeded in keeping their tax codes simpler than most other countries and Australia is a good case at hand.

The *Buti and van den Noord* paper uses an ad hoc version of the standard Aggregate Demand and Supply model to which some supply features have been added to explore the stabilisation properties of tax policy in a monetary union. Indeed, under completely new rules concerning monetary policy, now run at EU level, it could be the case that fiscal policy still under national rule would display different properties as to its stabilisation capabilities.

The *Marino, Monacelli and Siviero* paper uses a educed version of the Quaterly Model of the Banca d'Italia to explore how sensitive is the Italian economy (fluctuations) to the built-in stabilisers of the Italian fiscal system, in particular the size of the income elasticities of taxes.

The *Hort and Ohlsson* paper is a conceptual and provocative one. The authors seek to bridge the gap between academics and tax policy practitioners and to devise an "empirical tax policy" that is sound and common sense based. They provide illustrations on the Swedish case.

4. Main questions addressed in each paper

That is the list part I first wanted to avoid in my discussion of the five papers when I started to think about how to handle the challenge. So it could be said that I have not succeeded in this avoidance for the list is actually down here. However, I think that rather than to avoid doing that list I needed to read those papers, actually make that list and say something on each paper and then go beyond by setting a framework where different results from the papers, however summarised, become pieces of a wider picture about the leading theme of the particular session the papers were inserted in: *Taxation and Fiscal policy*.

In a way, my discussion now turns into an (extremely) selective survey of tax related literature that I stretch a little bit in order to get that wider picture compact enough.

The major questions, according to my reading, addressed in each paper are thus listed below complementing the previous short description made in the preceding section.

- Nagaosa (on Japan): (i) how can you make tax policy or tax reform when monetary policy does not work, nominal tax bases are shrinking and you have huge deficits? and (ii) how ambitious can you be in combining short-term stabilisation with long-term sustainability?
- Smith (on Australia): (i) how country specific factors shape or constrain tax reform and policy? and, (ii) how those factors interact with the universal need for policy to maintain macroeconomic stability and enhance competition and innovation of the national economy in the global arena?
- Buti and van den Noord (on the EU): (i) has the role of national fiscal policy changed in a monetary union? and, (ii) are not high aggregate tax rates in most EU countries preventing stabilisation to happen?
- Marino, Monacelli and Siviero (on Italy): (i) have recent tax reforms altered the stabilisation properties of the budget? and, (ii) is it preferable to have large tax elasticities rather than low ones in order to run a lowwer risk of increasing output variability?
- Hort and Ohlsson (on Sweden): (i) how to bridge academics and practitioners? and, how to balance equity, efficiency and stabilisation objectives of fiscal policy?

The extent to which these questions have been answered and how is presented below in a compact way so that we can have a more comprehensive picture of the whole matters dealt with in this session of the conference.

5. Organising the results

Table 1 contains a "grille de lecture" of the main results out of the papers discussed. I have detected four major areas that my authors have dealt with in their papers: (i) short-term stabilisation, (ii) long-term sustainability, (iii) efficiency of the tax system and (iv) international tax competition.

Area (i), stabilisation, has been dealt with in four of the five papers. Buti and van den Noord and Marino, Monacelli and Siviero address this issue more than any other one to conclude that tax policy has still a say on stabilisation issues, the more so in a monetary union where the interest rate is set at central level. The simulations performed in these papers confirm that high tax rates tend to be destabilising (Buti and van den Noord) while high income elasticity of taxes tend to mitigate fluctuations (Marino *et al.*). Tax policy, one learns from Smith, is not used in Australia for stabilisation purposes. This is a way to deal with the issue and a bold one for few governments would acknowledge not to say commit themselves to not using taxes for this. But Australia is different, and virtuous. Nagaosa echoes in his paper the Japanese government concern with taxes as an stabilisation device, although he immediately admits the little success so far achieved by tax cuts in the last decade.

Long-term sustainability, area (ii), is however the major concern for tax authorities in Australia and Japan. Smith concludes that the Australian tax system has its automatic stabilisers geared towards that end in what he finds more than a convenient feature. Also for Japanese tax authorities, song term sustainability is the "new approach" in their policy priorities. Nagaosa summarises the government plans concerning taxes as a compromise between further tax cuts in the short term and tax increases in the long run to balance recovery and sustainability. Looking at the effectiveness of previous tax cuts one would rather beg for tax increases as from now in order to translate expending capacity from households to the government and, if at all, tax cuts in the distant future.

Only Hort and Ohlsson deal with the efficiency issue, my area (iii) to conclude that more uniform taxation (*shrinking*), lower rates (*thinning*) and broader tax bases (*broadening*) are the ingredients of any master recipe for efficiency. Nothing against on my part and all in favour. Indeed, some of this is now being seen here and there, but not a at a sufficient rate. Removing distortions is the conundrum of tax reform. Or, in other words, how to dismantle personalised treatments out of tax codes. History and accumulation of particular treatments determine the current stance of taxes (Smith) more than efficiency considerations.

Table 1

Major Results of the Papers Discussed

	Short-term stabilisation	Long-term sustainability	Efficiency	International tax competition	Overall
Nagaosa (Japan)	Some direct concern	Major concern			Lowering taxes in the short-term and increasing them in the longer-term
Smith (Australia)	The budget is not used for this	The budget is geared towards mid to long-term stability Fiscal forecasting (every 5 years)		An issue of primary importance surrounded by doubts about how to proceed best	History and local factors shape the budget Distributional aspects are important
Buti and van den Noord (UE)	Primary concern of the modelling and simulation exercise				AD-AS model shows that stabilisation properties of tax policy can change in EMU Aggregate tax rates in EU are too large and destabilising
Marino, Monacelli and Siviero (Italy)	Primary concern of the simulations				Less output fluctuations (and slowly increasing ones) if higher income elasticities of taxes. Which has been the case in Italy

(continued)

Table 1 (continued)

	Short-term stabilisation	Long-term sustainability	Efficiency	International tax competition	Overall
Hort and Ohlsson (Sweden)			Uniform taxation. Low rates. Broad bases	Should we forget about capital taxation at all?	Broadening and thinning (and shrinking) approach. Empirical tax policy (academics, practitioners)
All	When tax reforms rise the income elasticity of taxes fluctuations can diminish. Monetary and economic integration can change the nature of shocks and the stabilisation properties of tax policy	Little concern about sustainability issues in the papers with the exception of the new focus of the Japanese reform and the built-in features of the Australian budget	Although emphasising the importance of removing distortions, few practical steps have been taken by recent reforms, at most: broadening, thinning and shrinking	More and more focus on this aspect of tax policy (inc. labour mobility). Should capital be taxed at all? Game-theoretical considerations lend support to simple IS or W+T solutions that are welfare enhancing	Tax policy: Continues to be history and ad hoc determined. Geared towards output stability within above limits, and increasingly exposed to the challenges of tax bases mobility

Finally, on the issue of international tax competition, area (iv), two of the five papers give to it particular attention. It has been found that game theoretical considerations support the idea that even simple information sharing or withholding plus transfer to residence country agreements would enhance welfare well beyond the outcome of competitive solutions. This contrast with worries expressed by Smith who concedes the utmost importance to the issue amid doubts about how to proceed best in order to avoid falling into the trap of the the optimal (strategic) taxation result of not taxing capital at all. This seems to be, by the way, the preferred option of Hort and Ohlsson on this issue.

All in all, the papers discussed tell us a neat story about the fact that tax systems continue to be history and ad hoc determined rather than moving decidedly towards a much needed simplification (broadening-thinning-shrinking). Their built-in stabilisers and discretionary levers also continue to serve short run output stability more than sustainability in the long run, and this under new environments such as EMU that change the nature of shocks and the responses of economic agents. At the same time, national tax systems are increasingly exposed to the consequences of tax international base mobility without a clear international cooperative strategy to cope with the temptation of international tax competition that would drive the corresponding tax rates to near zero.

COMMENTS ON SESSION II: TAXATION AND FISCAL POLICY

Pedro Duarte Neves[*]

Let me start by thanking the organizers, and Daniele Franco in particular, for having invited me to participate as a discussant in this conference. I found the six papers included in this session particularly stimulating. In the discussion, my comments will be organized in four main sections.

1. Tax reforms: two case studies

Japan and Australia are two very different economies. In Australia almost uninterrupted economic growth has been observed since the 1990-91 recession, whereas in Japan GDP growth in the last 5 years did not exceed 0.5 per cent (or 0.1 per cent per year); Australia has a balanced budget, contrasting with the 7.1 per cent deficit in Japan in 2002; (gross) public debt is 18 per cent of GDP in Australia and 157 per cent of GDP in Japan; Australia has a current account deficit, whereas Japan has a current account surplus. Finally, in Japan the intervention interest rates are virtually zero, whereas in Australia they are at 4.75 per cent. It is very interesting to compare the characteristics of fiscal reforms in these economies, with so marked differences in macroeconomic conditions.

The assessment of a tax reform in Japan has to take into consideration the present situation of the Japanese economy. In particular, two powerful forces are driving the economy in a dangerous way:

a) firstly, the vicious debt-deflation spiral, which is raising month after month the real burden of outstanding debt; deflation is also decreasing consumption, as consumers postpone purchases in a context of falling prices; these two effects together have conducted to an increase in the number of bad loans;

b) in second place, the path of the gross public debt seems to be very close to an unsustainable path, if a dramatic change in public accounts does not take place in the very next future.

The OECD estimates that a primary surplus of 1¾ per cent of GDP is necessary to attain a debt/GDP ratio at some 180 per cent of GDP by 2010. As the primary deficit is currently around 6½ per cent of GDP – the largest deficit of the OECD economies – a significant consolidation effort is required. In a clear unfavourable background – extremely low potential output growth and deflation, leaving aside, for the time being, the interest rate risk and the ageing pressures on total expenditure – I would like to raise the issue of the consolidation effort implicit

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[*] Banco de Portugal and Universidade Católica Portuguesa. Exchange of views with João Amador, Cláudia Braz, Mário Centeno and Jorge C. Cunha is gratefully ackowledged.

in the recent fiscal policy changes. So, my very first question to Mr. Nagaosa is precisely the estimated impact in public accounts – either in the deficit or in the structural deficit – of the proposed reform. Can we expect that these fiscal changes will bring fiscal accounts to a more sustainable path?

I have also a specific question for Mr. Smith. The paper mentions that higher health funding costs – due to demography and the average cost of programmes (¼ and ¾ of the estimated cost, respectively) – are projected to require an increase in public spending of about 4¼ per cent of GDP, up to 2040. This figure seems to be extremely large, at least when compared with similar estimates available for Europe. For instance, a 2001 Economic Policy Committee report – "Budgetary challenges posed by ageing populations" – estimates an increase in health expenditure in the period 2000-2050 of about 1.3 to 1.7 per cent (2.2 to 2.7 per cent of GDP if long-term care is also included). It would be interesting to have your views on the likely reasons behind the discrepancies between these estimates.[1]

Moreover, I would like to raise two issues and hear the comments from our Japanese and Australian colleagues. The first one deals with consumption taxation and the second one with environmental considerations. Both countries have introduced very recently value-added taxes (in the Australian case, the Goods and Services Tax was introduced in July 2000; the Japanese VAT was introduced in 1989). In both countries, revenue generated by this tax is a small fraction of total fiscal receipts and, in both cases, it was mentioned that the weight of this tax should increase in the next future. It is also the case that a flat rate applies in both countries (10 per cent in Australia and 5 per cent in Japan). The basically proportional nature of this tax – or regressive with respect to disposable income – suggests that further increases in VAT revenue could be obtained through the existence of two different VAT rates (introducing an higher one for durables and services, for instance). Such structure for the VAT would also produce some distributional effects. How do you assess the role of consumption taxation as a mean to increase the tax burden and, simultaneously, from the perspective of its distributional impact?

Finally, at least at a first glance, it seems that environmental considerations did not play a significant role in the tax reforms carried out in Japan and Australia. Reductions in greenhouse gas emissions – in particular CO_2 – are a very important issue in international policy, being now widely accepted the use of market-based instruments. I would like to have your views on the role of such considerations in the recent tax policy changes.

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[1] Possible candidates are the high medical price inflation, the increased use of new and more expensive technology, the increased demand of health care (in line with increased prosperity) and the increased coverage of public provision of health care.

2. Tax policy analysis

In this second topic I will deal with the role of different modelling techniques in the design of fiscal reforms. In order to properly assess the impacts of a tax reform or to compare alternative tax strategies it is essential to use adequate modelling tools. One could think of, at least, three different types of modelling techniques.

A) General equilibrium models

Endogenous growth dynamic general-equilibrium models are very useful to analyse, amongst other, the following issues:

- the impact on long-term GDP growth of tax policy changes (tax policy has the potential to affect long-term growth and not just for generating temporary level effects);
- the trade-off between efficiency and welfare (taxation mix), in particular in situations where binding restrictions in public accounts apply;
- the sustainability of social security systems.

B) Macroeconometric models

Macroeconometric models are very useful to estimate the short-run (say one to two years) impact in the economy – demand components, disposable income, prices, etc. – of a given tax reform. However, in general they are not adequate to assess the impact of Keynesian-type fiscal policies (stimulus in the form of public investment or various tax incentives) in a situation where Ricardian equivalence elements are likely to play a key role in individual decisions, as it is it seems to be the case of Japan already.

C) Microeconometric models

The need for this type of models is dealt with in the paper by Hort and Ohlsson. Microeconometric models play a key role in the empirical analysis of tax changes (see for instance Blundell, 1995[2]). This type of models is very useful at least for two different purposes:

C1) Incorporating behavioural responses of individual agents:

a) the analysis of behavioural responses to changes in work incentives (labour supply elasticities), both in terms of participation and hours of work;

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[2] Blundell R. (1995), "Tax Policy Reform: Why We Need Microeconometrics", *Fiscal Studies*, Vol. 13, No. 3, pp. 106-25.

b) estimation of demand systems, allowing for the identification of the complete set of own and cross price elasticities, extremely useful to assess the impact of indirect tax changes;

c) the degree of which new savings were generated by tax-exempt savings accounts (in general, the elasticities that describe savings decisions, over the life cycle).

C2) Individual welfare and distributional issues:

a) the impact of reforms on individual welfare and distributional issues, as we have seen this morning in Kaplanoglou's paper;[3]

b) how different types of households are affected by a given tax change (by age, sex, number of children, situation in the labour market).

It would be interesting to know which role was attached to these modelling techniques in the Australian and Japanese tax reforms.

3. Taxation and stabilization

As we know, cyclical fluctuations in economic activity have a sizable influence on government budget. Such effects on balances have a stabilising influence on economic activity (that is, they fulfil the role of budgetary automatic stabilisers). The size of the automatic stabilizers is influenced by various factors:

- cyclical postioning of the economy;
- the volatility of economic cycles;
- weight of the general government sector;
- the degree of cyclical sensitivity of tax bases;
- the generosity of unemployment compensation schemes;
- the sensitivity of unemployment to output fluctuations;
- the progressivity of the tax system.

Two papers presented this afternoon deal with this last issue. Buti and van den Noord present the result that higher and strongly redistributive taxes and benefits have destabilising effects in the event of supply shocks. That is, if supply shocks do prevail, the trade-off between stabilization and efficiency does not exist. Banca d'Italia's paper indicates that there is a value of the income elasticity of the personal income tax above which its increase does not determine a higher degree of stabilisation. This result holds for the *average past shock* in the economy, either from the supply or the demand side or any combination between them. These interesting and fairly similar results were obtained using two totally different approaches.

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[3] Kaplanoglou G. (2003), "Distributional Aspects of Indirect Taxation in Greece: 1988-2002", paper presented in the first session, "*Taxation and the labour market*".

It is well known that, in the case of demand shocks, fiscal stabilisers play a very useful role as they cushion the impact both on output and prices; in the case of a temporary supply side shock automatic stabilisers do smooth output, but at the cost of higher inflation. If the supply shock is permanent, automatic stabilisers delay the necessary adjustment towards the 'new' level of potential output. As Blanchard wrote, "with respect to aggregate demand shocks, automatic stabilisers stabilise, and this is good. With respect to aggregate supply shocks, automatic stabilisers also stabilise, but this is not good: they do not allow for the adjustment of output that would be desirable in this case".[4] Buti and van den Noord go a little bit further. In their model, automatic stabilisers operate not only on the demand side but also on the supply side, as higher stabilisers make the supply schedule steeper.

On this paper, I would like to make some few comments. The model of wage setting raises some interesting issues. First, the model is not expressed in terms of hours but in terms of heads (as if labour supply were decided on the basis of a "take it or leave it decision on a fixed amount of hours of work"). However, the relevant variable to analyse progressivity is wage income and not just the wage, as adjustment through hours worked is also a key element.

The graphical analysis shows that the progressive tax system operates as an automatic stabiliser on the labour market when it takes place an increase in the demand for labour (at an initial wage of w); in the case of a negative supply shock, however, progressivity drives employment further way from the initial equilibrium. What type of relevant negative labour supply shocks do you have in mind?

The simulation provided by the authors is very illustrative; it is not clear, however, the degree of adherence of the baseline to the observed behaviour; is it the baseline a good approximation of the reality? With the current euro area macroeconomic framework how do you see the relative likelihood of demand versus supply shocks (*vis-à-vis* the previous period). Should one expect that supply shocks will be (relatively) more likely *vis-à-vis* the pre-euro period?

Turning to the paper by Marino, Monacelli and Siviero, a key aspect has to do with the PIT elasticities, as the macro estimates and the micro estimates differ significantly (1.2-1.3 in the first case, 1.8-2.0 in the second case). It is probably the case that these elasticities have different meanings. Aggregate elasticities are computed in relation to the relevant tax base (gross of tax wages and pensions) and therefore they also take into account employment fluctuations. In addition, unless a very careful identification of the relevant discretionary tax changes that took place throughout the sample period takes place, the estimation of macro elasticities, through the estimation of time series regressions, might be capturing simultaneously cyclical and discretionary effects. Micro elasticities, obtained from tax rules, have obvious advantages, as one may simulate the impact of cyclical effects for a given tax structure. It is also worth mentioning that when obtaining your micro elasticities,

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[4] Blanchard O. (2000), "Commentary", *Economic Policy Review*, Federal Reserve Bank of New York, Vol. 16, No. 1, pp. 69-74.

the tax structure changes but the population/employment structure is kept constant. So micro and macro elasticities do not have, necessarily, the same information content.

I lack the intuition for the very sharp increase in the estimated output gap variance when the income elasticity of the withholding tax on dependent labour income decreases from say 1.2 to 1.18. The modelling of the elasticity *eta* is also not very intuitive. Unfortunately I do not have any useful suggestions for the authors, but both aspects would probably deserve further research and search for deeper economic intuition.

Just to conclude, I found particularly useful – and convincing – the approach that Marino, Monacelli and Siviero followed to assess the stabilisation properties of different fiscal schemes, which basically coincides with the framework that is used to appraise the performance of computing monetary policy rules – *i.e.* replicating the mix of the relevant historical shocks – rather than just concentrating on a limited number of selected shocks.

COMMENTS ON SESSION II: TAXATION AND FISCAL POLICY

Peter Part[*]

In face of a more prolonged than expected cyclical downturn in nearly the whole of the world, we see very diverging approaches in tax policies at present. On the one hand, some countries, *i.e.* the US, F, D, I, in addition to buoyant growth of public consumption spending, have implemented pro-active counter-cyclical measures, with the primary goal to back up short-term growth by boosting consumption/investment through higher real disposable income and enhanced economic confidence (albeit the fiscal multiplier is lower than in the case of expenditure). On the other hand, some governments have put their focus on changes in the structure of taxes with the aim to strengthen the longer-term growth potential of the economy or on pure automatic fiscal stabilisation.

While discretionary, short-term oriented tax policies have been applied widely across industrialised countries in this recent period of weak economic growth, the papers of session 2 do not draw much attention to this evidence. In fact, with regard to this discretionary uncompensated tax relief, we have observed fairly mixed experience in recent years, very often even very poor positive impacts on growth and employment. Nagaosa, for instance, demonstrates plainly that the discretionary tax measures in the order of 1.3 per cent of GDP to stimulate the economy, implemented in Japan since 1999 in a period of prolonged extremely subdued growth and deflation, have brought about very disappointing effects. In this respect, both the Australian and Japanese policy papers state unambiguously that in the future active measures will play an only negligible role in policy shaping in their countries.

Moreover, strikingly, while the theoretical papers concentrate on issues concerning automatic short-term stabilisation in this session 2, the more policy-oriented papers, in particular, emphasise structural, longer-term aspects of tax reforms and their short-term positive impacts on economic confidence.

1. Short-term stabilisation via automatic tax stabilisers

Automatic stabilisers in the tax system contribute significantly to short-term stabilisation, generally much more than the expenditure side. Buti and van den Noord stress in their paper in particular the government size in form of the overall tax burden. They claim that reforms in tax and benefit systems will not only increase economic efficiency, but, depending on the nature of shocks, especially when referring to the supply side, would also improve stabilisation properties when the tax

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burden would be lowered below critical levels (estimated values between 40 and 42 per cent of GDP in case of EU Member States).

However, the cyclical elasticity of automatic tax stabilisers is also determined via various other channels. The progressivity of the tax system, impact lags and the cyclical sensitivity of the tax base may influence the total tax elasticity as well. Austria, as an example, with a fairly high overall tax burden of around 44.5 per cent of GDP by international comparison, proved to have quite a low cyclical elasticity of taxes of less than 0.3. With relatively small output fluctuations, this results in an approximately average impact of automatic stabilisers on growth and employment.

Furthermore, Marino, Monacelli and Siviero show in their paper as one of the core results that the tax elasticity in personal income tax has, on average, become markedly more volatile in recent years. And due to higher marginal propensity to consume, tax elasticities for low incomes turn out to be higher than for high incomes. Therefore, as tax reforms impact both the progressivity and the size of automatic stabilisation and as cyclical swings show a varying composition of aggregate demand, tax elasticities in relation to GDP will be not stable. Thus, as the tax system is typically amended by every (annual) budget act, the economic impact of automatic stabilisation is fairly difficult to be accounted for by policy-making.

2. Medium and long-term (efficiency) considerations of tax reforms

The European Union set itself via the Lisbon agenda fairly ambitious medium and long-term goals to raise the growth potential. Tax policies, embedded into an overall framework of public finances, may contribute to increase growth and employment. More or less in the same vein as the Lisbon strategy of the European Union, the policy papers by Smith and Nagaosa also emphasise the longer-term growth strategy of tax policies in their countries.

Smith, in presenting the main objectives of the Australian tax policies, especially emphasises longer-term effects of tax reforms. Budgetary discipline and long-term financial sustainability should safeguard an appropriate national savings-investment balance which makes the economy more resilient to shocks in the medium-term and contributes to smooth growth and employment developments. In the long run, in particular in view of ageing populations, the tax system should be reoriented towards providing the right incentives to raise labour participation and productivity.

The paper by Nagaosa presents the shift in the policy focus of the Japanese government towards structural reform in consequence of the poor economic performance of active, counter-cyclical tax measures. Thereby, tax reform represents one of the four pillars of structural reform in restoring confidence into the Japanese economy and growth in the medium term. The tax system will be overhauled with the primary policy objectives of better intergenerational fairness, higher efficiency, less volatility in the system and markedly improved competitiveness.

While the latest EU and OECD reports on forecasting age-related public expenditure showed very clearly that demographic changes will exert significant pressures on public expenditure in almost all industrialised countries, in particular on pensions and health care, the impact of ageing on the overall tax burden does not appear to be that clear from the economic literature. Here, the Australian paper assumes a constant tax share in GDP within the context that the bulk of pension provision is based on privately funded pension schemes. In contrast, for instance, the Danish and Dutch governments argue in their stability and convergence programmes that in the long run they will receive higher tax revenues from their funded second and third pension provision pillars. This will be in the order of 2-4 percentage points of GDP, in particular from higher VAT and income tax revenues, in line with the rising volume of taxable pension income. The economic model used here is based on pension benefits, which are taxed when they are paid, while the contributions are exempt from income taxation. This implies significant tax subsidies in favour of such schemes and, thus, for retirement savings. The tax subsidies occur because firstly, tax payments are deferred into the future, secondly, in a progressive tax system a lower tax rate will, in general, be levied on pension benefits compared to the income from which the contribution was subtracted, and thirdly, when returns on capital invested are not taxed, investment in these funds are treated more favourable than other forms of investment.

However, following another stream of economic arguments, when ageing will raise age-related expenditure and, consequently, contribution rates in particular in PAYG schemes, gross wages (defined here as and wages gross of taxes, but net of social contributions) as a share of GDP may decline. Thus, tax revenues from wages as a proportion of GDP may even fall, given unchanged tax rates. As a result, the ultimate sign of future tax revenue developments depends on whether higher tax revenues from mounting and taxed pension benefits will offset the tax losses due to the decline of the wage sum. If wage sum reductions equal pension expenditure rises, total tax revenues will decline definitely, as on average a lower tax rate is imposed on pension benefits than on wages.

In addition, Japan faces a clear trade-off between reversing the deficit-debt spiral and revenue-neutral structural tax reform. Firstly, from a policy perspective, curbing high and unsustainable deficits of about 7 per cent of GDP only through expenditure cuts, appear to be fairly ambitious without any tax increases. Interest group pressures and social costs (*i.e.* in form of strikes) may get too high when the burden will not be borne by the general public. Secondly, also revenue-neutral oriented tax reforms may face lags in being fully financed, which will then contribute to a further widening of the deficit in the short-term. Expenditure reforms in certain fields, such as pensions and public administration, typically take time to fully work their effects through. And thirdly, the economic impact of a greying population is already more advanced than in most other industrialised countries. In this respect, tax revenues may already be affected negatively today.

Austrian tax reform 2004-05

Very much in line with the Australian and Japanese goals, the Austrian government set as its primary policy objective for the tax reform 2004-05 to enhance the growth and employment potential. In this reform, the Austrian government obviously stresses efficiency gains, gives some considerations on income distribution and draws only limited attention to short-term stabilisation. This tax reform will be implemented in two separate steps in the years 2004 and 2005, especially by lowering business and labour taxes and strengthening ecological taxation. This reform is presumed to reduce the net tax burden by 1.3 per cent of GDP in 2004/2005. Hence, this will amount to the largest reform since 1945. Despite this large volume, the public deficit will rise only to 1.5 per cent of GDP in 2005, before approaching again the common EU objective of "close to balance or in surplus". This reform will continue the line taken in two "stimulus" packages of the year 2002, which intended to strengthen the supply-side in particular by improving tax incentives on R&D investment and education in particular.

For the large tax reforms of the years 1989 and 1994 (which had, indeed, somewhat smaller supply side effects) model calculations showed an increase in GDP in the course of four years of approximately the size of the tax relief. This implied that the tax reforms were partly self-financed (by about one fifth). The growth effects, as focused on the supply-side, are estimated to be higher for this reform than for the previous ones. It is thus essential that government expenditures decline substantially in order to ensure financial sustainability. Additionally, labour supply will markedly increase due to a reform of the pension system. Since overall supply and demand are increased simultaneously, the rate of growth is expected to rise at least temporarily, especially by employment growth.

3. Timing of tax reforms

The main conclusion of the paper on tax policy analysis by Hort and Ohlsson is that, despite EU tax coordination and international economic integration, the lack of convergence in the tax systems will still hint at the existence of some national room for manoeuvre for EU Member States. Moreover, the paper points out rightly that major constraints represent tax competition, tax avoidance/evasion, interest groups and collection costs.

In addition to Hort and Ohlsson, in designing tax reforms, policy-makers may face the principal challenge: when is the right time to enact the reform, and when does a respective budgetary room for manoeuvre exist? They are confronted (at least) with four policy constraints:

a) Should they enact reforms in good or bad cyclical times: one may find the Irish case that tax relief has been perceived as expansionary (and led to an Art. 99(4) recommendation by the ECOFIN Council in 2001), contributing to inflationary tensions in an already overheating economic environment. Or one may create budgetary imbalances as it was demonstrated by initiating the Excessive Deficit

Procedure according to Art. 104 in the case of Germany and France in the years 2002 and 2003.

b) Should you implement the tax reform in one immediate or more gradual steps? As to the former, you are in danger to create a vicious circle of stop-and-go policies, with initiating high deficits, followed by consolidation. In the latter, one may face difficulties to adhere to the proposed time-schedule, which then may drag severely on economic confidence.

c) The timing is also closely linked with the issue of financing the tax reform. There may be some lags in structural expenditure restraint (*i.e.* pensions, administration), which in the short-term may lead then only to cuts in capital formation expenditure or shifts in taxation. This, however, will generate new economic distortions or will significantly hamper the growth potential.

d) In line with the Hort and Ohlsson paper, lags in decision, implementation and in effectiveness may negatively influence the outcome of the tax reform, *i.e.* through pro-cyclical effects, due to inappropriate timing. The Australian paper states that this tax reform should, in particular, improve timeliness.