

OECD Economic Surveys: Switzerland 2011



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

The economic situation and policies of Switzerland were reviewed by the Committee on 25 October 2011. The draft report was then revised in the light of the discussions and given final approval as the agreed report of the whole Committee on 18 November 2011.

The Secretariat's draft report was prepared for the Committee by Andrés Fuentes and Anita Wölfl under the supervision of Pierre Beynet. Statistical assistance was provided by Patrizio Sicari. The survey also benefited from external consultancy work done by Dirk Schoenmaker.

The previous Survey of Switzerland was issued in December 2009.

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BASIC STATISTICS OF SWITZERLAND

THE LAND

Area (1 000 sq. km)	41.3	Major cities (1 000 inhabitants, 31/12/2010)	
Cultivated land, grassland and pastures (1 000 sq. km)	15.2	Zurich	372.9
Forests (1 000 sq. km)	12.7	Basel	163.2
		Geneva	187.5
		Bern	124.4

THE PEOPLE

Population (thousands, 31/12/2010)	7 870	Civilian employment (thousands, 2010)	4 588
Number of inhabitants per sq. km (2010)	191	Primary (%)	3.4
Net natural increase (thousands, 2010)	17.6	Secondary (%)	22.8
Number of foreign workers (thousands, 2010)	1 249	Tertiary (%)	73.8

PRODUCTION

Gross domestic product, current prices (2010)		Gross fixed investment, current prices (2010)	
CHF billion	550.6	% of GDP	20.9
GDP per head (USD)	67 802	Per head (USD)	14 014

THE GOVERNMENT

Public consumption (% of GDP, 2010)	11.5	Composition of Parliament	National Council	State Council
General government (% of GDP, 2010)		Swiss People's Party	54	5
Expenditure	34.2	Social Democrats	46	11
Revenues	34.8	Parliamentary Group FDP	30	11
Gross debt (2009)	42.5	Christian Democrats/EPP	32	13
		Green Faction	27	2
		BDP Faction	9	1
		Last elections: 23 October 2011		
		Next elections: October 2015		

FOREIGN TRADE

Exports of goods and services (% of GDP, 2010)	53.6	Imports of goods and services (% of GDP, 2010)	42.2
Commodity exports (billion CHF, 2010)	193.5	Commodity imports (billion CHF, 2010)	174.0
Distribution by area (% of total, 2010)		Distribution by area (% of total, 2010)	
To industrialised countries	75.0	To industrialised countries	86.5
To 27 EU countries	58.5	To 27 EU countries	79.1
To OPEC	3.5	To OPEC	1.1
Distribution by categories (% of total, 2010)		Distribution by categories (% of total, 2010)	
Raw materials and semi-finished goods	19.8	Raw materials and semi-finished goods	24.4
Capital goods	26.1	Capital goods	24.1
Consumer goods	51.1	Consumer goods	43.8
Energy	3.0	Energy	7.7

THE CURRENCY

Monetary unit: Swiss franc		Currency unit per USD, average of daily figures	
		Year 2010	1.0416
		October 2011	0.8975

Executive summary

Switzerland's recovery has been broadly balanced despite strong appreciation of the Swiss franc. Capital markets' concerns regarding sovereign debt in several countries have led the Swiss franc to appreciate to record levels. While deteriorating price competitiveness was partially compensated by strong global demand for Swiss goods and services, exports have recently begun to weaken. The SNB has introduced an upper limit on the euro/Swiss franc exchange rate to stop appreciation. While keeping interest rates low for some time is appropriate, unusually low interest rates have boosted mortgage lending and house prices. To avoid building up imbalances, additional macroprudential tools should be introduced.

Tax reform can reduce incentives to leverage wealth and could increase potential growth. The tax burden in Switzerland is low in international comparison, mostly reflecting the substantial weight of non-tax compulsory contributions for the health and pension systems managed by private institutions. Shifting from the taxation of personal income to taxation of goods and services by widening the base of the VAT and increasing the standard VAT rate would be growth-enhancing. There is scope for such reform as personal income taxation contributes an unusually large share of tax revenues while taxation of goods and services is low. Such a reform could be accompanied by steps to cushion real income losses for low-income households. Generous provisions allowing the deductibility of interest payments from taxable personal income should be limited as it raises households' incentives to leverage and redistributes income towards wealthy households.

Implementing the planned reform of the regulation of the biggest two banks will reduce financial risks. The largest two banks remain highly leveraged, reinforcing the potential risks for taxpayers and the economy. Parliament has approved new legislation which will make substantial progress in addressing these risks. The reform introduces substantially higher risk-based capital requirements and a leverage ratio of about 5%. The two big banks will be required to develop emergency plans to ensure the maintenance of systemically relevant functions in case of a threat of insolvency. Procedures for orderly resolution will require international co-ordination. In this context a more stringent requirement for the leverage ratio and a higher contribution from highest-quality capital would offer substantial benefits for financial stability at little cost to the economy. The SNB should be given powers to set macro-prudential requirements on the banking sector to slow excessive lending growth.

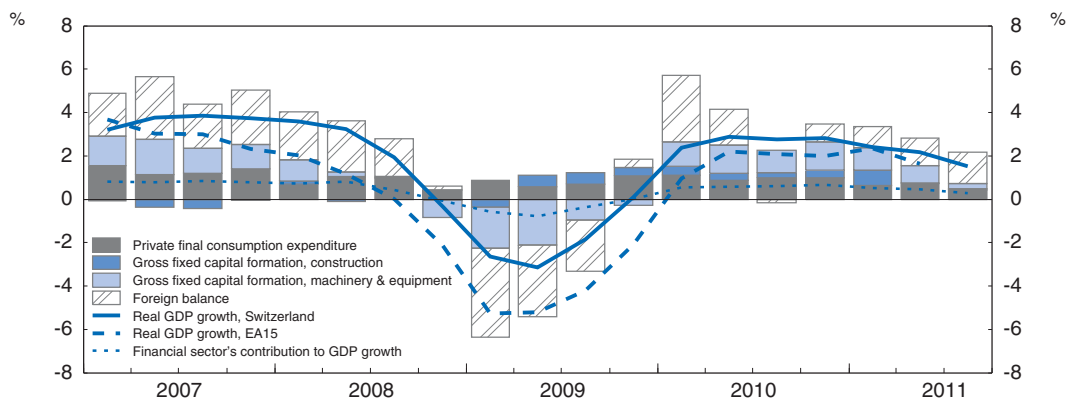
Meeting greenhouse gas emission reduction targets requires more cost-effective policies. Greenhouse gas emissions are relatively low in Switzerland, but it may be difficult to meet emission reduction targets with the existing climate policies. Making the policy mix more cost effective could be achieved in three areas. Introducing a carbon price on transport fuels could address CO₂ emissions from road transport, the sector with the largest potential to reduce emissions at low cost in Switzerland. Further improvement of the rental law and revising the use of the CO₂ levy on fossil fuels may help to increase the incentive of home-owners to invest in energy-saving renovations. Switzerland would benefit from linking its emission trading system to the EU scheme, and there is a need to improve the incentives to reduce emissions in the industry sector.

Assessment and recommendations


The economic recovery has been broadly balanced but risks to the outlook have increased

Switzerland emerged relatively early from a recession that had been less deep than in the euro area. The recovery continued in the first half of 2011, although with slowing momentum (Figure 1). Domestic demand has been boosted by investment, notably in construction. Financial services output has recovered, although at a slower pace than in previous expansions. Substantial employment growth has continued to lower unemployment while absorbing a large inflow of foreign workers (Figure 2, Panel A). While the output gap is now small, consumer price inflation remains low, as exchange rate appreciation damped import prices, notably for imported commodities and oil.

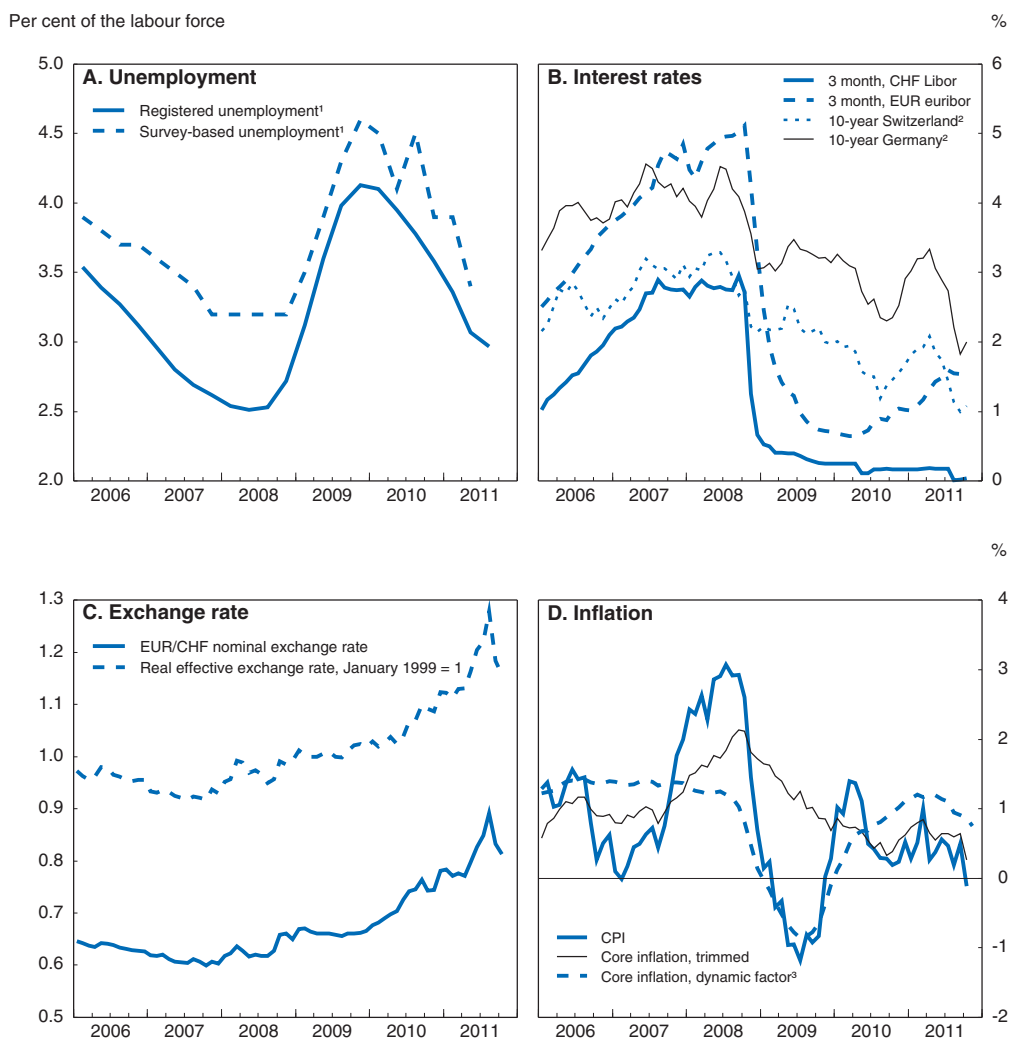
Figure 1. **Real GDP growth and its main contributors**
Year-on-year growth rates and percentage contributions



Source: OECD, Economic Outlook 90 Database; SECO.

StatLink  <http://dx.doi.org/10.1787/888932560721>

While uncertainty over the near-term outlook is substantial, especially in the context of the euro area debt crisis, economic indicators point to a period of economic stagnation in the near term, especially in manufacturing. This is related to decelerating activity in trading partners, notably Germany, and the appreciation of the Swiss franc. GDP growth may weaken in 2012, widening the output gap, and the unemployment rate is expected to bottom out (Table 1). Inflation is also likely to be low if the Swiss franc remains at its historic highs against major currencies. Nonetheless, according to OECD estimates, potential growth has not diminished as a result of the crisis and amounts to about 2%. It has been supported by a continued large inflow of foreign workers. However, while the


Figure 2. **Macroeconomic indicators**

1. Seasonally adjusted.

2. Sovereign bonds.

3. Dynamic factor inflation (DFI) extracts the inflation trend from a large number of nominal and real macroeconomic variables which allows it to anticipate movements in actual inflation.

Source: OECD, Main Economic Indicators and Economic Outlook 90 Databases; SNB, Monthly Statistical Bulletin, November 2011.

StatLink  <http://dx.doi.org/10.1787/888932560740>

aggregate productivity gap with respect to best-performing OECD countries has stopped widening in recent years, it remains substantial and reflects weak performance in some sectors not open to international competition. Despite progress over the past 15 years, there is hence scope for further reform of product market regulation, notably in services markets, including in network industries, as highlighted in earlier *Economic Surveys* and *Going for Growth*.

Table 1. **Short-term economic projections**

	2008	2009	2010	2011	2012	2013
	Current prices CHF billion	Percentage changes, volume (2000 prices)				
GDP at market prices	545.0	-1.9	2.7	1.8	0.8	1.9
Private consumption	308.7	1.4	1.7	1.1	1.3	1.3
Government consumption	59.3	3.3	0.8	1.3	1.5	1.6
Gross fixed capital formation	115.2	-4.9	7.5	4.2	2.9	4.2
Final domestic demand	483.2	0.1	2.9	1.9	1.7	2.0
Stockbuilding ¹	0.2	0.4	-1.2	-1.2	0.2	0.0
Total domestic demand	483.4	0.6	1.5	0.6	1.9	2.1
Exports of goods and services	307.3	-8.6	8.4	3.9	0.4	5.7
Imports of goods and services	245.6	-5.5	7.3	2.0	2.7	7.0
Net exports ¹	61.7	-2.4	1.3	1.3	-0.9	0.0
<i>Memorandum items</i>						
GDP deflator	-	0.2	0.1	0.8	0.2	0.3
Consumer price index	-	-0.5	0.7	0.4	0.0	0.3
Private consumption deflator	-	-0.5	0.7	0.6	0.2	0.3
Unemployment rate	-	4.3	4.5	4.0	4.3	4.0
General government financial balance ²	-	1.0	0.6	0.8	0.5	0.6
Government debt ²	-	43.7	42.6	42.0	41.2	40.7
Current account balance ²	-	11.4	15.6	13.4	12.6	12.8

Note: National accounts are based on official chain-linked data. This introduces a discrepancy in the identity between real demand components and GDP. For further details see OECD Economic Outlook Sources and Methods (www.oecd.org/eco/sources-and-methods).

1. Contributions to changes in real GDP (percentage of real GDP in previous year), actual amount in the first column.

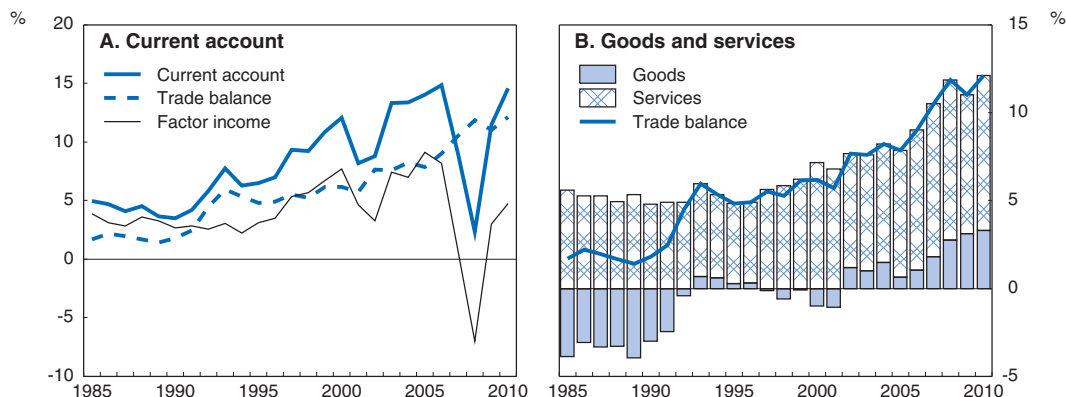
2. As a percentage of GDP.

Source: OECD Economic Outlook 90 Database.

The strong appreciation of the Swiss franc is threatening the export sector

The trade-weighted real exchange rate appreciated to record levels as the Swiss franc benefited from capital inflows in the context of turbulence in some euro area debt markets (Figure 2, Panel C). The speed of the appreciation accelerated in 2011 and the real effective exchange rate, calculated by the Bank for International Settlements, was almost 40% above its long-term average in August. With an export share of 50% of GDP, the likely overvaluation of the exchange rate relative to fundamentals and the rapid speed of appreciation impose particularly heavy costs on sectors producing tradable goods and services. The current account surplus returned to its level observed prior to the crisis (Figure 3) in 2010, which is, however, not inconsistent with exchange rate overvaluation. Switzerland has a large current account surplus which is largely due to structural factors not related to the real exchange rate. The recovery in global financial markets boosted investment income, including profits from the foreign affiliates of the large Swiss banking and insurance institutions, as well as revenues from financial services exports. Exports of merchandise trading services, including the trading of raw materials, have expanded on a large scale in recent years. These services exports are little sensitive to exchange rate movements. Deteriorating price competitiveness in goods exports was more than compensated by strong global demand for Swiss goods and services, notably from emerging East Asian economies to which, according to OECD estimates, Switzerland has closer trade ties than most European OECD economies. Exports to emerging Asia have contributed more than a third to overall Swiss export growth since 2009. The specialisation of exports on goods and services which are research-intensive and patent-protected (such

Figure 3. **Current account and main components**
As a percentage of GDP



Source: SNB, Monthly Statistical Bulletin, November 2011.

StatLink  <http://dx.doi.org/10.1787/888932560759>

as pharmaceuticals) as well on luxury market segments may have contributed to this strong demand growth.

During the summer of 2011, exchange rate appreciation accelerated at an unprecedented pace, as the CHF-euro exchange rate fell from CHF 1.23 per euro at the beginning of July to less than CHF 1.05 per euro in August 2011, before stabilizing at around 1.2 following the change in monetary policy (see below). The negative effects of real exchange rate appreciation are subject to substantial lags. Surveys indicate that most firms have so far accommodated the appreciation by lowering margins and therefore have not reduced the volume of production. But exports have begun to fall. Export-oriented small and medium-sized businesses are particularly vulnerable because they depend on domestically priced inputs to a larger extent than large firms. In view of the sunk cost characteristics of investment in production facilities and firm-specific human capital, there is a risk that even temporary large exchange rate appreciation can have permanent effects on production supplied by these businesses, possibly resulting in large welfare losses.

Some concerns are emerging that a housing market bubble may start building up

Activity in domestically-oriented sectors has benefited from unusually low short and long-term interest rates (Figure 2, Panel B), reflecting notably the confidence financial investors place in the Swiss economy. Low interest rates have boosted domestic mortgage lending, which has already been growing vigorously for several years. The response of domestic demand growth to these developments has been moderate, in part because housing investment is inelastic to changes in prices. House prices appear to have accelerated and strong mortgage lending is increasing financial risks for banks and indebted households, which would be aggravated if interest rates were to rise sharply. In the assessment of the Swiss National Bank (SNB), house prices exceed fundamental valuations only in some local areas so far, although continued price increases could signal a housing bubble. Indeed, both outstandingly low interest rates and robust income growth generate a propitious setting for asset price bubbles to develop. Financial risks arising from the build-up of a house price bubble could be exacerbated by gross household

indebtedness that is among the highest in the OECD area, even though household financial wealth is also sizeable, reflecting, in part, the large funded component in the pension system. A housing bubble in the domestic housing market could increase risks faced by the domestically oriented, smaller, banks. This could add to the potential risks resulting from the large size of the two large, internationally oriented banks.

Monetary policy needs to remain expansionary

Core inflation measures have remained between zero and 1%. In view of the recent and massive exchange rate appreciation, and the deterioration of the global economic outlook, the output gap is expected to widen, keeping inflationary pressures low. According to the SNB's conditional inflation forecast, which is based on the assumption of a policy rate of zero percent, inflation will remain close to or fall below zero until 2013 and will increase to 1% by 2014. Monetary stimulus will therefore need to remain expansionary for some time, unless the scenario underlying the inflation projections changes, for example through a reversal of recent exchange rate developments. Since interest rates may therefore remain unusually low and liquidity abundant it is important that macro-prudential measures are taken in parallel to avoid excessive mortgage lending (see below).

To counter a rapid and massive appreciation of the Swiss franc in the summer of 2011, which seems to be largely driven by a search for safe havens by investors, the SNB lowered the upper limit of the target band for its policy rate – the 3-month Swiss franc LIBOR – from 0.75 to 0.25% on 3 August 2011. The SNB has also embarked on an unprecedented liquidity expansion through repurchase and foreign exchange swap transactions with the aim to weaken the Swiss franc. On 6 September, the SNB introduced a floor to the CHF/euro exchange rate of 1.20 CHF/euro and announced it stands ready to purchase unlimited amounts of foreign exchange to enforce the exchange rate ceiling. The SNB argued that the overvaluation of the Swiss franc poses an acute threat to the Swiss economy and that, without the lower limit, there would have been the risk of a deflationary development, which could have entailed mutually reinforcing declines in activity and prices. Even with the exchange rate above 1.20 CHF/euro there will be a period with negative inflation in 2012 according to the SNB's inflation forecast published in September. The SNB should weigh the benefits from this intervention against its potential risks. In view of the speed and the size of the appreciation, the intervention by the SNB was appropriate to fulfil its mandate to maintain price stability. A number of other countries have also recently taken unilateral action, ranging from currency intervention to measures to influence capital inflows. While these measures were introduced to achieve legitimate domestic policy objectives, were such practices to become more generalised they could collectively have negative spillover effects on trade and global capital allocation.

Fiscal policy should remain prudent

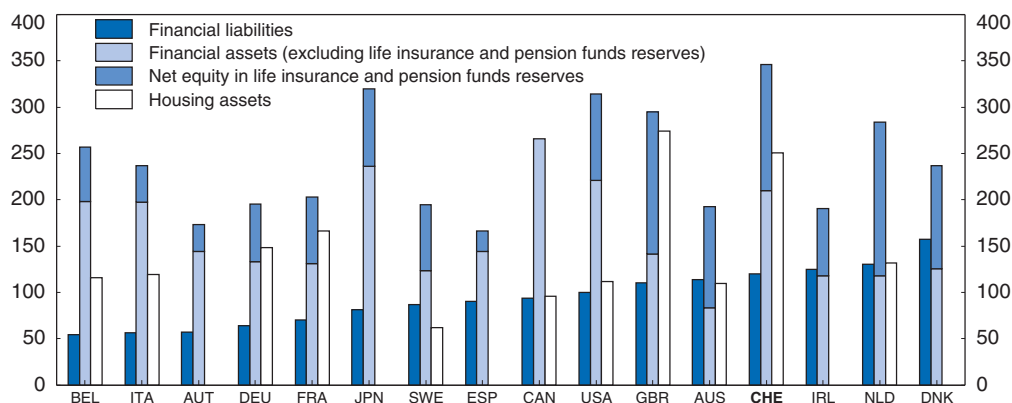
Prudent budgetary policies, a relatively mild recession during the global economic and financial crisis and a rapid recovery have kept the general government balance in surplus in 2010. Federal fiscal policy remains consistent with meeting the requirements of the debt-brake rule, which requires balanced budgets over the cycle. Relatively robust economic growth so far, sustained by domestic demand, may result in overestimating structural revenue growth. However, in view of the deteriorating economic outlook, the automatic stabilisers should be allowed to operate, even though this might result in a modest deterioration of budget outcomes.

Incentives for households to leverage their wealth should be reduced

Net wealth and net financial wealth are high, in part reflecting assets in pension funds, but gross debt of Swiss household is also high (Figure 4). The personal income tax system generates incentives for households to leverage their wealth. All interest on household debt is tax deductible, subject to a ceiling defined by capital income received and an additional 50 000 CHF per year (equivalent to two thirds of average disposable income). Incentives to leverage wealth are reinforced by the tax advantages on the returns of an important part of household wealth, including capital gains on stock holdings and pension fund assets. While data are limited, they suggest that taxation of imputed returns on owner-occupied housing raises little revenue in part because of difficulties in aligning imputed rents with market developments. Available tax data indicate that revenues from the taxation of imputed rents are negative as expenditures deducted by tax-payers appear to exceed imputed rents. Finally, early withdrawals of savings held in pension funds are taxed at a fifth of the full tax rate under certain conditions, and such withdrawals can be used to repay mortgages.

Figure 4. **Household assets and liabilities in high-income OECD countries, 2009¹**

As a percentage of GDP



1. Non-consolidated excepted for Australia, for which only consolidated data are available.

Source: OECD, National Accounts Database 2011.

StatLink  <http://dx.doi.org/10.1787/888932560778>

By giving incentives to household indebtedness, the Swiss tax regime can potentially aggravate any future period of financial instability. It also has undesirable redistributive effects, as the deductibility of interest payments mostly benefits wealthy households and distorts household financial decisions, generating deadweight costs as a result of excessive financial intermediation for the sole purpose of minimizing tax payments. The tax deductibility of interest expenses of households from personal income tax should be phased out although it should be kept for interest on mortgages for housing that is let. Once (and only once) the tax deductibility of interest expenses of households is abolished, taxation of imputed rents of owner-occupied housing should also be removed to ensure a consistent taxation of costs and benefits of owner-occupied housing. This combination would reduce administrative and tax compliance costs. Early withdrawals of pension fund assets should be taxed in full. These steps would also widen the base of personal income taxation and could therefore make room for lower labour tax rates, thereby increasing work incentives.

Changes in the tax structure could strengthen potential activity

The Swiss tax system is heavily geared towards the taxation of household income, which is more harmful to economic activity than taxation of consumption. By contrast, taxation of consumption of goods and services is low, including VAT and environmental taxes. Real estate taxes also make a minor contribution to tax revenues. Substituting taxation of goods and services for the taxation of personal income would be growth-enhancing. Several goods and services are fully exempt from VAT, creating significant distortions for activity, especially in upstream markets. As in other OECD countries, banking services are exempt from VAT and the government is evaluating the elimination of the tax on securities transactions. The base of the VAT should be widened, especially by removing exemptions. An increase in the standard VAT rate of 8% should also be considered. Options to apply the VAT to financial services should be explored in order to equalise the tax treatment of this sector with respect to other sectors. Higher environmental taxation is necessary to address both global and local externalities (see below). Personal income taxes should be reduced. Such a shift in the taxation would be likely to redistribute real disposable income from low income households to high income households, especially in view of the fact that low income households pay no or little federal income tax over a wide range of income. However, Swiss households pay lump sum contributions to compulsory health insurance on a per-capita basis. These contributions are also paid by low income households, although federal and cantonal governments pay transfers to lower the burden of these contributions for such households. The withdrawal of these transfers raises effective marginal taxes. These transfers could be withdrawn more gradually as income rises. Such a step would cushion the negative impact of an increase in the VAT on lower-income earners. Most working women work part-time. One factor is costly childcare, which holds back full-time female labour participation. There is scope for subsidizing the supply of childcare facilities more generously and effectively, as argued in several past *Economic Surveys*. Funding for childcare facilities should be increased and provided through a national voucher scheme to pay for services in accredited facilities. Such subsidies could be targeted to households on modest incomes. The provision of more generous subsidies for children from deprived socio-economic would maximize the educational benefits of childcare facilities.

Powers to set personal income tax rates are assigned to all three government levels (federal, cantonal and municipal). While tax competition among cantons and municipalities appears to have contributed to more efficient provision of public services, competition among cantons and among municipalities with respect to personal income tax rates has some negative side effects. Tax rates on low income earners are relatively high in poor cantons, as the mobility decisions of high-income households, who favour low-tax cantons, have tended to undermine their tax bases. Giving more room for real estate taxes to generate revenues for municipalities would allow the tax burden to shift from personal income taxation to the taxation of real estate, which is less harmful for economic activity. Such a shift could limit some of the harmful effects of tax competition that result from the selection effects of the dispersion of personal income tax rates across cantons and municipalities, as it would allow local governments to tax a relatively immobile tax base. Real estate taxes may also be particularly suited to funding municipalities because of the stability of revenues and the relatively close correspondence of such revenues with both spending needs and provision of local public services, which is capitalised in real estate prices. The scope for local governments to raise a higher share of

revenues from the taxation of real estate should be raised. Real estate is included in the general tax on net wealth. In addition, several cantons apply specific taxes to real estate. However, the revenues from these specific taxes are limited by the constitution to the level of expenditure on public infrastructure development in residential areas. This limitation should be removed. Cantons should consider assigning real estate tax raising powers to municipalities in full. Municipalities' income tax surcharges could be limited nation-wide.

Cross-border issues in taxation need to be addressed

Cantons use low lump-sum taxes to attract high-income individuals moving to Switzerland from abroad. These individuals can apply for lump sum taxation provided they do not engage in economic activity in Switzerland. At the federal government level, their tax liability is assessed by applying the personal income tax on the quintuple of the rental payment or the imputed rent for the Swiss residence. They may reduce the tax base in other OECD economies. The lump sum tax regime for non-economically active individuals should be abolished and these individuals should be subjected to the standard taxation of personal income and wealth. Such a step would also be consistent with the abolition of taxation of imputed rents more generally.

Switzerland has made progress in improving international co-operation in combating tax evasion, notably by revising its tax treaties with partner countries so as to incorporate fully the OECD standard on the exchange of information between tax administrations. Nonetheless, the peer review of Switzerland conducted by the Global Forum on Transparency and Exchange of Information for Tax Purposes has identified areas which need to be improved further in Switzerland. Notably, Switzerland should undertake the necessary measures to ensure that appropriate mechanisms are in place to identify the owners of bearer shares in all instances. It should also ensure that the identification requirements of the given taxpayer or the holder of the information in the revised double tax agreements as well as its interpretation thereof are in line with the standard for the effective exchange of information. The country has already introduced bills to address several recommendations made in the peer review report, in particular those dealing with the aforementioned identification requirements.

Box 1. Three key recommendations on improving the tax system

- To reduce incentives to leverage, tax deductibility of interest expenses of households from personal income tax should be eliminated (except for interest on mortgages for housing that is let).
- To enhance growth, the tax burden should be shifted away from labour towards less distortive taxes such as consumption taxes. To that aim, the personal income tax should be reduced while the base of the VAT should be widened and an increase in the standard VAT rate considered.
- To further improve potential growth and avoid negative side effects of tax competition, limitations on local governments' ability to raise real estate taxes should be eliminated, allowing higher real estate tax revenues to partly substitute personal income tax revenues at the local level.

Reform of regulation of the large, internationally active banks is essential to limit potential financial risks

While the two largest banks (Big-2) have downsized their balance sheets from a combined total of nearly seven times GDP in 2007 to 426%, they remain exceptionally large in international comparison (Table 2). Direct exposure to euro area crisis countries is low, but the Big-2 remain very highly leveraged, resulting in potential risks for taxpayers and the economy should losses recur. Current regulation allowed the Big-2 to maintain loss-absorbing capital levels below 2% of total assets on average at the end of 2010, even in the context of persistent global financial turmoil, although capital relative to risk-weighted assets is higher than in many internationally active banks. The past financial crisis has revealed that financial difficulties in one big bank can have potentially far-reaching consequences for the economy and could be very costly for tax payers.

Table 2. **Banks' total assets in per cent of GDP**

		2007	2010
Euro area	Credit institutions	317	338
	MFIs	330	350
Switzerland	All banks	669	505
	Top 2 banks ¹	693	426
United Kingdom	MFIs	486	542
	Top 2 banks ¹	117	165
Denmark	Banks	232	240
	Top 2 banks ¹	261	259
Netherlands	MFIs	379	382
	Top 2 banks ¹	274	268
Ireland	Credit institutions	706	759
	Top 2 banks ¹	194	203

1. Data include foreign subsidiaries' assets.

Source: SNB; ECB; National Central Banks; OECD Economic Outlook 90 Database; Eurostat and Bankscope.

The government has presented draft legislation with proposals to reduce the potential need for large scale public rescue operations, on the basis of the recommendations of an expert commission. The draft legislation was approved by parliament in September 2011 with minor modifications. The new legislation foresees tighter capital requirements, which are expected to require capital to amount to about 19% of risk-weighted assets in the Big-2, and a leverage ratio requirement which is currently estimated to reach around 5%. However, these measures, once approved, will be implemented over a transition period of several years, in line with the Basel III process. The low capacity of the Big-2 to absorb losses requires prompt corrective action, especially in the context of ongoing financial instability. The regulator should require the Big-2 to hold more loss-absorbing capital relative to total assets in the near term.

The capital levels foreseen in the new legislation include a basic requirement, a buffer component banks have to build up and retain when profitable as well as a progressive component which varies in line with the banks' balance sheet size and their market shares in domestic lending markets. The progressive component, in particular, is well suited for reducing moral hazard and associated risks among large banks, and counteracting incentives for banks to grow bigger so as to benefit from implicit government guarantees. Close to half of the required capital can consist of contingent convertible bonds (CoCos, see

below), the remainder being common equity. Common equity, the valuation of assets and their risk weights are defined in line with Basel III.

The reform package makes substantial progress in reducing financial risks. A leverage ratio of about 5% for the Big-2 is however still modest in view of the risks involved from losses of a similar or larger order of magnitude. While most of the Big-2's assets are foreign, they account for close to 30% of domestic lending. Recent theoretical and empirical research indicates that higher capital requirements do not generate substantial social costs in terms of lower credit volumes, while providing significant benefits not only for financial stability but also lending quality, as they reduce moral hazard from implicit government loan guarantees. The need for substantial tightening of capital requirements is reinforced by the absence of an internationally co-ordinated resolution mechanism which could help avoid the rescue of a failing bank by the government (see also below). It is crucial that, at the least, the proposed capital requirements for the Big-2 are implemented in full. A stricter leverage ratio requirement should be introduced.

The reform also foresees requiring the banks to develop minimum contingent procedures to enable them to keep systemically important activities afloat, while closing down others, when their capital falls below critical thresholds. However, these requirements have yet to be spelled out. The reform package foresees that banks which improve their capacity to be unwound orderly beyond the minimum requirements to maintain systemically important functions can get a rebate on the capital requirements. Systemically important activities to be protected have yet to be defined, but will in any case relate to domestic financial markets only. In view of the global scope of the Big-2's activities and the close financial and reputational links between the components of banking groups, credible resolution plans will require an internationally co-ordinated approach at the group level. It is important that reductions in capital requirements are only granted if credible internationally co-ordinated resolution mechanisms at the group level are presented by the Big-2 and that they are discussed in the multilateral supervisory colleges, as intended by FINMA.

Contingent convertible bonds (CoCos) can contribute close to half of the new capital requirements. Their conversion into paid-in capital will be triggered when the regulatory accounting value of common equity relative to risk-weighted assets drops below predefined thresholds. Additionally, these CoCos include a non-viability clause which can be triggered by FINMA if there is a threat of insolvency according to FINMA's assessment. There is a risk that regulatory accounting values may reflect the true financial situation of banks only with a considerable delay, especially if most assets, such as loans, are not subject to mark-to-market valuation rules. Risk weights are determined by the banks' own models and have in the past proven inadequate, while regulatory forbearance contributed to lack of corrective action. Book valuations are subject to some managerial discretion and management is required to defend incumbent stockholders' interests, which may incline management to avoid conversion. For these reasons, it is important that book values of the banks concerned are assessed independently, especially with respect to the banks' own risk assessments. While the non-viability assessment provides another safeguard against late conversion, it is subject to FINMA's discretion and may generate the potential risk of regulatory forbearance. On the other hand, triggers based on market valuations of the Big-2 alone risk fostering speculation to push market valuations down to the trigger value, which could destabilize the market. The accounting triggers for the contingent convertible bonds (CoCos) should be complemented by market indicators: when the stock price of one (or

both) of the Big-2 banks that issue the CoCos drops sharply, the authorities should monitor the viability of the bank and if necessary activate the non-viability clause triggering conversion.

The reform stipulates two different thresholds for the conversion of CoCos into common equity. Two thirds of the CoCos the Big-2 can issue to meet capital requirements may be subject to a conversion trigger of 5%, while the conversion of the remaining third is to be triggered at 7% of common equity relative to risk-weighted assets. The lower trigger is set just above the minimum common equity that banks will be required to hold at all times, set at 4½ per cent of risk-weighted assets. A belated conversion would entail more significant risks for the CoCos subject to the lower conversion trigger, reinforcing the need for the banks to hold substantial common equity buffers.

Regulators should ensure that the Swiss financial system is prepared for a simultaneous trigger of CoCos issued by the Big-2. In particular, it would be dangerous for the Swiss financial system if the buyers of CoCos are concentrated within a few Swiss financial institutions. To this end, it is useful to limit exposures of all Swiss financial intermediaries to the Big-2. Such limits are already in place for the banks. The two largest Swiss insurance groups' balance sheets sum to more than 100% of GDP. Significant exposures to the Big-2 could exacerbate any financial risks in the Big-2. For insurance companies specific provisions on risk concentration *vis-à-vis* the Big-2 should be considered.

Macprudential considerations need to be incorporated effectively in prudential regulation

To strengthen macro-prudential regulation, co-ordination between the government, the financial market regulator (FINMA) and the SNB was improved in 2010 and 2011, including through the regular exchange of information and co-ordinated crisis prevention. FINMA and the SNB can jointly define projects of common interest, in which they consult each other but they are not generally required to do so. The current financial crisis showed that the supervision of individual banks needs to incorporate explicitly developments in domestic and international financial systems to assess risks fully. The authorities are considering options how to strengthen macroprudential oversight and the government has announced the introduction of macroprudential tools for the mortgage market. In view of its macroeconomic expertise and its responsibility to contribute to the stability of the financial system, a leading role of the SNB in ensuring that system-wide risks and macroeconomic developments are adequately reflected in prudential regulation would be desirable. The role of the SNB in microprudential regulation should be strengthened to ensure that system-wide risks are taken into account in such regulation. For example the SNB could be mandated to propose measures to incorporate system-wide risks in regulation. FINMA could be required to either comply or explain, while retaining its ultimate regulatory competence.

Neither FINMA nor the SNB have powers to impose cyclically-dependent buffers across all banks, or temporary rules to prevent excessive lending growth, for example in the mortgage market. Implementation of Basel-III rules will result in the introduction of a counter-cyclical buffer starting in 2016, which may be too late for preventive action in the domestic mortgage market. Therefore, the Swiss authorities are considering introducing such a buffer already in 2012. The SNB should be given powers to introduce macroprudential instruments. These could be, for instance, time-variant counter-cyclical

capital buffers or measures to curb excessive lending growth, such as limits on the loan-to-value ratio or the debt service-to-income ratio.

There is a need to strengthen system-wide oversight over mortgage lending, especially in view of persistently low interest rates. Such oversight is critical in a country hosting a major international financial centre. For example, no statistics are available on average loan-to-value ratios and their frequency distribution in new mortgages. Current legislation does not give sufficient powers to the SNB to require commercial banks to provide all the necessary information, for example, to ensure that data can be aggregated across banks. Some indicators suggest that house price rises have accelerated recently, with signs of prices rising above fundamental values in parts of the country. Some gaps in available data hamper the monitoring of financial risks. The SNB should be enabled to collect all the necessary data for effective oversight over the domestic mortgage market. The authorities are reviewing the improvements needed in data availability to strengthen macroprudential oversight.

Some reform of the regulatory framework for the small banks active in domestic lending markets would help reduce potential risks further

Cantonal banks, which are mostly owned by cantonal governments, have recently been particularly active in mortgage lending. While their individual balance sheets are relatively small, they are on aggregate important players in the domestic lending market. The widespread guarantees of cantonal banks by cantonal governments, which lower their funding costs, may help them gain market shares, especially in the current context of diminishing interest margins, and may encourage them to take on excessive risks. These risks are potentially heightened by the dependence of these banks on revenues from mortgage lending and the concentration of cantonal banks in their respective local markets, some of which have overheated. Explicit government guarantees to the cantonal banks should be eliminated.

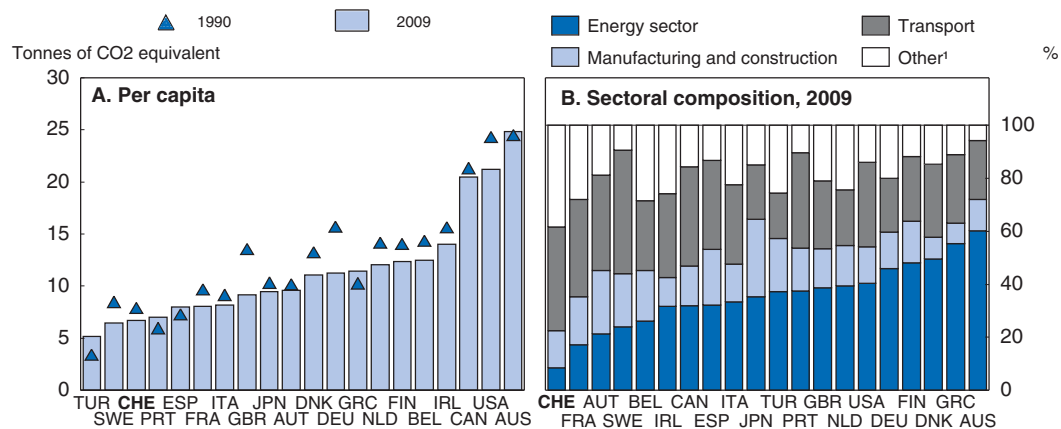
Box 2. Three key recommendations on reducing risks in the financial system

- A stricter leverage ratio requirement, above the foreseen level of around 5%, should be introduced. Preferably, common equity should contribute a larger share to the capital requirement.
- Credible and internationally co-ordinated resolution mechanisms at the group level should be in place for the Big-2 before any reductions in capital requirements are granted.
- To avoid imbalances building up, macroprudential tools should be introduced, such as measures to slow credit growth. The SNB should be enabled to collect all the necessary data to oversee the mortgage market.

Meeting greenhouse gas emission reduction targets requires more cost-effective policies


Switzerland is characterised by a low level of greenhouse gas emissions per capita (GhG) as compared to other countries which reflects the strong reliance on energy sources emitting small amounts of greenhouse gases and an industrial structure with a negligible weight of heavy industries (Figure 5, Panel A). Greenhouse gas emissions have remained

Figure 5. **Total per capita greenhouse gas emissions and percentage contributions to greenhouse gas emissions by sector**



1. "Other" cover emissions from fuel combustion in the following sectors: commercial/institutional; residential; agriculture, forestry and fishing.

Source: UNFCCC Database.

StatLink  <http://dx.doi.org/10.1787/888932560797>

almost the same since 1990 (Figure 5, Panel A), as emission reductions in the residential and industrial sector were offset by increases from the transport sector. Estimates suggest that Switzerland may not meet its 2012 Kyoto target of an 8% cut of greenhouse gas emissions below the 1990 level on average between 2008 and 2012. However, efforts to ensure compliance are under preparation. Meeting the 2020 target of a 20% emission reduction below the 1990 level will necessitate more cost effective policies so as to minimize losses in welfare and activity that may otherwise arise. This is particularly important as Switzerland is characterised by relatively high estimated marginal abatement costs.

Rendering the current policy mix more cost-effective would require addressing three general issues. *First*, efficiency could be increased by aiming at a uniform implicit carbon price within and across broad sectors. *Second*, prioritising quasi-voluntary measures before recourse to more effective market-based instruments, such as taxes or emission trading, may not produce the desired incentive effect for emission reduction and may reduce the political acceptance of a price on all greenhouse gas emissions. *Third*, the frequent use of revenues from taxes and levies for earmarked projects may reduce their effectiveness and waste resources.

The implicit carbon price in road transport is low

Road transport is the sector with the highest CO₂ emissions in Switzerland (Figure 5, Panel B) and CO₂ emissions from road transport have been continuously increasing, notably due to increased passenger road transport. CO₂ emissions are higher in congested traffic, as fuel consumption is up to two or three times as high in stop-and-go traffic as compared to fluid traffic. Congestion has increased eight-fold over the past 15 years, up to 15 000 hours in 2010. Addressing problems resulting from increased road transport, in particular congestion, would have a double dividend as they generate other important external costs for the society.

The implicit carbon price from road transport is very low, underscoring even more the large potential for emission reductions at low overall costs in the road transport sector. Swiss excise duties on transport fuel consumption are not high enough to create sufficient incentives to reduce emissions from car use. Estimates suggest that the revenues from fuel tax may not even be high enough to cover other transport-related costs. While high on diesel, the level of the excise duty on unleaded gasoline, which is used by the majority of cars, is low in international comparison. Moreover, commuting costs are tax-deductible. While the Swiss heavy vehicle fee (HVF) is an effective and flexible policy instrument, it is restricted to freight transport, which accounts for only 10% of total road transport. As part of Switzerland's efforts to tackle climate change, the Swiss Parliament has recently adopted legislation for more stringent emission performance standards for new passenger cars, in line with EU regulation. Also the energy efficiency label for cars is welcome as it helps to enhance the awareness of environmental costs linked to transport fuel consumption. However, the standards and the label are only likely to be fully effective if combined with price based measures.

In order to address CO₂ emissions from road transport, a CO₂ levy on transport fuels should be introduced. This levy would best be combined with a variable congestion charge that would be higher in congested geographical areas and periods of peak demand. In contrast to an overall flat rate levy, congestion pricing induces an efficient use of roads by redistributing demand for car use in time and space. Furthermore, since it would internalise a large part of the external effects from car use, the respective CO₂ levy would be lower than would otherwise be necessary. The most flexible and effective congestion charge system would consist of an electronic pricing scheme using satellite navigation. Even in such a system, confidentiality can be ensured without changing the institutional setting. Introducing a congestion charge early on could ensure that CO₂ emissions from road transport are dealt with soon. A congestion charge should be embedded in a broader mobility pricing framework that the government is planning to introduce in the longer run.

The policy mix in the residential sector can be made more cost effective

Despite the potential for reduced energy consumption from energy-saving renovation and reduced greenhouse gas emissions, there seems to be little incentive to renovate older buildings. About 85% of all dwellings are more than 30 years old while only 10% of dwellings have been constructed within the past 10 years. Moreover, only about 1% of the dwellings are renovated per year. One important reason for this are high investment costs relative to potential savings and lack of information on available technology and the savings it generates. The structure of the housing market also contributes, as two thirds of Swiss households live in rental dwellings, combined with rent regulation that makes it uncertain for home-owners whether they can pass on energy-saving investment into higher rents. To encourage energy-saving investment, a CO₂ levy on fossil heating and process fuels came into force in 2008 and the rental law was amended to make it easier for owners to pass on the costs from energy-saving investments. In 2010, the government launched a buildings programme which consists of financial incentives to individual renovation projects, financed by one third of the CO₂ levy's revenues.

There is scope to make this policy mix more cost effective. *First*, even with the 2008 amendment to the rental law, it may remain uncertain for owners whether their renovations will ultimately be judged as energy-saving, which would allow owners to pass on costs from energy-saving renovations to higher rents. The definition of energy-saving

renovations should be based on clearly defined criteria, *e.g.*, potential gains in energy efficiency achievable through the renovation. Moreover, if owners can only pass on the costs to the rent, leaving all of the return of the investment to the tenants, owners may still have an insufficient incentive to undertake energy-saving investment. If the extent to which rents can be raised was linked to potential energy efficiency, beyond cost recovery, owners would have a stronger incentive to undertake energy-saving renovations. A complementary tool would be to make provision of information on energy efficiency of dwellings compulsory.

Second, the use of the CO₂ levy in the residential sector should be revised. The level of the CO₂ levy is substantially lower than an estimated efficient uniform CO₂ tax and may hence not induce a sufficient incentive for energy-saving renovations. Moreover, while the buildings programme addresses some informational barriers on the side of the households, a significant risk of deadweight losses remains while achieving relatively modest emission reductions on top of those achievable through the levy. This risk arises especially since the subsidies in the buildings programme apply to all energy saving renovations, and are not targeted at renovations of rented dwellings. Once rent regulation is improved as suggested above, and a higher level of the CO₂ levy is eventually put in place, the financial incentives in the framework of the buildings programme would become redundant and should hence be gradually phased out. During the phase-out, subsidies should be made more restrictive, for instance by linking subsidy allocation to potential gains in energy efficiency.

Linking the Swiss and the EU emission trading system will help, but steps are required in the transition to the new system

In Switzerland, the industrial sector contributes only about 10% of total greenhouse gas emissions (Figure 5, Panel B) and has managed to largely decouple emissions from production. The current policy mix to reduce CO₂ emissions in the industrial sector goes in principle in the right direction as it involves market-based instruments to a large extent. The CO₂ levy on fossil heating and process fuels also applies to the industrial sector. Firms that are exempted from the CO₂ levy for competitiveness reasons can participate in the recently established Swiss emission trading system, and in March 2011, Switzerland and the EU started negotiations with a view to linking their emission trading systems. The government is committed to its efforts to link the Swiss system (Swiss ETS) with the EU emission trading system (EU ETS) as this would allow Swiss firms to trade in a much larger and efficient system, and it has the potential to provide Switzerland with a more cost-effective way to reduce emissions.

There do not appear to be precise criteria as to the definition of loss in competitiveness or the level of energy intensity needed to justify an exemption from the CO₂ levy on fossil fuels. Firms can be exempted from the levy if they establish an agreement with the regulator to meet a bilaterally negotiated emission target. This setting risks that CO₂ emissions are not priced, reducing the efficiency of the CO₂ levy. The overall impact of the CO₂ levy on firms' competitiveness is small, reducing the need for exemptions from the levy for competitiveness reasons. Swiss firms should be obliged to either pay the levy or participate in the emission trading system. For instance, firms in sectors covered by the EU ETS could participate in the emission trading system, while for firms in sectors not covered by the EU ETS, exemptions from the tax should be phased out.

The government's plan to set up a list of criteria to be met by firms requesting exemption from the levy is a first step in the right direction.

The Swiss ETS is a baseline-credit system. Firms can choose whether they want to participate or not and emission allowances are allocated to the companies free of charge, in accordance with the bilaterally negotiated targets. On top of distorted emission reduction incentives that result from bilaterally negotiated targets, this design also entails adverse selection in that only those firms participate that would have reduced their emissions in any case. For instance, giving emission permits for free is likely to reduce the incentives of firms to cut emissions and hence to participate in permit trading, because firms who made large cuts in emissions risk being granted fewer emission permits in the future. Within the ETS, emission targets should be set in the sense of binding emission caps for the industry as a whole. Beyond improved incentives, this step would also move the Swiss ETS closer towards a cap-and-trade system which will be required for the linking with the EU ETS anyway. Emission permits should also be auctioned, at least up to the limit foreseen in EU rules. Steps in this direction are planned in the draft revision of the CO₂ Act.

The Climate Cent Foundation, a voluntary initiative by the Swiss oil industry, uses the revenues from a small levy on imported fuels to finance domestic and international emission reduction projects, notably projects in the framework of the UN clean development mechanisms (CDM). The financing of such projects has the potential to reduce emissions at very low cost, compensate for carbon leakage, and boost the transfer of cleaner technologies to developing countries. However, verifying that the international projects produce emission reductions on top of those which would have resulted anyway is difficult. There is scope for Switzerland to work towards improved environmental integrity of the international emission reduction projects. Moreover, owing to its obligation to contribute to emission reductions within Switzerland, the Climate Cent Foundation has a position of a dominant player and can set emissions allowance prices inhibiting competition in the Swiss ETS. The Climate Cent Foundation should not be allowed to distort the emission trading market. The right to collect the climate cent should be replaced by a CO₂ levy on transport fuels as recommended above.

Box 3. Three key recommendations on reducing greenhouse gas emissions

- In order to address strongly increasing CO₂ emissions from road transport, a CO₂ levy on transport fuels should be introduced. This would best be combined with the introduction of a time- and area-dependent congestion charge.
- To boost energy-saving renovation in the building sector, rental regulation should be further improved. The definition of energy-saving renovations and the extent to which rents can be raised should be based on clear criteria, *e.g.*, potential gains in energy efficiency achievable through the renovation.
- The ongoing efforts by the government to link the Swiss system with the EU emission trading system (ETS) are strongly encouraged. Several steps would have to be made to make the climate policy mix in the industrial sector more cost effective in the transition towards this linking.

ANNEX A1

Progress in structural reforms

This table reviews action taken on recommendations from previous *Surveys*. Recommendations that are new in this *Survey* are listed at the end of the relevant chapter.

Recommendations in previous Surveys	Action taken since September 2009
A. Competition	
Apply the prohibition principle to all hard-core cartels. Raise ComCo's resources and ensure its independence by excluding members that represent economic interests.	The Federal Council will submit a revision of the Federal Act on Cartels to the Parliament in 2012 establishing a new independent competition authority and ban certain forms of vertical and hard core horizontal agreements if they are not justified by efficiency reasons. The SIEC test (Significant Impediment of Effective Competition) shall be introduced for merger control. ComCo has been endowed with additional personnel in 2011.
Consider introducing criminal sanctions to punish people responsible for anti competitive behaviour.	Reform proposals to introduce administrative and criminal sanctions against private persons were submitted to public consultation.
Reform the bankruptcy law to reduce the prescription period and facilitate the use of the concordat procedure.	A proposed reform of the concordat procedure which would facilitate the financial reorganization of companies is being discussed in Parliament.
Strengthen the independence of sector regulators.	Legislation should enter into force in the second half of 2012 making the postal regulator (PostCom) independent from the Federal Council and endowing it with the power to impose fines. The government plans to make the electricity market regulator independent from the Federal Office of Energy in 2012.
Privatise remaining government-ownership in potentially competitive market segments of network industries.	None.
Harmonise procurement rules across cantons, lower threshold values for public tendering, improve the accountability of procurement actions and benchmark public procurement costs at lower levels of government.	A revised ordinance has simplified procedures. Procurement statistics have been improved and prices are being benchmarked.
In the electricity sector, introduce ownership separation between generation and transmission, strengthen the powers of the regulator, introduce price caps and benchmark regulation, use regulatory accounting rules for the determination of network access prices.	The strengthening of the separation of the Swiss transmission system operator Swiss grid from other activities as well as <i>ex ante</i> benchmark regulation of access prices are under consideration.
In telecommunications, apply <i>ex ante</i> regulation to access conditions to the local loop and to interconnection charges.	<i>Ex ante</i> regulation is being discussed in Parliament.
In railways, make tendering of regional passenger services compulsory, ensure non-discriminatory access to rolling stock and allow competitors to propose investment projects. Base investment decisions on an independent cost-benefit assessment.	Parliament is considering introducing tendering of regional passenger transport services, although not on a compulsory basis, as well as rules on the provision of the incumbent's rolling stock for services tendered to competitors. Co-ordination regarding investment projects among the infrastructure operating companies, transport companies and the authorities have been introduced, but not in freight.
In postal services, eliminate restrictive personnel rules and administrative privileges applying to the incumbent. Abolish sector-specific regulation regarding the fixing of pay and working conditions.	Differences in rules and regulations have been eliminated, except for universal services obligations.

Recommendations in previous Surveys	Action taken since September 2009
In agriculture, remove impediments to structural change in land law. Reduce protection against imports. Eliminate collusive actions among producers. Lower subsidies and shift them towards direct income support.	Expenditures for market support have been further reduced and shifted towards direct payments. Payments for the dairy sector were abolished and customs duties on processed cereals for human consumption reduced.
B. Labour market	
Improve the integration of foreign workers. Harmonise the rules on the lengths of residency for naturalisation.	A study on the integration of EU-citizens has been published in 2011 and a thematic review by the OECD is underway. Draft legislation which aims to grant Swiss citizenship after 8 instead of 12 years of residency and to limit the power of the local authorities in setting the duration of residency is being discussed in Parliament.
Lower the maximum duration of unemployment benefits.	The maximum duration of unemployment benefits has been lowered for workers with short contribution records and a special rule for regions with particular unemployment problems has been abolished.
Provide students from non-EU countries graduating in Switzerland more time to find a job in Switzerland.	Legislation from January 2011 stipulates that foreign nationals with a Swiss university degree may be admitted if their work is of high academic or economic interest. They shall be temporarily admitted for a period of six months following completion of their education or training in Switzerland in order to find suitable work.
C. Education	
All cantonal governments should introduce compulsory, free schooling from the age of 4, set common educational objectives for this phase, and offer full-day attendance.	The HarmoS-Concordat came into effect in August 2009. 15 cantons (representing 76% of the entire population) have ratified the Concordat. It introduces compulsory education from the age of 4, common educational objectives, and the obligation to offer day-schools.
Introduce a national voucher scheme and a national system of accreditation of facilities to support childcare provision for children below the age of 4.	The Conference of Cantonal Directors of Social Affairs has published recommendations for quality standards. The Confederation subsidizes innovative projects like vouchers at cantonal and local levels.
Strengthen the capacity of early childhood education and childcare facilities to support children with specific education needs. Promote access of the foreign population to early childcare services.	Support of children up to 6 years with specific needs is being integrated into the public education system.
Investigate regularly the impact of differences in education policy, spending and resources across cantons and determine best practice. Evaluate regularly education outcomes, as foreseen in HarmoS concordat.	National education standards for compulsory education in key competencies were adopted in June 2011 by the Swiss Conference of Cantonal Ministers of Education.
Strengthen accountability of schools for education outcomes. Conduct regular external testing over the school career at all schools, and benchmark the results against the newly defined competency objectives.	Regular evaluation of the achievement of the national education standards (see above) is planned within the national education monitoring. The evaluation will be based on sample classes.
Introduce management staff, responsible for objective setting, improving education practice, evaluating and helping to develop teaching skills. Require head teachers in all cantons to acquire school management skills.	Almost all schools have a school head, responsible for managing a school. Common standards for the skill needs of school heads (continuing education) were adopted by all cantons.
Reinforce school autonomy with respect to defining teaching content and materials.	None.
All cantons should participate in the review of the placement of children with learning difficulties or disabilities in separate schools and classes as foreseen in the concordat.	The Intercantonal Agreement on Special Needs Education came into effect. All 12 cantons which ratified the concordat to date will adhere to the policy of preferring the integration of children with special education needs in regular classes over separation. Federal legislation will apply these rules to the remaining 14 cantons.
Postpone first tracking to the age of 13 in all cantons and raise mobility across school tracks subsequently.	All cantons with first tracking at age 11 or 12 will extend duration of primary education so as to postpone first tracking to the age of 13.
Review whether the current mix of vocational and education training and academic education for young people is right for the needs of the labour market.	None, except an analysis of the private and social returns from education in the Swiss Education Report 2010.
Improve the system for recognising immigrants' qualifications, and implement plans to validate skills acquired through experience. Further improve the supply of language teaching for immigrants.	The process for the validation of formal, informal and non-formal skills to obtain a Federal vocational education and training diploma has been defined for more than 30 professions. In the future, more professions will be included in line with demand. Cantons boost language teaching for immigrants with funds from the Federal Office for Migration.

Recommendations in previous Surveys	Action taken since September 2009
In higher education, consider a rise in tuition fees while making government-sponsored loans widely available, coupled with income-contingent repayments.	None since the formulation of an inter-cantonal agreement aimed at harmonizing scholarships and loans at national level (the Stipendien-Konkordat). So far, the agreement has been ratified by six out of the twenty-six cantons.
D. Fiscal policy	
Benchmark the cantons' and communes' employment and civil servants' salaries for each area of spending.	None.
Remove stamp duties on issuance of equity and housing market transactions.	Stamp duties on issuance of debt will be abolished by 2012. Removing stamp duties on issuance of equity is being discussed. No action taken as concerns taxing housing market transactions.
Introduce a moderate capital gains tax for private households' holdings of equity stocks.	None.
Reduce the number and breadth of exemptions and reduced rates in the VAT.	Draft legislation to broaden the tax base by abolishing most of today's exemptions and to uniform VAT rates is pending.
E. Health care	
Do away with the mixed hospital funding system, assigning the funding responsibility to insurers.	The Federal Council approved a report on uniform funding of hospital and outpatient services by the compulsory health care insurance.
Require that patients pay the difference in the price of a branded product and lower-priced generic. Eliminate cantonal policies that allow practicing doctors to dispense drugs.	Co-payment for equivalent products with the same active substance is increased from 10 to 20% if prices exceed the average price of drugs in the lowest third of the price range of products containing the same active substance by more than 20%, irrespective if originator or generic drug.
Include diagnostic information in determining risk-compensation payments among health insurers. Improve incentives for insurees to enrol in managed-care programmes. Allow greater freedom for insurers to contract with providers.	The criteria defining the payments to or from the risk compensation fund are extended by information on hospital stay in the preceding year. Introducing information on out-patient treatments is being discussed in Parliament.
F. Old-age and disability insurance programmes	
Consider indexing the retirement age in the first-pillar system to changes in average life expectancy. Deal with lack of sustainability through adjustments to contribution rates, benefits and required years of contributions.	None.
Introduce incentives for prolonging work after the standard retirement age.	Incentives have been raised in the second pillar; no action taken in first pillar.
Allow pension funds to set the conversion rate. Index the minimum interest rate to realised market returns. Reassess the generosity of tax incentives for the occupational schemes.	None.
Reduce the marginal effective tax rates on labour income of disability insurance beneficiaries. Regularly test their work capacities during the first few years of receipt, and randomly thereafter.	A government proposal aims to reduce disincentives to resume work. Beneficiaries are monitored as to their capability to take on work.
G. Regulation of financial intermediaries	
Base prudential standards for financial institutions on their systemic and micro-prudential risks.	Capital adequacy requirements for banks under Basel II (except the Big-2) have been redefined. The new requirements are based on banks' total assets, assets under management, privileged deposits and required equity capital. A capital adequacy target and an intervention threshold have been introduced for the capital ratios.
Ensure that the big two banks' capital adequacy remains among the most stringent of major international banks.	Legislation tightening capital adequacy requirements beyond international norms was approved by Parliament (see Chapter 2).
Establish rules based mechanisms mandating cyclical capital buffers based on indicators of the market cycle and risks.	A countercyclical buffer (CCB) will be introduced in the course of the Basel III implementation. A draft ordinance has been sent to public consultation, which includes also the possibility for an activation of a CCB prior to the Basel III time line.
Raise the leverage ratio of capital to the book-value of Big-2 assets to at least 4% for the consolidated level. Include domestic lending in the assets used to compute the ratio.	Legislation foreseeing a stricter leverage ratio requirement has been approved by parliament (see Chapter 2).
Consider measuring the aggregate exposure of individual insurers to one or more of the Big-2, and ensure that insurance companies have appropriate limits.	None. On an ongoing basis, counterparty exposures of all insurance groups/conglomerates are monitored and exposures to individual asset classes and counterparties limited.

Recommendations in previous Surveys	Action taken since September 2009
Give greater emphasis on macroprudential oversight and include monitoring of all major components of the financial system.	FINMA and SNB have improved regular monitoring and risk assessment. Reporting requirements for insurance companies have been tightened. FINMA has started assessing six key macroeconomic factors on a biannual basis. Co-operation between FINMA and SNB on financial stability matters was improved. The Swiss Federal Department of Finance, FINMA and the SNB have signed a tripartite memorandum of understanding (see Chapter 2). Pension funds remain outside FINMA's remit.
The SNB should lead, together with FINMA, the elaboration of macroprudential standards and make its views public.	In April 2011, the Swiss Federal Department of Finance (FDF) established a joint working group, including high-level representatives from FDF, FINMA and the SNB to assess the current state of macroprudential supervision in Switzerland, including governance issues related to the implementation of macroprudential measures.
Give FINMA the authority for imposing administrative penalties for serious violations of its regulations.	None.
Ensure that FINMA's personnel and other resources are adequate to the authority's responsibilities.	FINMA has recruited senior professionals from the private sector for some of its key positions, and has introduced a technical career path to increase the authority's attractiveness as an employer.
The largest insurance companies should be subject to a close oversight regime similar to that applied to the Big-2.	Within FINMA's redesigned supervisory approach, the large insurance companies have been assigned a lower risk category than that of the Big-2 and are subject to an adapted oversight regime.
Consider periodic rotation of the outside auditors responsible for particular financial institutions, and widen the range of authorized external auditors.	According to FINMA's new supervisory concept, periodic rotations of the lead auditors will be introduced, subject to the respective risk category that is assigned to a bank.
Strengthen FINMA's liquidity regulation and oversight of the largest institutions and extend it in simplified form to other financial institutions over time. Consider including a core liquidity ratio applied to foreign currency denominated assets.	The new regulatory liquidity regime has been implemented. The introduction of a Net Stable Funding Ratio concept following the Basel committee's proposals will be considered. For the other banks, the new Basel liquidity standards will be introduced following the international schedule.
Broaden top-down stress tests of risks to the financial system; include disturbances based on recent market stress and very low probability scenarios.	FINMA plans to extend the scope of stress testing beyond the currently examined two large banks with the aim to cover up to 15 banks. Supervisory expectations on stress testing have been enhanced. For the two large Swiss banks, the soundness and effectiveness of their internal stress testing approach is regularly assessed. To be able to dispose of an independent view, stress test design and scenarios are developed jointly by FINMA and the SNB. FINMA and the SNB have put in place a formal revision process in close collaboration with the two banks. Loss Potential Analysis has been introduced to better identify the large banks' underlying individual loss and cumulative loss in case of a further drastic market deterioration. An analogous approach is being applied to a sample of medium sized banks since the beginning of 2011.
Reform deposit insurance law, introducing some pre-funding and revise the present ceiling on insured deposits as necessary to keep in line with other countries.	The temporary increase of the ceiling on depositor protection from CHF 30 000 to CHF 100 000 per account has become permanent as has the requirement on banks to hold liquid assets in Switzerland to be able to fund deposit withdrawals. The upper limit for payouts under the insurance was increased from CHF 4 billion to CHF 6 billion.
Phase out remaining preferences for cantonal banks, notably the guarantee on their liabilities and fund their mandates explicitly from government sources.	None.
Consider broadening the core colleges of supervisors for the Big-2. Co-operate with foreign counterparts to develop contingency plans so as to deal with future crises.	International co-ordination of resolvability and resolution plans is being developed.
Continue implementing the decision to endorse the OECD standard on transparency and the exchange of information in tax matters as rapidly as possible.	34 treaties have been amended to include the international OECD standard on administrative assistance in tax matters as of July 2011, of which 10 are already in force. The authorities intend to allow the identification of a taxpayer also by other means than the name of the person concerned.

Recommendations in previous Surveys	Action taken since September 2009
H. Housing	
Remove restrictions on the setting of a new rental price when a new tenant moves into a dwelling.	No action considered necessary by the authorities.
Ensure that yearly rent increases for existing tenants can at least compensate for inflation, regardless of contract duration. Allow rent adjustment to market prices for incumbent tenants over longer periods, while protecting them against high increases over short periods.	No action considered necessary by the authorities.
Review construction norms so as to reduce costs. Harmonize regulations set by cantons and local governments. Do not require firms to pay the wages for certain professions prevailing in the canton of the construction project.	A working group to review construction norms is being established, as is a concordat to harmonize certain regulations.
Strengthen enforcement of the Internal Market Act, by allowing private parties to take legal action on the basis of the Act when construction plans in one canton are rejected elsewhere, and by reducing exemptions.	None.
Reduce municipalities' incentives to selectively attract high-income households, <i>e.g.</i> by better ensuring that demand for social services is taken into account in intergovernmental transfers received by municipalities. Strengthen their incentives to attract population, <i>e.g.</i> by raising the weight of real estate taxation in their budgets.	None.

Chapter 1

Making the tax system less distortive

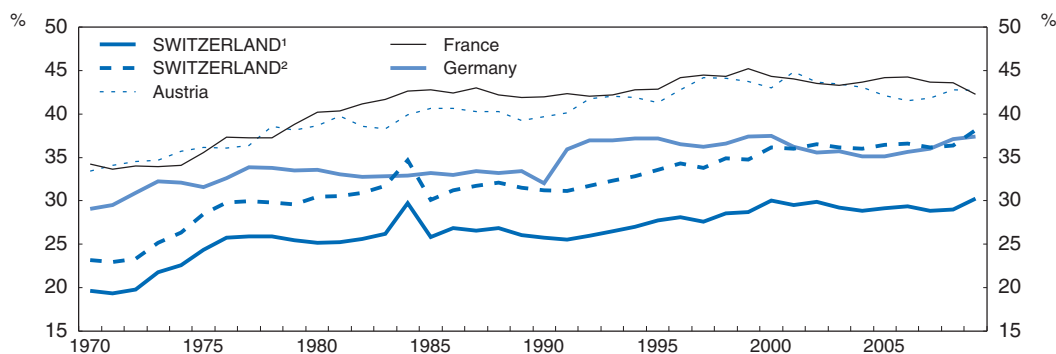
The tax burden in Switzerland is low in international comparison, largely reflecting the substantial non-tax compulsory contributions towards the health and pension systems which are managed by private institutions. Taxation of personal income and labour earnings is relatively high, whereas the taxation of consumption is low. Empirical research on OECD economies and on Switzerland specifically indicates that shifting taxation away from personal income towards the taxation of consumption would strengthen incentives to engage in economic activity. The structure of the corporate tax burden could be improved to remove disincentives for small firms to grow. Reducing the generous provisions which allow interest payments to be deducted from taxable personal income would reduce incentives for households to excessively leverage their wealth, with benefits both for financial stability and equity in the tax system. While tax competition among sub-national authorities has reinforced fiscal discipline, adverse side effects on equity could be reduced, including through greater reliance on real estate taxation in municipalities.

The main characteristics of the Swiss tax system

The Swiss tax system has three main features that set it apart from most other OECD countries. First, tax revenues and tax burden indicators are very low in comparison to other high income economies. An unusually large share of social services and transfers are financed from compulsory contributions that do not flow to general government but rather to private non-profit organisations. These include a substantial part of pension and most health insurance benefits, which are largely funded from tax revenues in most other OECD countries.¹ The funded second pillar pension system is managed by employers' and workers' representatives at the firm level. Adding the revenues from compulsory contributions to tax revenues, the total burden is similar to the tax burden in neighbouring high-income European economies and has gradually trended upwards (Figure 1.1). Empirical evidence indicates that taxation of consumption and real estate are less harmful for economic activity than income tax. In Switzerland taxation is heavily geared towards the taxation of personal income, while the taxation of consumption and real estate are low, as detailed in the following section. Hence, the room for growth-enhancing tax reform is relatively large in Switzerland.

Figure 1.1. **Swiss tax and compulsory contribution revenues in comparison to tax revenues in neighbouring countries**

As a percentage of GDP



1. Total tax revenue.

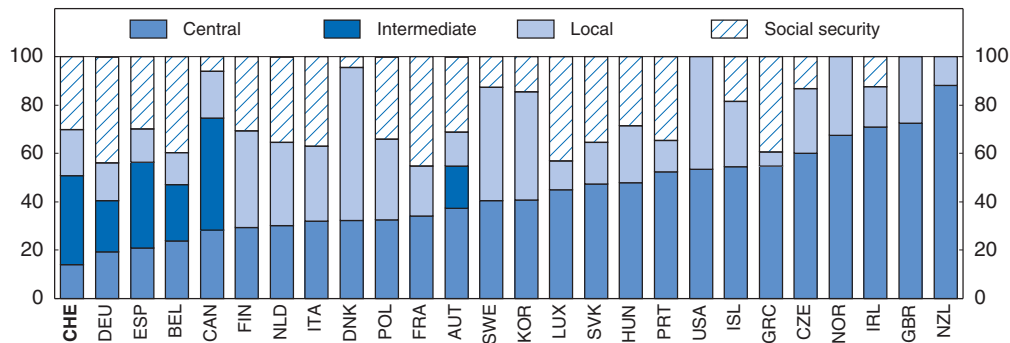
2. Total tax revenue plus compulsory 2nd pillar pension, health and accident insurance contributions.

Source: OECD, Revenue Statistics 2010; OFAS.

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Second, regional and local governments play a more important role in government finances than in most OECD countries (Figure 1.2). The cantons obtain most tax revenues from taxes which they set themselves, as transfers from the federal government play a minor role. As Box 1.1 shows, sub-national governments' tax setting powers are wide-ranging, including in personal income and in corporate taxation, where cantons and the

Figure 1.2. **Expenditure by level of government**
Per cent of total general government expenditure, 2009¹



1. Excluding transfers paid to other levels of government. 2008 data for Korea and New Zealand. In countries where data on regional government spending is not available it is included in local government.

Source: OECD (2010), OECD National Accounts Database.

StatLink  <http://dx.doi.org/10.1787/888932560303>

Box 1.1. Tax setting powers

The Constitution gives **the federal government** the exclusive right to raise a general consumption tax, customs duties, a withholding tax on capital income, and stamp duties on the trading and issuance of securities. Important specific consumption taxes reserved for the federal level include excise duties on tobacco and transport fuel. The constitution also determines that the tax bases on personal income, net wealth and on corporate profits have to be the same across all levels of government. Tax-setting powers are otherwise not constrained at the federal level, although there is no federal wealth tax.

Cantons can freely set taxes except where the constitution assigns this competency to the federal level. They have to tax the common bases fixed in the constitution. Hence, **cantons**, for example, must set taxes on corporate and personal income as well as on personal net wealth, although they can set schedules freely, subject to the requirement not to impose regressive schedules on personal income. Ten cantons set specific taxes on the value of real estate (*impôt foncier*) themselves. In 7 cantons these taxes are set by the cantons and their municipalities jointly. Six cantons do not allow taxes on the value of real estate (Bureau d'information fiscale, 2006). **Municipalities'** tax-setting powers are determined by the cantons. They can typically set personal income tax rates as a surcharge on cantons' taxes so do not change cantonal tax structures. Personal income taxation makes up most of their tax revenues. Municipalities may also contribute to setting wealth taxes in this way. The municipalities in 4 cantons have the exclusive right to set real estate taxes, subject to limits. The municipalities also set some taxes on the purchase of specific goods and services.

The people can legislate, including on tax issues. Increases in the rates of federal taxes are subject to a compulsory nation-wide referendum. A referendum is also carried out if 50 000 signatures are gathered. 6 referenda on tax issues were carried out between 2004 and 2010 at the national level. The most recent popular tax initiative (November 2010), which aimed at harmonizing personal income tax rates on high incomes across the country, was defeated. The latest compulsory referendum (September 2009) approved a temporary increase in VAT rates, with revenues earmarked to fund disability insurance benefits. An earlier proposal of a permanent increase in VAT rates for the same purpose was defeated. Referenda are also quite frequent at the cantonal level. Of 6 referenda conducted in the cantons of Zürich and Bern since 2003, five entailed a reduction of tax burdens.

confederation set tax rates. The small size of cantons reinforces the extent of tax competition that their wide-ranging tax setting powers generate. This could generate benefits but also some distortions as discussed later. Third, popular votes also play a significant role in tax setting.

This chapter first analyzes how shifting the tax burden further towards consumption and real estate would encourage activity. This could include introducing a valued-added tax in the financial sector, which would have the benefit of levelling the playing field with other sectors. The chapter then examines how taxation could be reformed to reduce incentives towards excessive household leverage, which could increase macro-economic risks and result in costly financial intermediation to minimize tax liability. Finally, the chapter analyzes how some adverse side-effects of tax competition on efficiency and equity could be corrected.

Making the tax system more supportive of growth

Shifting taxation from direct to indirect taxes would reduce economic distortions

Shifting the taxation of income to the taxation of consumption may be beneficial for boosting economic activity (Johansson *et al.*, 2008 provide evidence across OECD economies). These benefits may be bigger if personal income taxes are lowered rather than social security contributions, because personal income tax also discourages entrepreneurial activity and investment more broadly.² Swiss empirical studies estimate a favourable effect on welfare when indirect tax revenues are substituted for personal income tax revenues, whereas results are ambiguous when social security contributions are reduced (Bodmer, 2007).

Direct taxes make up a larger share of overall tax revenues than in most OECD countries (Table 1.1). This is especially true for personal income taxes. The share of social security contributions, which are levied on payrolls and income of the self-employed, is modest in international comparison. However, the compulsory contributions to the 2nd pillar pension system, which are not included, generate revenues equivalent to about 5½ per cent of GDP and are assessed on the same income base as the social security contributions. The compulsory health insurance contributions raise revenues equivalent to about 2½ per cent of GDP. In several respects compulsory payments to fund pension and health contributions are well-designed to minimise disincentive effects to engage in economic activity, but some disincentives are unavoidable, especially in the case of contributions to health insurance which tend to be universal, as in Switzerland (see further below).

Conversely, taxes on consumption of goods and services are low, especially in relation to total tax and compulsory contribution revenue. The OECD VAT revenue ratio is relatively high in international comparison (Figure 1.3), which indicates a broad tax base and effective tax collection. Nonetheless, several goods and services are subject to exemptions from the VAT (OECD, 2010). Exemptions distort after-tax prices of intermediate goods and services across different final uses, generating dead-weight losses in the whole production chain. Since exemptions preclude the deduction of VAT payments on purchases of intermediate goods and services, they create a cascading effect as the non-deductible tax on inputs is embedded in the subsequent selling price and is not recoverable by taxpayers down the supply chain. Their removal is therefore particularly desirable on efficiency grounds.

Table 1.1. **Structure of tax revenue**
Per cent of total revenues, 2010¹

	Personal income tax	Corporate income tax	Social security contributions	Property tax	Goods and services tax
Australia	37.4	18.7	0.0	9.6	29.1
Austria	22.5	4.6	34.5	1.3	28.0
Belgium	28.1	6.2	32.5	6.9	25.4
Canada	35.0	10.7	15.3	11.3	24.4
Chile ²	38.4	0.0	7.0	3.6	51.3
Czech Republic	10.3	9.8	44.7	1.3	33.4
Denmark	50.6	5.7	2.1	4.0	31.7
Estonia	16.0	4.0	38.7	1.1	39.8
Finland	30.0	6.0	29.8	2.7	31.5
France	16.9	4.9	38.8	8.5	25.0
Germany	24.4	4.2	39.1	2.3	29.5
Greece	17.0	8.1	34.6	5.6	37.1
Hungary	17.8	3.3	30.7	3.1	42.8
Iceland	35.5	4.6	11.6	6.8	35.5
Ireland	27.0	9.2	20.3	5.6	36.9
Israel	19.1	9.0	17.2	9.6	40.0
Italy	27.2	6.5	31.5	4.7	25.8
Japan	20.0	9.6	40.9	10.1	19.1
Korea	14.3	13.9	22.8	11.4	33.9
Luxembourg	21.4	14.4	29.6	7.2	27.1
Mexico ²	28.6	0.0	16.7	1.7	50.2
Netherlands	22.8	5.3	36.1	3.9	30.7
New Zealand	37.5	12.4	0.0	6.9	39.3
Norway	23.8	22.6	22.8	2.9	28.0
Poland	14.6	7.2	35.7	3.9	37.0
Portugal	17.9	9.1	28.8	3.8	39.6
Slovak Republic	8.2	9.0	43.3	1.5	36.4
Slovenia	15.2	5.0	40.3	1.6	37.3
Spain	21.7	5.5	37.7	6.1	26.7
Sweden	28.0	7.6	25.0	2.4	29.5
Switzerland	32.3	10.8	23.3	7.4	21.8
Turkey	14.1	7.3	24.5	4.1	47.9
United Kingdom	28.6	8.7	19.1	12.1	30.9
United States	32.1	10.9	26.2	12.9	17.9
OECD³	24.7	8.4	26.6	5.5	32.5

1. 2009 for Australia, Greece, Japan, Netherlands, Poland and the OECD aggregate.

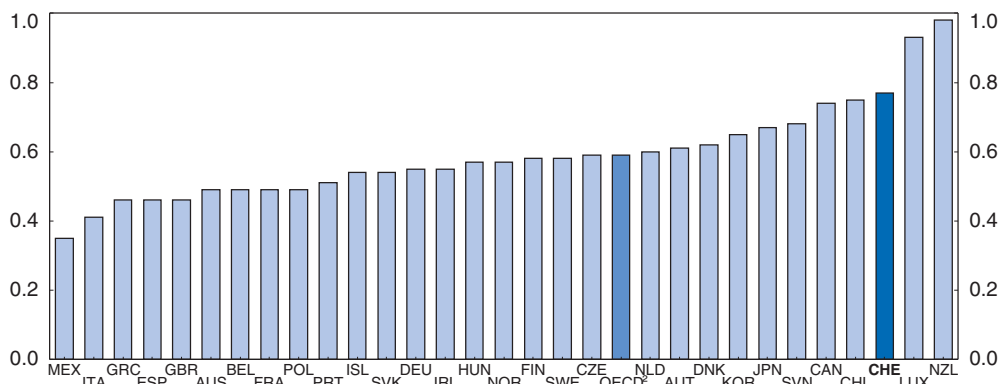
2. Data shown in the first column covers both personal and corporate income tax.

3. Unweighted average.

Source: OECD, *Revenue Statistics Database* 2011.


In January 2011 the standard VAT rate was raised marginally, from 7.6 to 8%, for a period of 7 years. The reduced rate for hotel services was raised from 3.6 to 3.8% and the rate for basic goods, notably food, from 2.4 to 2.5%. The additional revenues are earmarked to cover a deficit in the public disability insurance, before ongoing reforms of disability insurance generate sufficient savings and allow disability benefits to be funded without these revenues from 2018 onwards. There is scope for raising the tax rates further and using the revenues to lower personal income taxes. Some steps to lower tax compliance costs permanently were also introduced.³ Draft legislation introducing a single tax rate of 6% and abolishing most exemptions and zero rates was rejected by one chamber of parliament in 2009. Recent parliamentary initiatives propose to maintain most exemptions and tax hotel and restaurant services at lower cost. The decision on the reform of VAT is

Figure 1.3. VAT revenue ratio¹
2008



1. The VAT revenue ratio (VRR) is defined as the ratio between the actual value added tax (VAT) revenue collected and the revenue that would theoretically be raised if VAT was applied at the standard rate to all final consumption. This ratio gives an indication of the efficiency of the VAT regime in a country compared to a standard norm. It is calculated as: $VRR = \text{VAT revenue} / ([\text{consumption} - \text{VAT revenue}] \times \text{standard VAT rate})$.
2. Unweighted average excluding Israel, Turkey and the United States.

Source: OECD (2011), *Consumption Tax Trends 2010*.

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still pending. According to estimations by Bodmer (2007), the simplifications contained in the rejected draft legislation would yield gains of between 0.3 and 0.8% in GDP, in part because administrative costs of business subject to the tax are estimated to fall by 18%. VAT reform should be pursued further, notably to remove exemptions. The introduction of a single rate as originally planned is desirable.

Taxes on environmentally harmful behaviour, notably taxation of transport fuels (see Chapter 4), are also low. Conversely, property taxes account for a relatively large share of tax revenues. A general wealth tax and taxes on securities transactions, rather than real estate tax, make up the bulk of these revenues (Table 1.2).

Reducing the overall contribution wedge on labour

The tax wedge on labour seems low in international comparison. However, once payments to the compulsory 2nd pillar pension and the contributions to the health-care system are taken into account, the total tax and contribution burden on labour is higher than in the OECD on average (Figure 1.4).

A shift from direct to indirect taxation requires steps to compensate households on modest incomes

The federal personal income tax schedule has a marked progressive structure, with modest incomes being subject to zero or low marginal rates. The cantons' personal income taxes tend to be less effective in redistributing income, because incentives to attract high-income earners lower the progressivity of tax schedules and because there is some tendency for high income earners to reside in low-tax cantons (see below). A tax reform which raised federal consumption taxes and lowered federal personal income taxes could therefore raise the tax burden on low-income households. One option to make households on modest incomes benefit from such a reform would be to raise the transfers the federal government pays to low-income households to lower the cost of compulsory health insurance (see Box 1.2), phasing them out more slowly as personal income rises.

Table 1.2. **Property taxes**
Per cent of GDP, 2010¹

	Recurrent taxes on immovable property	Taxes on financial and capital transactions	Other ²	Total
United Kingdom	3.4	0.6	0.2	4.2
France	2.5	0.6	0.6	3.6
Canada	3.0	0.2	0.3	3.5
United States	3.1	0.0	0.1	3.2
Israel	2.3	0.5	0.3	3.1
Korea	0.8	1.8	0.3	2.9
Japan	2.1	0.3	0.3	2.7
Luxembourg	0.1	0.4	2.2	2.7
Iceland	1.8	0.4	0.3	2.5
Australia	1.5	1.0	0.0	2.5
Switzerland	0.1	0.5	1.6	2.2
New Zealand	2.1	0.0	0.1	2.2
Italy	0.6	1.1	0.3	2.0
Denmark	1.4	0.3	0.2	1.9
Spain	0.8	0.8	0.3	1.9
OECD³	1.1	0.4	0.3	1.8
Ireland	0.9	0.5	0.2	1.6
Netherlands	0.7	0.5	0.3	1.5
Belgium	0.1	1.0	0.2	1.2
Poland	1.2	0.0	0.0	1.2
Greece	0.2	0.8	0.2	1.2
Portugal	0.6	0.5	0.1	1.2
Norway	0.3	0.2	0.7	1.2
Hungary	0.3	0.3	0.6	1.2
Finland	0.6	0.3	0.3	1.2
Sweden	0.8	0.3	0.0	1.1
Turkey	0.2	0.8	0.1	1.1
Germany	0.5	0.2	0.1	0.8
Chile	0.5	0.2	0.1	0.8
Slovenia	0.5	0.1	0.0	0.6
Austria	0.2	0.3	0.0	0.5
Czech Republic	0.2	0.2	0.0	0.4
Slovak Republic	0.4	0.0	0.0	0.4
Estonia	0.4	0.0	0.0	0.4
Mexico	0.2	0.1	0.0	0.3

1. 2009 for Australia, Greece, Mexico, Netherlands, Poland and the OECD aggregate.

2. Including wealth and transactions taxes.

3. Unweighted average.

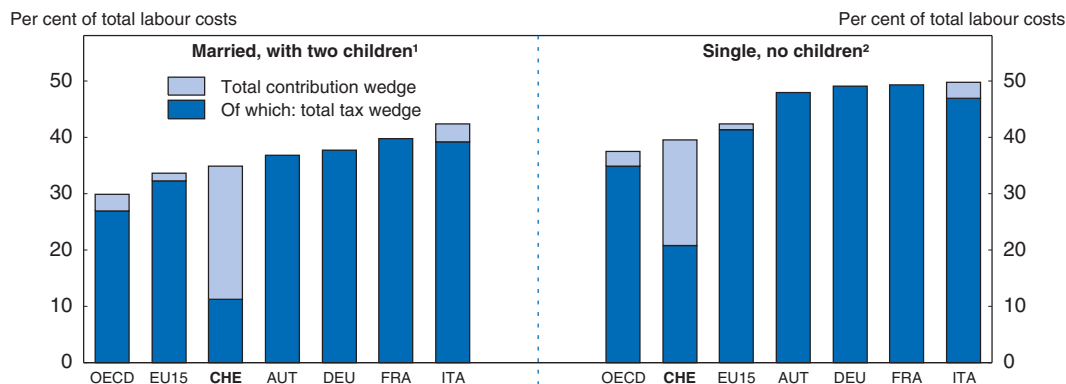
Source: OECD, *Revenue Statistics Database* 2011.

Redistributive social security benefits could be more fully funded from general tax revenue

Most social security contributions fund benefits which are earnings-related, notably pension and unemployment insurance benefits. Contributions based on labour earnings are appropriate when benefit entitlements are linked to the level of labour earnings, as in this case such contributions may not be fully perceived as taxes by workers. Contributions to the 2nd pillar pension system bear a close relationship with benefit entitlements. However, some social security benefits redistribute income towards households with low incomes, so are less closely related to contributions. This is particularly true for pension entitlements in the first pillar, which has a marked redistributive component. In particular,

Figure 1.4. **Total contribution wedge and total tax wedge on labour income by main family type and wage levels in international comparison**


2010



1. With wage level between 100% and 133% of average wage.

2. With wage level equal to 100% of average wage.

Source: OECD, *Taxing Wages* 2010.

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Box 1.2. Health insurance contributions and support for low income households

The health insurance contributions are fixed as lump sum payments for each insured individual. Their level depends on the canton of residence, the insurer and the co-payment regime chosen (lump sum payments are also lower for children than for adults). The federal and cantonal governments subsidize contributions paid by low-income households with cash transfers, and contributions from households with insufficient income are subsidised in full. The subsidies to these contributions are assessed on a comprehensive measure of income and wealth.* Since the subsidies are withdrawn as income rises, they generate disincentive effects akin to personal income taxation. The withdrawal of these subsidies as household income rises raises effective marginal taxes and pushes them above 100% in some cases (Balthasar et al., 2008).

* OECD data on the compulsory contribution wedges include information on *premia* for compulsory health insurance but do not incorporate the subsidies to reduce their cost for low-income households.

within a generation of pensioners, it redistributes income from workers with relatively high average earnings over their active life to workers with relatively low earnings (OECD, 2011a). Funding redistributive transfers to low-income households from general tax revenues improves horizontal equity as it avoids the burden of funding such transfers falling on the assessment base of social security contributions only, which excludes some types of income.

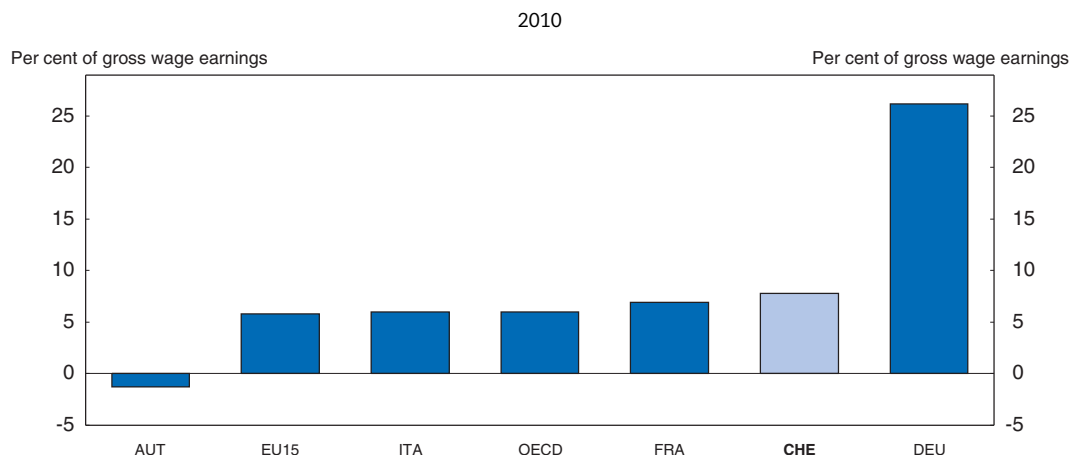
The federal government's budget contributes a fixed share of 19.6% to the funding of pensions and disability benefits from general tax revenue. In addition, 8% of VAT revenues are earmarked to contribute to the pension system. While the extent of such redistribution is difficult to assess, the redistribution of income within the first pillar pension system could be fully financed from tax revenues.

Work incentives for second earners could be improved

One positive aspect of the system of per capita health insurance contributions is that it helps mitigate disincentive effects for second earners to take up work. If the main earner's income is sufficient so that the household does not qualify for subsidy payments, further potential earners have to contribute to the funding of health insurance, regardless of whether they work or not. Hence, potential second earners in households are expected to make a contribution to the funding of health insurance even if they do not engage in economic activity.


While the health insurance contribution system helps preserve incentives for second earners to take up work, the income tax wedge on second earners is higher than on main earners (Figure 1.5). Moreover this difference is bigger than in some other European countries, despite some measures to widen basic tax allowances for two-earner households introduced in 2008 (see the 2007 *Economic Survey*). The relatively high tax burden on second earners reflects the joint taxation of the personal income in the federal income tax schedule. Most cantonal tax laws also provide basic income tax allowances for partners even if they do not work which tends to raise the tax burden on the earnings of a working partner relative to the tax burden of the main earner.

Figure 1.5. **Measure of the income tax wedge for the second earner relative to the main earner¹**



1. Difference between the tax rate on the earnings of the main earner and the tax rate on the earnings of the secondary earner within married families with two children, assuming wage levels equal to 100% and 67% of AW, respectively.

Source: OECD, *Taxing Wages* 2010.

StatLink  <http://dx.doi.org/10.1787/888932560360>

Higher tax wedges for second earners than for main earners are particularly harmful for economic activity because women respond more elastically to changes in the after-tax wage rate than men. Moreover, the decisions on the taxation of households with multiple earners at one government level affect the tax bases of the other government levels. As a result of these spillovers, there is a risk that such decisions at any one government level do not fully take into account their full effect on the tax base. Taxing each wage earner within a household equally, for example by introducing separate assessment for income tax purposes, has significant economic benefits. There is also a case for harmonising the rules

governing taxation of households with multiple earners across government levels, thereby introducing separate assessment of each household member throughout.

Leveling the playing field between financial services and other sectors

Transactions of equity and debt securities intermediated by Swiss financial companies are subject to a tax of 0.15% on domestic securities and 0.3% on foreign securities, although numerous exemptions apply. This tax raises revenues of 0.3% of GDP. Since few countries impose taxes on such transactions, they create a competitive disadvantage for such trade to be carried out in Switzerland and for securities markets to develop. They raise capital costs especially for those Swiss businesses which cannot easily substitute foreign issuance for domestic issuance. On the other hand, they allow the government to exploit the comparative advantage of Switzerland in the provision of financial services for the purpose of generating tax revenues. The Swiss government is evaluating whether to abolish this transaction tax as well as options to make up for the revenue shortfall.

As in other OECD countries, banking services are exempt from VAT.⁴ Taxation of financial services is desirable in order to align the tax treatment of banks with other sectors which are subject to VAT and broaden the base of taxation. Subjecting banks to VAT would remove distortions, which result from the taxation of intermediate goods and services used as inputs (as in other exempt sectors, see above). As argued by the IMF (2010, and references therein, *e.g.* Huizinga, 2002), it is possible to include all services provided by financial intermediaries into the VAT regime, although no country does so in practice. This could be achieved by treating all financial inflows as taxable sales and all outflows as tax-deductible. The government is evaluating whether to charge VAT on commissions income in order to offset part of the revenue loss from abolishing the transactions tax (Bühler *et al.*, 2011). However VAT on commission income alone creates compliance costs and may yield little revenue, as similar transactions can be remunerated on a commission basis or on a margin basis. The government should explore the feasibility of applying a VAT on financial services.

To offset the exemption of banking services from VAT, an additional tax could be applied on the sum of profits and salaries of financial intermediaries, as proposed by the IMF (2010). In addition, a higher tax rate could be imposed on profits above a notional return on equity and high levels of remuneration at a higher tax rate. As argued by the IMF, such a step could perhaps help to tax the rent component in financial sector value added more heavily, and could avoid adding to tax-generated incentives for banks to prefer debt to equity finance. An exemption on a notional return on equity from the taxation of profits could also encourage banks to hold more common equity, the most reliable form of capital. However, a tax on profits and wage earnings would be difficult to reconcile with the VAT regime that applies in other sectors and could therefore generate distortions. For example, the tax could generate further cascading effects on the price of financial services used as intermediate products if it cannot be deducted from VAT by downstream producers. The treatment of exported financial services would also be difficult to reconcile with the VAT regime applied to other sectors. The advantages and disadvantages of introducing an additional tax on the sum of profits and salaries therefore need to be carefully weighed.

Reducing distortions in households' financial decisions

While Swiss households' financial wealth and housing wealth is high, Swiss households are also among the most highly indebted in the OECD area. Although 61% of

Swiss households rent their dwelling, a higher share than in most other OECD countries, most debt consists of mortgage loans. Indebtedness in the business sector is modest in international comparison and the distinction of debt of non-incorporated businesses and households may not always be clear-cut. Nonetheless, tax-induced incentives for households to leverage could potentially aggravate any future episode of financial and macroeconomic instability, especially in the context of vigorous mortgage lending activity. For example, the consequences of an increase in interest rates, a fall in house prices and the stock market or a credit crunch could be magnified by the large stock of outstanding household debt, even in the presence of high net household wealth. This consideration may be particularly relevant for Switzerland which is more exposed to financial risks for other reasons, notably the presence of very large financial intermediaries (see Chapter 2).

The tax system generates incentives for households to leverage their wealth. All interest payments are tax deductible, subject to a ceiling which is defined as the sum of taxable return on assets and an additional 50 000 Swiss francs per year (equivalent to about two thirds of average disposable income). Incentives to leverage financial and housing wealth are reinforced by the absence of taxation on the returns of an important part of household wealth. While interest and dividend income held outside pension funds is subject to personal income taxation, capital gains on household equity stock holdings are generally not taxed. While capital gains on housing are taxed by most cantons in principle, taxation of these gains is limited by several provisions. Rates are typically reduced quickly as the holding period lengthens. Exemptions apply when a household moves from one dwelling to another. Indeed, when house prices are expected to rise, such capital gains contribute significantly to the expected return of housing. Revenues on housing assets are taxed in principle, including imputed rents of owner-occupiers. However taxation of imputed rents appears to be ineffective: it generates little revenue, in part because owner-occupiers declare substantial expenses and imputations are difficult to adjust to actual market prices. A study for the canton of Berne (Peters, 2009) reports that the abolition of the taxation of imputed rental income would actually increase tax revenue. Finally, the wealth tax does not diminish incentives to leverage as it is assessed on net household wealth.

Tax subsidies also apply to the returns on savings in pension plans. The tax-free accumulation of interest within the pension fund, in particular, generates a more favourable tax treatment of savings within pension funds compared with savings outside pension funds.⁵ Under certain conditions, savings can be withdrawn before retirement, including for the purpose of mortgage repayment. The amount withdrawn is taxed at a reduced rate; the rate varies depending on the specific canton. At the federal level the rate amounts to one fifth of the rate that would be due if the withdrawal were taxed as one-off income. These tax advantages do not depend on the mortgage interest rate, and may therefore be particularly prone to encourage speculative housing investment when interest rates are low. Indeed households frequently withdraw savings accumulated in pension plans before retirement, notably to amortise mortgage loans.⁶

The wide-ranging deductibility of household interest payments from taxable income also generates unwanted redistributive effects. High income and wealthy households benefit relatively strongly because the maximum interest payments that can be deducted rises in line with taxable asset returns received. Moreover, high-income and wealthy households have more scope to raise their gross debt. High-income households would benefit more strongly from the abolition of taxation of imputed rents, as home ownership is concentrated among the wealthy (OECD, 2009a). However, this effect is likely to be

limited, owing to the evidence suggesting that taxation of imputed rents net of deductions does not generate significant revenue. Moreover, since tax subsidies for mortgage borrowing tend to result in higher house prices, especially in countries where housing supply is inelastic, as in Switzerland, households with modest income tend to be crowded out from the housing market (Caldera-Sánchez and Johansson, 2010 and OECD, 2009a). High-income households also have more scope and incentives to engage in rent-seeking activities that reduce the imputed rent liability, for example by incurring tax-deductible expenses to improve home amenities. These are unlikely to raise the rent imputed for tax purposes. According to a study from the year 2000, 52% of home owners with taxable income of more than 150 000 CHF declared negative net imputed rental income whereas this was true only for 34% of home owners with less than 50 000 Swiss francs of revenue (Commission Valeur Locative, 2000).

There are no strong efficiency arguments for maintaining the deductibility of interest payments on household debt. Moreover, the current tax regime produces deadweight loss because households have incentives to bear the costs of excessive financial intermediation to benefit from the tax advantages of leveraged wealth. Cutting the tax deductibility of household interest payments would also offer the advantage of broadening the income tax base, allowing income tax rates to be lowered. Such a step would help improve incentives for entrepreneurial activity in non-incorporated businesses (including the self-employed). It should be accompanied by the elimination of the taxation of imputed rents. These reform steps would also contribute to lowering tax administration and compliance costs (Daepf, 2010).

There also is a case for taxing capital gains on households' financial assets. Such a tax would reduce the difference between capital income accruing in the form of interest or dividends, which are fully taxed (outside pension funds), on the one hand, and capital gains, which are untaxed, on the other hand. These differences distort financial decision-making. For example, they create incentives for households to hold stakes in businesses which retain profits so as to avoid taxes on distributed profits. Such incentives can, for example, induce some firms to retain profits and ultimately prevent the allocation of resources from old to new businesses. While capital gains taxes raise the effective tax burden on household capital income, the impact on domestic investment decisions is likely to be modest, as international capital mobility renders savings and investment decisions largely independent from each other at the country level. A capital gains tax would broaden the personal income tax base which could help to reduce the tax and contribution burden on labour income along the lines discussed above. Since capital gains accrue disproportionately to wealthy households, it would also contribute to equity objectives.

The capital costs of closely-held small corporations are more likely to be affected by a capital gains tax at the household level, as they may not have easy access to international equity markets. In Switzerland closely-held limited liability and joint stock companies (with at least 10% of capital concentrated in the hands of a single individual) benefit from diminished taxation of dividends. The objective of this provision is to limit the double taxation of income distributed (on account of taxation of profits by corporate income tax and of dividends by personal income tax). To maintain symmetry of taxation of capital gains and dividends, this rule could also apply to the taxation of capital gains on shares in these businesses. Since access to international capital markets is likely to be difficult for some of these companies, such a provision would prevent adverse effects of capital gains

taxation on domestic investment activity. However, the special tax status of closely-held businesses may be used for tax planning.

Alleviating some negative impacts of tax decentralisation and competition on efficiency and equity

The evidence on the impact of decentralisation of fiscal policies on economic growth is mixed (see *e.g.* Koethenburger and Lockwood, 2010, and references therein). It is likely that it depends on which tax and spending responsibilities are decentralised as well as on how funding arrangements are set up. Empirical evidence suggests that the mandatory referenda reduced government spending by 19% for the median canton after controlling for demographics and other determinants of spending (Feld and Matsusaka, 2003; Feld, 2004).⁷ For example, the evidence reported in this empirical work shows that mandatory referenda are associated with more efficient service provision as well as higher reported subjective happiness of inhabitants (Feld and Matsusaka, 2003 and references therein).⁸

Evidence also suggests that tax autonomy may lead to a smaller and more efficient public sector, helping to limit the tax burden and improve tax compliance (Feld, 2009; Feld, *et al.*, 2010).⁹ Efficiency-raising effects of tax autonomy and tax competition on the public sector have also been reported in empirical research with Norwegian and German data (Blöchliger and Pinero Campos, 2011, and references therein). Tax autonomy generates opportunities to choose the level of public service provision and taxation, although in practice such “voting with your feet” seems mostly limited to young, highly educated and high-income households. Decentralised tax setting also fosters benchmarking of the performance of jurisdictions belonging to the same government level by voters, even in the absence of “voting with your feet” (Blöchliger and Pinero Campos, 2011).

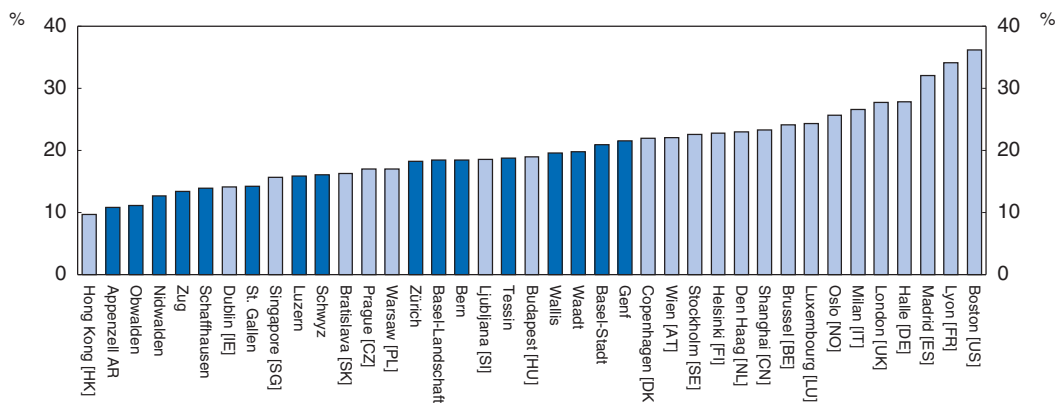
Corporate income tax decentralisation has favoured low rates but also generates some distortions

Tax competition is likely to have contributed significantly to lowering corporate tax rates in Switzerland over the past 25 years. Indeed, empirical evidence shows that the responsiveness of sub-national governments to tax changes of other subnational governments (“tax mimicking”) is the strongest in the case of corporate taxation (Blöchliger and Pinero Campos, 2011). Corporate tax revenues play a modest role in cantonal tax revenues. As Figure 1.6 illustrates, high tax rates are found in urban cantons which are likely to offer non-tax locational advantages, notably Basel, Geneva and Zürich. Tax competition may allow rural, economically less highly developed cantons to offset such disadvantages with lower tax rates.


Despite low tax rates in international comparison, the contribution of corporate taxation to tax revenues is broadly in line with other OECD economies, which indicates a broad tax base and the attractiveness of Switzerland as a location. Low corporate tax rates encourage entrepreneurship and economic activity and limit tax incentives for businesses to leverage their funding. Indeed, unlike in the case of private households, business indebtedness in Switzerland is moderate in international comparison.

Some cantonal corporate income tax settings could nonetheless be improved. Several cantons levy progressive taxes with rates rising in line with either profits or the return on equity, although some cantons have abandoned progressive structures in recent years. High profits do not only reflect pure economic rents but, for example, firm size. Progressive corporate income taxes harm incentives for businesses to grow. Since growing businesses

Figure 1.6. Corporate tax burden of Swiss cantons in international comparison



Source: BAK Basel Economics, BAK taxation index 2009.

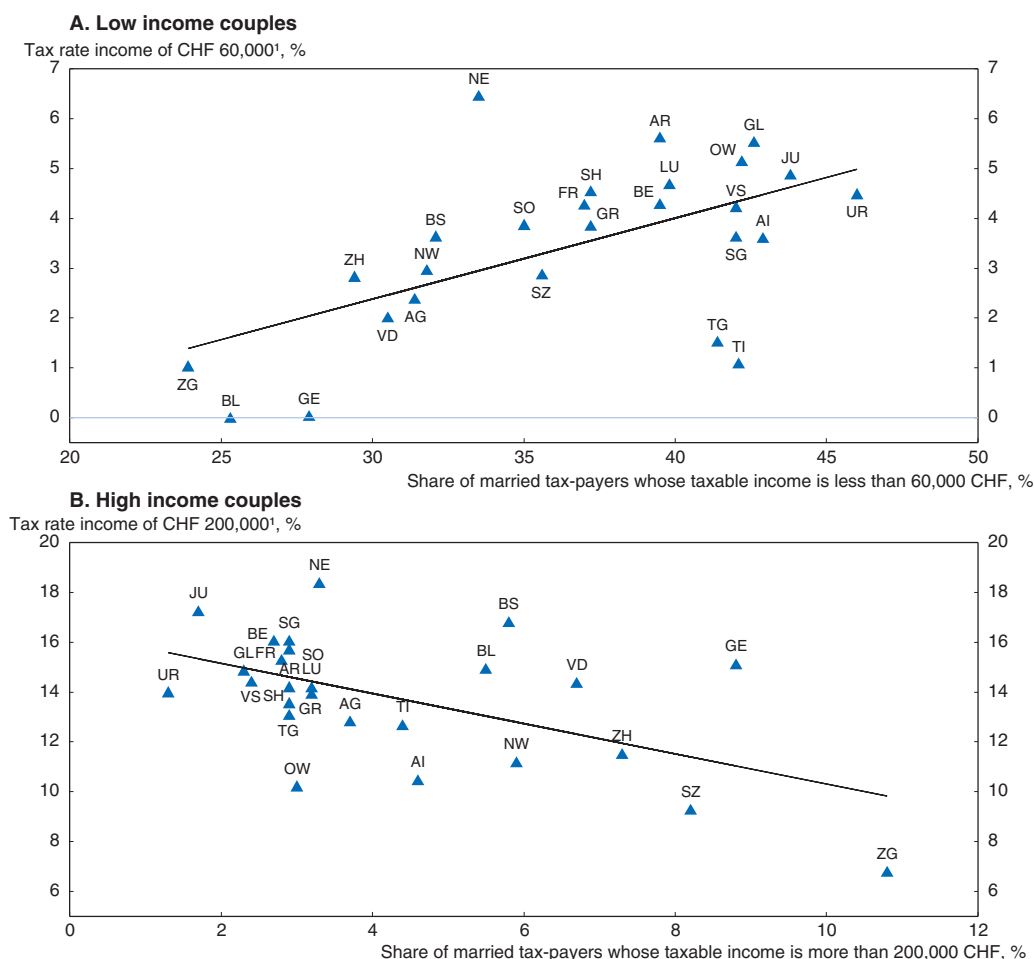
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are likely to be high performers in terms of productivity, such disincentives are likely to hit high-performing businesses the most, with losses to aggregate productivity performance, which has been modest in Switzerland relative to best-performing high-income countries. Empirical research suggests that it is fast growing new firms, rather than all new firms, which account for most of the new job creation by small and medium size enterprises in advanced countries (Wong and Autio, 2005, and references therein). Progressive taxes also generate incentives for firms to split into smaller units. Effects of progressive taxes on firm size have been reported for US states (Goolsbee, 2004). Eliminating progressive tax structures could remove some disincentives to entrepreneurial activity.

All cantons also charge a tax on firm equity. It creates barriers for the creation of businesses, as newly created businesses are likely to have low returns on equity. The payment of this tax also impairs their liquidity when cash-flow is low and access to loans limited. At the federal level, taxes on the issuance of equity¹⁰ also generate barriers for business creation. While these taxes generate little revenue, the distortions may nevertheless be significant, given that firm creation is likely to contribute to productivity growth, especially in industries developing new technologies (*e.g.* Scarpetta *et al.*, 2008).

Personal income tax competition raises some equity issues

Personal income taxes account for the bulk of cantonal and municipal tax revenues and tax rates differ widely across cantons. There is a tendency for cantons with a large share of households on low and middle incomes to have relatively high cantonal and municipal tax rates for incomes in this range (Figure 1.7). These households provide the bulk of tax revenues in these cantons, so these cantons are likely to have to rely on relatively high tax rates to fund public services. The large spread in the shares of high and low income households across cantons and the correlation of these shares with average tax rates suggests that cantons and municipalities with a relatively small share of low-income households can set lower tax rates on income and wealth to fund public services. These tax rates attract high-income households, which are the most mobile and who benefit more from tax differences, which may reinforce the concentration of high income households in low tax jurisdictions.

Figure 1.7. **Income distribution and tax rates across cantons, 2007**

1. Average income tax rate on the labor income of a dependent worker, married with two children; canton capitals or main towns.

Source: OFS; Administration Fédérale des Contributions (AFC).

StatLink  <http://dx.doi.org/10.1787/888932560398>

While personal income tax revenues also play an important role in funding subnational governments in some other small European countries (Blöchliger *et al.*, 2011), Switzerland stands out because all three levels of government have substantial personal income tax-setting powers. The assignment of income tax-setting powers to all three levels of government reinforces vertical externalities: a jurisdiction which raises its income tax rate reduces incentives for economic activity, thereby reducing not only its own tax base but also those of the other government levels. Decisions on tax rates may not take the negative effects on other jurisdictions into account. These vertical externalities may contribute to over-reliance on personal income taxation.

In most cantons, cantonal governments or municipalities can also set tax rates on the value of real estate, although setting these tax rates is an exclusive competency of municipalities only in a few cantons. Constitutional legislation restricts the use of revenues from specific taxes on real estate to the funding of public infrastructure for residential development. International empirical evidence shows that real estate taxes are

less affected by tax competition (as reflected in tax “mimicking”)¹¹ than other taxes, reflecting the immobility of the base.¹² Giving more room for real estate taxes to generate revenues could limit some of the harmful effects of tax competition linked to the selection effects of personal income tax rates, as it would allow local governments to tax a relatively immobile tax base.¹³ Such a reform would allow the tax burden to shift from personal income taxation to the taxation of real estate, which is less harmful for economic activity.

Assigning real estate tax setting powers to the municipalities exclusively may have further advantages. Such an assignment may help reduce vertical tax externalities, especially if combined with limitations on the municipalities’ ability to raise personal income tax rates. Moreover, real estate taxes may also be particularly suited to funding municipalities because of the stability of revenues and the relatively close correspondence of revenues with spending needs (Joumard and Kongsrud, 2003).

A special tax regime applies for non-Swiss citizens settling in Switzerland.¹⁴ These individuals can apply for lump sum taxation provided they do not engage in economic activity in Switzerland. At the federal government level, these foreign nationals’ tax liability is assessed by applying the personal income tax on the quintuple of the rental payment or the imputed rent for the Swiss residence. In addition, the tax liability must not be inferior to the tax revenue that their income derived from Swiss sources would generate if it were subjected to personal income taxation. Cantons can determine further taxation on these individuals. Some cantons employ this tax regime to attract rich individuals. The federal government has proposed draft legislation raising the minimum tax base to seven times the rental value of the residence. While this tax regime may reduce administrative tax enforcement costs when income derived from assets outside Switzerland is difficult to trace, the scheme may have adverse effects on the tax revenues of other countries and violates horizontal equity. The beneficiaries face strong disincentives to contribute to domestic output.

Box 1.3. Recommendations to improve the tax system

Making the tax system more growth enhancing

- Widen the base of the VAT, especially by removing exemptions and unifying tax rates. Over the medium term raise tax rates. Explore the technical feasibility of applying a VAT on financial services. If a VAT on financial services is not introduced, consider an additional tax on profits and remuneration in banking services.
- Reduce personal income taxes. Withdraw transfers paid to low-income households to reduce the cost of compulsory health insurance more gradually as household income rises.
- Lower the tax wedge on second earners, for example, by introducing separate assessment of partner income. Set up uniform rules concerning the taxation of several earners within one household across levels of government.
- Replace progressive cantonal corporate taxes with proportional taxes and abolish capital taxes. Remove taxes on the issuance of equity securities.

Reduce distortions in households’ financial decisions

- Limit the tax deductibility of interest expenses of households from personal income tax to mortgage interest on rental housing and phase out the deductibility of other interest payments. Remove the taxation of implicit rents of owner-occupied housing.

Box 1.3. Recommendations to improve the tax system (cont.)

- Withdraw tax advantages for early withdrawal of 2nd and 3rd pillar pension fund assets for the purposes of mortgage repayment.
- Introduce taxation of capital gains on households' financial assets.

Alleviate some negative impact of tax decentralization & competition

- Enhance the scope for local governments to raise a higher share of revenues from the taxation of real estate and lower the share of personal income taxation. To this end, eliminate legislation limiting the revenues from specific taxes on the value of real estate to expenditures related to public infrastructure development in residential areas. Consider assigning real estate tax raising powers to municipalities in full and consider limiting local governments' capacity to raise personal income tax rates.
- Abolish the lump sum tax regime for individuals who are not economically active in Switzerland. Subject all residents to standard personal income taxation.

Notes

1. Compulsory contributions also fund accident insurance and some child benefits. These are also not taxes but are relatively minor.
2. In the case of Switzerland, social security contributions are also assessed on income of the self-employed, so they also may discourage self-employment income. However, the level of social security contributions (which mostly fund pension and unemployment benefits) bears some relationship with the level of benefits received, limiting disincentive effects.
3. These include widening access to the simplified regime for small businesses and facilitating access to the deductibility of VAT payments on intermediate goods and services.
4. Insurance services are also exempt from VAT. Taxes on specific insurance transaction appear to provide a close substitute and are not subject to the pitfalls of other financial transaction taxes which are discussed below. See Bühler *et al.* (2011).
5. As in many OECD countries, contributions to these pension plans can be deducted from tax (up to legally defined limits) and interest income accumulated within the funds is tax exempt, while pension annuities are subject to personal income taxation.
6. According to a non-representative survey quoted by Zimmermann (2011), more than 40% of residents in Luzern with pension savings used pension plans for housing purchase.
7. Evidence from the US also suggests a damping effect of referenda on sub-national government spending. See *e.g.* Matsusaka and McCarthy (2001).
8. For example, cantons with direct democracy have more efficient rubbish collection according to a study published in 1983.
9. Feld *et al.* 2010 show that public spending in cantons which devolve spending responsibilities more strongly to municipalities spend less than other cantons.
10. The issue tax on equity capital is levied on the emission of participation rights in domestic incorporated companies and co-operative societies. Increases in par value, partial payments, and trading in share certificates are considered equivalent to emission. Upon formation or recapitalisation of a joint stock corporation or a limited liability company, an exemption of CHF 1 million applies to participation rights issued for a fee. The tax rate for the issue tax on equity capital is generally 1%.
11. Sub-national governments respond less when other subnational governments reduce property tax rates than is the case for corporate or personal income tax rates.
12. Even in the long term, allowing for the effect of house prices on housing construction, the price elasticity of housing supply is low, especially in Switzerland (Caldera Sánchez and Johansson, 2011). With an inelastic housing supply the real estate tax on housing is fully born by owners.

Moreover, in view of the modest tax rates, typically set well below 1% of the house price, tax-induced changes in house prices are small.

13. Even to the extent that housing supply is price elastic in the long term, pushing up housing costs, selection effects are attenuated because the share of housing costs in personal income typically declines as household income rises.
14. In current legislation this tax regime also applies to Swiss citizens who have lived abroad and return to Switzerland. Draft legislation proposes to eliminate this provision.

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Chapter 2

Reducing risks in the financial system

Despite some deleveraging over the past 3 years, the very large size of the balance sheets of the two big banks represents a major potential risk for the economy and public finances. These risks are reinforced by the low level of loss-absorbing capital held by them. Legislation, approved by parliament in September 2011, will reduce these risks, notably by strengthening capital requirements, although the foreseen leverage ratio of about 5% implies only a modest capacity to absorb losses. A stricter leverage requirement would generate substantial benefits and little cost to the economy. Contingent convertible bonds can contribute about half to required capital, so it is crucial that they are designed to ensure that they provide effective cushions in a systemic crisis. The planned reform also requires banks to develop mechanisms for their own resolution in case of failure but credible mechanisms of this kind have yet to be developed and require international co-ordination. Bank regulation needs to consider system-wide risks more explicitly. Macro-prudential regulation would also help the authorities to prevent excessive mortgage lending growth in the context of exceptionally low interest rates. Cantonal banks have expanded mortgage lending particularly actively. Removing the explicit government guarantees for their liabilities would also help lower risks. A partially-funded deposit insurance scheme would provide further stability to the Swiss financial system. Significant improvements in the regulation of pension funds have been introduced, although further steps are desirable.

The largest Swiss financial institutions require adequate legislation to limit systemic financial risks

The 2 big banks continue to pose large systemic risks

The Swiss financial system contains a diverse set of financial institutions. At one end of the spectrum, there are two exceptionally large banks as well as three large insurance companies. At the other end, there are multiple banks, insurers and pension funds which are much smaller (Table 2.1). In international comparison, the 2 largest banks, UBS and Cr dit Suisse (the “Big-2”) are at the top end of large banks in comparison to the size of the

Table 2.1. **Financial system profile**

Financial structure in CHF billion, 2009			
	Number of institutions	Total assets	Assets as % of 2009 GDP
Banks	325	2 668	488.4
Big-2	2	1 445	264.5
Cantonal banks	24	404	74.0
Regional and savings banks	70	92	16.8
Raiffeisen bank	1	140	25.6
Foreign owned or branches	156	353	64.6
Private banks	14	39	7.1
Other banks ¹	58	196	35.9
Insurance companies ²	114	851	155.8
Life insurance	24	281	51.4
General	90	570	104.3
Pension funds ²	2 543	539	98.7
Worldwide assets of major Swiss financial institutions, 2010 ³			
	CHF billion, 2010		% of 2010 GDP
UBS	1 317		241.1
CSG	1 009		184.7
Swiss Re	238		43.6
Zurich Financial Services	391		71.6
Foreign currency assets and liabilities as per cent of total assets/liabilities, end 2010 ⁴			
	Assets		Liabilities
All Swiss banks	50		52
Denominated in USD	26		27
Denominated in euros	13		14

1. Trading banks, stock exchange banks, and other banks.

2. Figures for end-2008.

3. Consolidated group.

4. Swiss booked assets only.

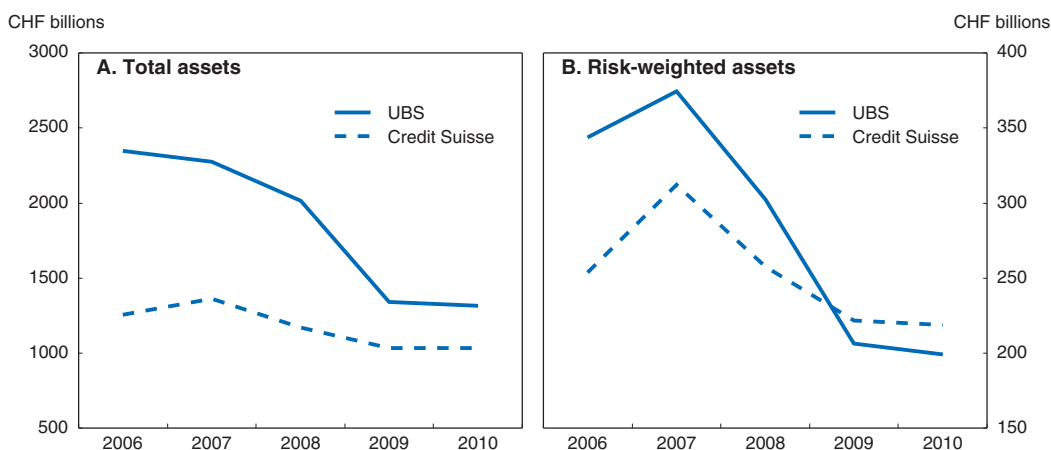
Source: Swiss National Bank, *Monthly Report on Banking Statistics*; *Annual Reports* of UBS and CSG for 2008, IMF 2009.

economy with combined assets worth 426% to GDP (Table 2 in the Assessment and Recommendations).


The Big-2 each pose a systemic risk for the Swiss financial system and for public finances, as underscored during the global financial crisis. One of the Big-2, UBS, needed a large government rescue package in 2008, which included the purchase of impaired assets worth CHF 38 billion (7½ per cent of GDP) by a designated fund (*StabFund*) set up by the SNB, of which 90% was financed by a loan granted by the SNB, as well as a temporary capital injection of the government into UBS amounting to CHF 6 bn (1.2% of GDP, see OECD, 2009a). The Confederation sold its stake at a CHF 1.2 billion gain corresponding to an annualized return of more than 30%. Most of the *StabFund*'s assets have been sold without a loss. The overall remaining risks for the public sector could be reduced from 7½ per cent of GDP in 2009 to 1½ per cent of GDP as of July 2011.

The Big-2 have reduced their balance sheets in the aftermath of the global financial crisis. UBS was hardest hit and has downsized substantially. Total assets declined by more than 40%. Crédit Suisse, the smaller of the Big-2, downsized from 1 360 to 1 030 CHF billion; a reduction of 25% (Figure 2.1). A similar pattern can be observed on risk weighted assets. These reductions are sizeable in an international context. While all banks faced a reduction in their 2008 balance sheet compared to the pre-crisis level of 2007 (due to lower prices), many banks rebounded subsequently to the pre-crisis level, whereas they stagnated in Switzerland.

Figure 2.1. **Swiss big banks' total and risk-weighted assets**



Source: Annual Reports of UBS and CSG.

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The balance sheet reductions notwithstanding, the Big-2 continue to be among the systemically important financial institutions (SIFIs) worldwide, whose disorderly failure would cause significant disruption to the wider financial system and economic activity worldwide (FSB, 2010). Moreover, in comparison to the large Swiss insurance groups, these banks are more prone to create systemic risk due to the short-term nature of their liabilities and their strong ties to other financial intermediaries domestically and abroad.

The Financial Stability Board has introduced the concept of global SIFIs (G-SIFIs): large financial institutions that are systemic in a global context. A list of 30 G-SIFIs was

published in 2011. The assessment methodology for G-SIFIs relies on an indicator-based approach and comprises five broad categories: size, interconnectedness, lack of substitutability, global cross-jurisdictional activity and complexity. The Big-2 are in that group and they are also systemically important for the domestic financial market. The Big-2 Swiss banks are Too-Big-To-Fail (TBTF) and therefore enjoy an implicit state guarantee which becomes effective when losses rise to a significant level relative to capital. This asymmetric pay-off gives an incentive to excessive risk taking, which can exacerbate the risks the banks pose for the global and domestic financial system.

The large size of the Big-2 also raises the question whether they are Too Big To Save (TBTS) for Switzerland. Small countries with large, internationally operating banks may lack the capacity to save their large banks on their own, which was the case, on a much smaller scale, of Iceland. The difficulty may be exacerbated in the case of large-scale liquidity problems, as the banks' liquidity needs may arise in foreign currency, for which the home central bank's capacity to provide liquidity support could be limited and may depend on foreign central banks' willingness to offer liquidity in the currencies concerned.

The initial policy response to financial risks in the large banks has been insufficient

In view of the substantial risks posed by the Big-2 the Swiss authorities initially responded to the crisis with stricter capital requirements for these two banks specifically, including the introduction of a leverage ratio requirement on the balance sheets of the Big-2 as well as improvements in liquidity requirements (described in the last Economic Survey, OECD, 2009a). FINMA imposed leverage ratios on the Big-2 at 3% at the group level and 4% at the level of individual domestic corporations. However, the leverage ratio requirement has remained weak because of the exclusion of domestic loans from the denominator, the inclusion of positions in capital which cannot absorb losses (such as deferred tax assets) and the reduction of the asset base on which the leverage ratio is calculated by netting certain assets and liabilities.¹ These weaknesses will be addressed with the implementation of the new TBTF regulation and Basel III (see below). As a result, loss-absorbing capital of the Big-2 remained below 2% of their total assets on average at the end of 2010 (SNB, 2011). The capacity of banks to absorb losses without external help thus remains very limited. Indeed credit default swap rates of both banks remained high, a multiple of the levels observed before the crisis.

In part, these shortcomings reflect the deficiencies of the current Basel II capital requirement framework. *First*, overall required capital buffers are too low. *Second*, the risks associated with certain activities (such as trading and securitization) are not adequately reflected in the risk weights of securities. The capital requirements focus on individual exposures and fail to capture the macro-dynamics within the financial system. The Basel II framework also makes no allowance for the specific challenges posed by the Too Big to Fail (TBTF) and, in some cases, Too Big to Save (TBTS) status of the largest banks. *Third*, the Basel II framework allows banks to build up exposures in off-balance sheet vehicles. *Fourth*, the financial crisis has also shown that both the level and the quality of bank capital base are important. Common shares and retained earnings ("common equity") are the most reliable components of capital to absorb losses. Some capital instruments allowed under Basel II rules have proven less capable of absorbing losses in the financial crisis. In view of these shortcomings Swiss rules introduced in 2009 also tighten requirements on the quality of eligible capital. FINMA also introduced stricter capital requirements on the smaller banks in 2011. These depend on the banks' total assets, assets under management

and ensured deposits. These requirements exceed earlier rules, which obliged banks to hold a minimum Tier 1 regulatory capital ratio of twice as much as the Basel II standard.

The Basel III capital framework, to be phased in between 2013 and 2016, in line with the Basel III process, addresses some of these shortcomings. It foresees a more substantial role for common equity in capital requirements, so as to ensure required capital is truly loss-absorbing. In addition, the level of the capital requirements will be increased for all banks. Thus, the common equity requirement has been set at 7% of risk-weighted assets while total tier I and tier II capital requirements have been set at 10½ per cent. The Basel committee has also presented a capital surcharge requirement for G-SIFIs, which has been issued for consultation. The capital surcharge has to be met with common equity and ranges from 1% to 2.5% of risk-weighted assets in the first instance, depending on a bank's systemic importance. To provide a disincentive for banks facing the highest charge to increase materially their global systemic importance in the future, an additional surcharge of up to 1% could be applied to them.

Legislation approved by parliament in September 2011, discussed below, will improve capital requirements on the Big-2 further, including with a stricter leverage ratio requirement. However, this legislation will be fully implemented only in 2019. The low level of loss-absorbing capital, as a ratio of the balance sheet, is a source of concern, especially in the context of continued international financial market turbulence. Direct exposures of the Big-2 to countries most affected by the euro area debt crisis are modest. For the Swiss banking system as a whole, exposures to the Greek, Irish, Italian, Portuguese and Spanish economies amounted to 1% of the balance sheets in September 2011, according to data from the Bank for International Settlements. However, they remain exposed to indirect effects should financial market turbulence worsen. Therefore immediate action to raise the level of loss-absorbing capital the Big-2 are required to hold relative to total unweighted assets is necessary.

New legislation on the Big-2 is welcome, although several improvements could be considered

The Swiss financial authorities set up a Commission of Experts (*Swiss Commission of Experts, SCE*) in 2010 to determine which businesses had a major systemic importance for the Swiss economy and to present proposals for their regulation (SCE, 2010). The Commission included representatives of the authorities, academia, and the private sector, mostly from the large financial businesses. The Commission determined that the Big-2 banks clearly had such systemic importance. These proposals were followed closely by the government in draft legislation. The legislation was approved by both chambers of parliament in September 2011. Two key components of the proposed reform are substantially higher capital requirements and resolution plans for the two large Swiss banks.

The purpose of higher capital requirements is to reduce the probability of failure. The purpose of requiring resolution plans from systemically important banks is to create conditions that would allow a wider range of options to policy makers other than having the whole bank rescued (Avgouleas *et al.*, 2010). A resolution plan is to be used when a bank may get into difficulties (such as when equity falls below regulatory minima or in the case of outright insolvency). The G20 group of countries has requested resolution plans to be drawn up for the top 30 G-SIFIs. The Financial Stability Board is currently working on this exercise. The requirement to develop resolution plans for the Big-2 Swiss banks included

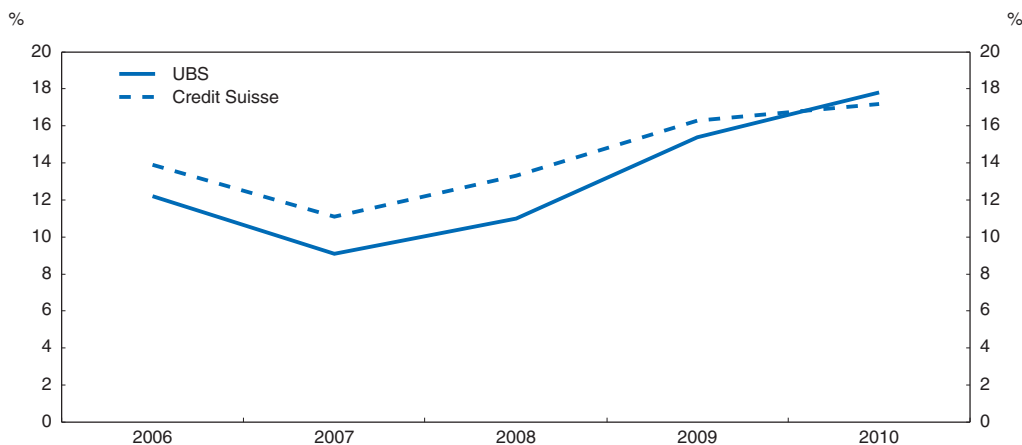
in the draft legislation is thus in line with international reform efforts. Both steps can help limit the government support that one of the Big-2 may require in the event of a crisis and would therefore reduce both the moral hazard that results from the TBTF status and the risks associated with the TBTS status. In addition, the draft legislation includes measures to improve risk diversification, notably by reducing the interconnectedness within the banking sector. A further element are liquidity requirements which have been implemented earlier.

Some OECD countries have also imposed taxes on bank balance sheets to seek a contribution for potential future government rescues of banks. In the case of Switzerland, the key challenge is to reduce the risk of one of the large banks requiring a rescue package which may exceed the resources the public sector is able to provide within a short period of time. A tax would not reduce this risk significantly. The authorities therefore appropriately focus on preventing the occurrence of such events. Moreover, contributions from banks to fund rescue measures do not reduce such moral hazard. However, taxes on specific balance sheet positions may be an option to consider if they can internalise the social costs that result from systemic risks such positions generate as effectively as regulation (IMF, 2010).

The capital adequacy requirements have been raised substantially for the Big-2

The new capital requirements on the Big-2 should reach about 19% of risk-weighted assets (as a result of ongoing balance sheet reductions they may drop to 18%, see below). These exceed the total requirements on G-SIFIs (summing up the Basel III requirements and the G-SIFI surcharge proposal from the Basel committee) by 4 to 6½ percentage points. The Big-2 have increased their capital ratios in recent years (Figure 2.2). In the second quarter of 2011, these reached 18% in both banks (however, these figures are still based on the Basel II definitions). In line with international practice, the capital requirements apply at group as well as individual bank level. These new requirements also exceed those in the United Kingdom, which has recently proposed a 3% capital surcharge for its large SIFIs (Independent Commission on Banking, 2011). In terms of common equity (the most reliable

Figure 2.2. **Capital adequacy ratio of Swiss big banks (in %)**



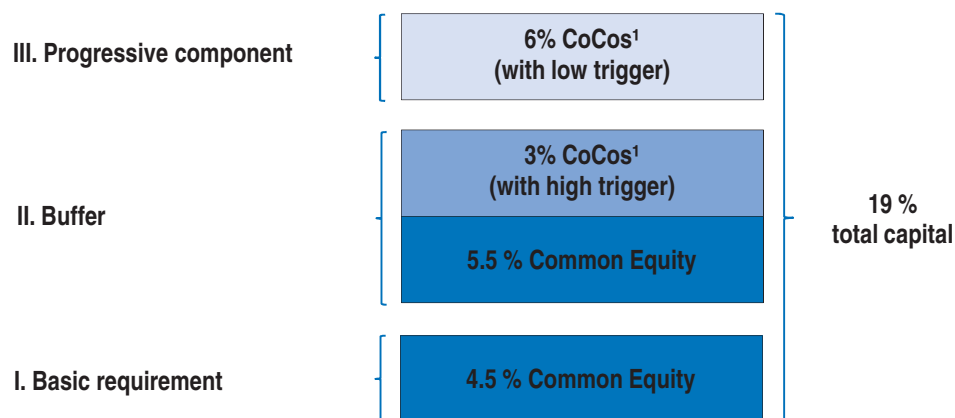
Source: Annual Reports of UBS and CSG.

StatLink  <http://dx.doi.org/10.1787/888932560436>

form of capital), the planned capital adequacy requirements are broadly similar to the international standards for G-SIFIs.

More specifically, the new capital regime consists of three building blocks, as illustrated in Figure 2.3. The minimum requirement is set at 4.5% of risk-weighted assets. The second component is a new buffer requirement at 8.5%. Banks have to restore and maintain this buffer in “good times” (defined in terms of profitability). This requirement is in line with the new Basel III regime which promotes the build-up of adequate buffers above the minimum, which can then be drawn down when a bank suffers losses. These two requirements add up to a 13% capital requirement for the Swiss banks, of which 10 percentage points are to be held in the form of common equity.

Figure 2.3. **The new capital regime for SIFIs**



1. Contingent convertible loans (or CoCos).

The third component is progressive since it is determined as a function of the market share in the domestic loan market and the size of the balance sheet. The Big-2 have to hold 0.3% of extra capital against risk-weighted assets for each additional percentage point of market share beyond a market share of 10%. Similarly, above a minimum threshold of CHF 250 billion (about 50% of Swiss GDP), they have to hold 0.6% of extra capital for each additional CHF 250 billion of risk-weighted assets. Based on the current market share of around 20% and total assets (not allowing for replacement value netting)² of around CHF 1 500 bn of the Swiss Big-2 banks, the progressive component is set at 6%. The progressive component ensures higher loss-absorbing capacity in larger banks with more systemic importance.

An innovative element of the new Swiss capital regime is that about half of the total capital required can be held in the form of Contingent Convertible Loans (or CoCos) or equivalent loss-absorbing debt (*e.g.*, write-down bonds) (Figure 2.3). The reform proposal foresees that these bonds must be converted into common equity if common equity drops below predefined levels. If common equity drops below 7% of risk-weighted assets, the CoCos held within the buffer component are automatically converted. This first trigger is set relatively high to ensure that capital can absorb losses without falling below the minimum requirement and without the need to suspend normal operations. CoCos in the progressive component are subject to a lower trigger, set at about 5% common equity, just

above the regulatory minimum of 4.5%. The capital provided in the progressive component is expected to be available to underpin organizational measures for the emergency plan to separate systemically important functions from other functions of the bank should the bank need to be unwound. The banks are required to define these emergency plans (see below). Both triggers are based on the book value of common equity. Additionally, these CoCos include a non-viability clause which can be triggered by FINMA if there is a threat of insolvency according to FINMA's assessment. Other conditions for the conversion, notably the conversion price, are left to the discretion of the banks (however, the contractual obligations must be approved by the regulator). For example, banks can set the conversion price when the bonds are issued, or at the time of conversion. A recent issue of contingent convertible bonds by *Crédit Suisse* foresees that the price of conversion is determined by the share price at the time of conversion. This is appropriate, as it maximizes shareholders' interest in avoiding a deterioration of the solvency of the bank to the trigger point, and so helps to reduce moral hazard for shareholders and management.

The CoCos will only work if triggered on time. There is some concern that accounting values and possibly supervisory assessments lag the real-time financial development of a bank, especially when it is in trouble (Calomiris and Herring, 2011, Flannery and Perotti, 2011). The recent subprime crisis shows the adverse, systemic impact of common exposures and positions that cumulate across firms that seemed *ex ante* to be individually well capitalized. Japan in the 1990s was an example of banks that were individually strong but systemically weak in response to real estate shocks (Hirtle, Schuermann and Stroh, 2009). In all these cases, banks were well capitalized on the basis of book value. UBS had a very high capital adequacy ratio (CAR) in accounting terms when the financial problems hit in 2008. Hence, if CoCos had been in place and had been triggered based on accounting values, they may not have been triggered on time. Moreover, management has some discretion over accounting values and may use such discretion in the interest of incumbent shareholders whose interests the management is legally required to defend. The determination of risk weights for the assets are also subject to considerable managerial influence, as they are calculated on the basis of the banks' own models. Admati *et al.* (2010, and references therein) for example, argue that this system is easily manipulable. Incumbent shareholders' interest may be to hold back the conversion of the bonds as it would dilute ownership of the bank. While the non-viability assessment is intended to provide a safeguard against late conversion, it is subject to FINMA's discretion and may therefore generate the potential risk of regulatory forbearance.

A first alternative to the current Swiss proposal would be to base a trigger for conversion on market values. Such a trigger has drawbacks as market assessments of firm value may be volatile. This may lead to early conversion. But that is less of a problem than later conversion, as it would provide equity well in time. To reduce the possibility of excessively early conversion, a stock market decline could be defined over a sufficiently long period to avoid triggers based on daily volatility. Also, as a market-based trigger might generate incentives to speculate on the trigger, which could generate instability, FINMA may need to actively use its powers to act against market manipulation. However, as argued by Callomiris and Herring (2011), the use of a moving average over, for example 3 months, combined with the liquidity of equity markets and the ability of banks to issue equity would reduce such risks.

A second option, to avoid belated conversions of CoCos into common equity would be for the Swiss authorities to monitor the market value of the Big-2 that issue CoCos. If the

market indicator signals problems, while the book value does not (yet), FINMA could, for example, be required to request an independent review of the book value of the bank by auditors. Moreover, if the bank becomes non-viable by market standards the legal documentation of the CoCos should allow for conversion. Furthermore, it is important that the regulator undertakes its assessment of bank management's book valuations with more independence than before the crisis. Steps to ensure the independence of the regulatory authorities from the banks are therefore critical to ensure that CoCos are an effective regulatory instrument. Regulatory oversight of the Big-2 has been tightened since, in part through stricter specification of stress testing (see Table A1) but regulatory forbearance cannot be excluded.

A belated conversion would entail more significant risks for the CoCos subject to the lower conversion trigger. Indeed, most of the CoCos the banks can hold to fulfill capital requirements are triggered at a value just above the absolute minimum of regulatory capital (*i.e. at about 5%*). Credible resolution mechanisms for internationally active banks may not be available in the next few years (see further below) and rescue measures for banks have typically had to take place well before book values of capital dropped to regulatory minima. The risk of belated conversion reinforces the need for the banks to hold substantial common equity buffers.

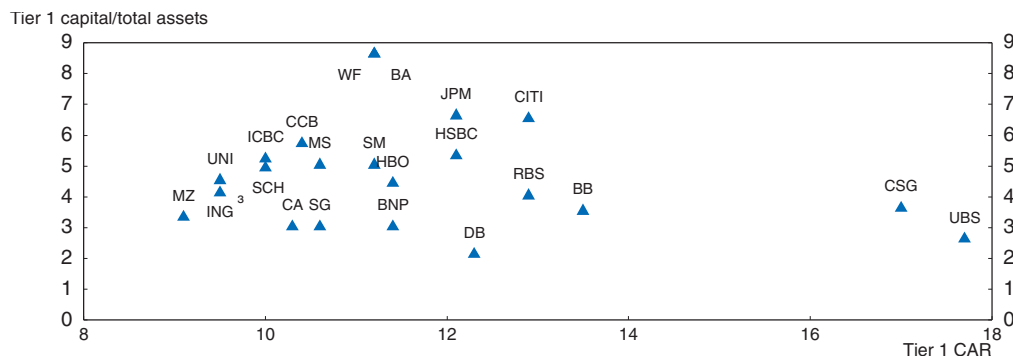
Another concern is the impact of the triggering of CoCos on the financial system (Goodhart, 2010). *First*, the holders of the CoCos should be able to absorb any losses after the CoCos are converted. CoCos should therefore be widely held, spreading the risk. To minimize the risk of contagion, they should preferably be held outside the financial system. Banks are rightly not allowed to invest in CoCos. Insofar as CoCos are held within the financial system, by insurers or pension funds, the draft legislation proposes to treat them as equity. However, as insurance companies have some systemic weight, specific provisions on risk concentration *vis-à-vis* the Big-2 should be considered. *Second*, the CoCos of several banks can be triggered at the same time. Such a simultaneous trigger could happen in particular with the progressive component at the low trigger point. The SNB and FINMA should prepare a scenario for such a systemic event.

A more stringent leverage ratio needs to be introduced to complement the capital adequacy ratio

Banks can circumvent capital requirements based on risk weighted assets by moving to asset classes with lower risk weights. The new Basel III regime therefore complements the capital requirements with a leverage ratio, defined as Tier I capital to total exposure, set at 3%. The Swiss authorities will adopt the new Basel III definition, which encompasses all assets (domestic and foreign) and does not allow netting. The new Swiss TBTF legislation introduces a leverage ratio that is calibrated on all requirements set in risk-weighted terms outlined above and implies a capital requirement slightly below the risk-based requirements as determined by the Swiss commission of experts based on year-end 2009 data. The leverage ratio is expected to amount to about 5% at present, although the exact ratio will depend on the development of the domestic market shares of the Big-2 and of their total assets. This leverage ratio is strongly endorsed as it provides a double lock on the door for "unlimited" risk taking.

Swiss banks tend to have relatively high tier-1 capital levels relative to risk-weighted assets compared to an international peer group, as illustrated in Figure 2.4, whereas tier-1 capital relative to the sum of unweighted assets (leverage ratio) remains relatively low. The

Figure 2.4. **Leverage and capital adequacy ratios of major international banks¹**
2010²



1. Banks' acronyms are the following: BA, Bank of America Corp.; BB, Barclays Bank; BNP, BNP Paribas; CA, Crédit Agricole Group; CCB, China Construction Bank; CITI, Citigroup; CSG, Credit Suisse Group; DB, Deutsche Bank; HBO, HBOS; HSBC, HSBC holdings; ICBC; ING, Ing Bank; JPM, JP Morgan Chase and Co.; MS, Mitsubishi UFJ Financial Group; MZ, Mizuho Financial Group; RBS, Royal Bank of Scotland; SCH, Santander Central Hispano; SG, Société Générale; SM, Sumitomo Mitsui Financial Group; UBS; UNI, Unicredit; WF, Wells Fargo and Co.

2. Data refer to the fiscal year from March 2009 to March 2010 for Japanese banks.

3. 2009 for tier 1 capital/total assets.

Source: Bureau van Dijk, *Bankscope Database*.

StatLink  <http://dx.doi.org/10.1787/888932560455>

numbers shown in Figure 2.4 are based on Basel II definitions, which are subject to significant shortcomings, in part because of an excessively wide definition of capital, as discussed above. According to these definitions, the leverage ratio of Crédit Suisse was 3.7%, and of UBS 2.7%, in 2010. They appear lower than the average leverage ratio of the international peer group at 4.8%. If only truly loss absorbing capital is counted, the leverage ratios have been estimated at below 2% for the Big-2 on average, as noted above. The banks may need to raise the ratio of capital relative to the balance sheet by more than 3 percentage points to reach the leverage ratio requirement of about 5% in the reform package, which must be fully met in 2019. Both common equity and the CoCos count towards meeting the leverage ratio requirement. It implies a modest capacity to absorb losses before the bank becomes insolvent (equity drops to zero).

The costs of higher capital requirements in terms of funding costs for the economy are low or zero (Admati *et al.*, 2010). Increased capital requirements do not increase banks' funding costs substantially, even though the required return on equity is typically much higher than the interest cost on bank debt before the financial crisis. As equity increases, the risk born by each unit of equity diminishes. Hence the required return on equity, which includes a risk premium, must decline. Moral hazard, which affects debt funding much more than equity funding, and the different tax treatment of the return on equity and the interest on bank debt also drive a wedge between the rates of return on bank equity and bank debt. However they drive a wedge between the private costs of equity and debt financing rather than the social costs. They should hence not induce policy makers to limit capital requirements. Moreover, since higher capital requirements reduce moral hazard, they should improve the quality of lending, with positive effects on long-term growth. The benefits of higher capital requirements in terms of preventing or mitigating financial crises are high, as the recent financial crisis has shown.³ A stricter leverage ratio requirement should be implemented. Preferably, common equity should contribute a larger share to the capital requirement.

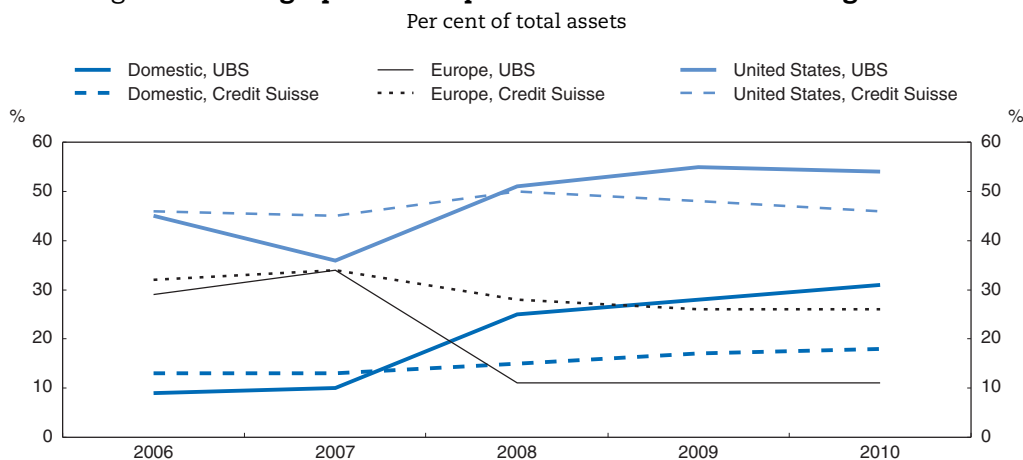
Risk diversification could be improved

A risk diversification requirement defines the maximum risk that a bank may incur in relation to specific counterparties. Banks in Switzerland and elsewhere in the OECD have preferential risk weights for lending between each other. The drying up of the interbank market illustrated the vulnerability of the banking sector to these exposures. Following recent European rules, the draft legislation proposes to raise the risk weight on interbank claims from a preferential 20% to 100% (equivalent to any other commercial counterparty). The risk of banks to single counterparties is currently restricted to 25% of eligible capital.

The reform package also proposes to reduce total risk concentrations aggregated over all individual risk concentrations in the Big-2. An individual risk concentration is defined as a total exposure to a counterparty that is equal or higher than 10% of eligible capital. The current rules restrict total risk concentrations to 800% of eligible capital. The Swiss authorities are considering reducing this limit, which has not been binding in the past. Such a step would also be helpful in reducing the interconnectedness within the financial sector.

Risk concentration could also arise with respect to geographic areas. Assets from one country are, for example, subject to systemic risk that is underestimated if only individual risks are assessed. The draft reform does not address the international dimension of risk diversification. The Big-2 Swiss banks traditionally have a large presence in the United States. Measured by assets, this exposure amounts to 40 to 50%. UBS increased its US exposure from 36% in 2007 to 54% in 2010, as illustrated in Figure 2.5. The Swiss authorities could consider extending the risk diversification approach to geographic concentrations.

Figure 2.5. **Geographical composition of assets of Swiss big banks**



Source: Annual Reports of UBS and CSG.

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Effective resolution plans will require international co-ordination

To curtail the TBTF problem the reform will require the Big-2 to prepare emergency plans to ensure the maintenance of systemically relevant functions in case of a threat of insolvency. Additionally, the Big-2 will be required to set up global recovery and resolution plans (RRP). Properly designed resolution plans may allow systemically important banks to fail or, at least, to be unwound in an orderly fashion, limiting the adverse impact on the

financial system and the economy domestically and internationally. The Federal Council sets the requirements for the emergency plan by ordinance, with the aim to avoid having tax-payers' money to be used to rescue one of the Big-2 in the case of a threat of their insolvency. The reform requires the Big-2 to take preventive measures that will help to preserve the systemically important functions while winding down the non-systemic parts of the bank. The reform act does not define the functions that will be considered systemically important precisely but gives some pointers: domestic banking business, in particular deposit and credit business, and payment functions. Including retail deposits and lending within systemically important functions appears appropriate as they are essential for the smooth functioning of the economy. Government involvement, and potential support, can then be restricted to these systemically important activities which will be determined by the SNB. These systemically important functions could, for example, be put into a bridge bank, endowed with sufficient capital from the conversion of the low-triggered Cocos, to continue these critical functions. The minimum requirements on resolution mechanisms have yet to be defined.

Orderly resolution of such global banks is feasible only with appropriate co-ordination and co-operation of all national authorities of the countries in which the banks conduct substantial business (Schoenmaker, 2011). In a co-operative approach, national authorities can implement the lowest cost option to resolve a bank (rescue, partly unwinding or closure). The recent global financial crisis has highlighted that an unco-ordinated approach, such as in the resolution of Lehman Brothers, can contribute to global systemic risk. So a national approach towards the resolution of the Big-2 is unlikely to be effective in times of crisis (see below). In this context, the proposals of the Swiss commission of experts for a rebate on the capital surcharge when national and international resolvability is improved are welcome. If the collaboration of the authorities of the affected countries is indeed improved, the repercussions of an insolvency are reduced, thereby allowing a lower capital surcharge. This puts a premium on national and international efforts to align insolvency procedures and recognize foreign procedures. However, since the required loss-absorbing capital of the Big-2 is expected to be limited to about 5% of the balance sheet, this rebate should only be granted if a fully credible international resolution plan is in place.

Finally, resolution plans are also relevant for insurers. FINMA may consider requiring resolution plans for the three large insurers. It appeared during the recent crisis that large insurance companies can also pose a systemic threat. *First*, insurance companies can act as counterparties to other financial institutions, for example in derivatives transactions (as in the case of AIG). *Second*, insurance companies may be forced to sell risky assets when their capital becomes close to or below the regulatory minimum. Such forced fire sales could lead to further declines in asset prices.

Stronger cross-border arrangements are essential

The large Swiss banks (UBS and CSG) as well as the large Swiss insurers (Swiss Re and Zurich Financial Services) have sizeable international operations, in particular in the major financial markets. Cross-border supervisory co-operation is therefore essential for effective supervision of these large Swiss financial institutions. The Swiss have developed a range of cross-border arrangements to help supervise the largest financial institutions and for crisis management. These include regular information exchanges and discussions with the US and UK regulatory authorities as well as the co-operative arrangements for insurance company supervision established with EU member states in 2006. During the

crisis, the SNB arranged temporary currency swap lines with the United States Federal Reserve and other central banks to ensure provision of foreign currency liquidity to Swiss banks. Such arrangements are both bilateral and multilateral, though mainly confined to a few major countries. Also in place are more multilateral supervisory college arrangements in respect of the largest banks and insurance groups (OECD, 2009a).

The experience of the global financial crisis has shown that stronger and broader multilateral arrangements need to be developed to strengthen crisis management capabilities. The Financial Stability Board has recommended developing recovery and resolution plans for the global SIFIs (FSB, 2010). In particular, SIFI resolution must be a viable option. The FSB notes that effective resolution includes effective cross-border co-ordination mechanisms. An FSB Cross-border Crisis Management Group (CBCM) is monitoring the development of G-SIFIs recovery and resolution plans in close co-operation with the institution-specific Crisis Management Groups (FSB, 2011).

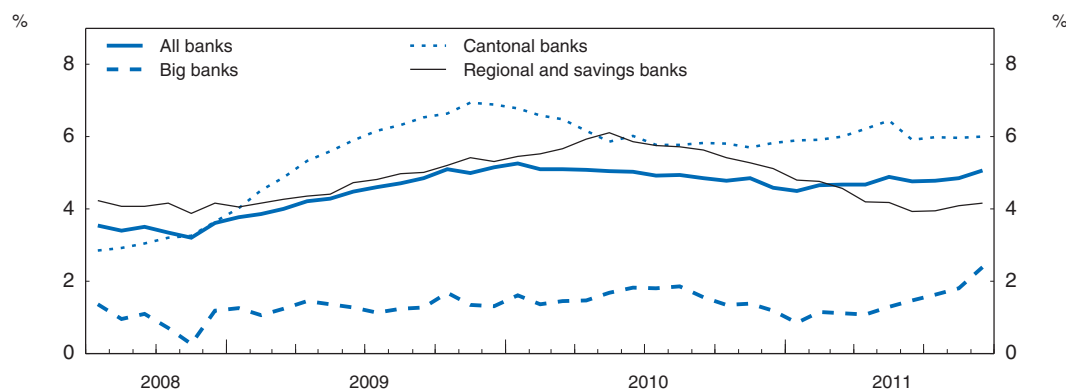
FINMA could use the supervisory colleges for the largest Swiss financial institutions to devise a resolution plan at group level. Such group level resolution plans would go beyond the domestic rescue plans for the systematically relevant functions, which are currently prepared. The resolution of troubled banks in the past indicates that an approach at the level of the group is often more effective and efficient. Reputation effects make it often impossible to separate the parent from the subsidiaries. Avgouleas *et al.* (2010) suggest that resolution plans for international banks could include a burden sharing mechanism for central banks (liquidity support) and ministries of finance (capital support). The burden sharing would then be agreed for each bank separately. The Swiss authorities, FINMA, SNB, and the Federal Department of Finance (FDF), should push for a more international approach towards defining and resolving the systemically important functions of the Big-2.

Regulation of smaller financial institutions

Cantonal banks

Mortgage lending of cantonal banks, which are mostly owned by cantonal governments, has recently been particularly strong (Figure 2.6). Cantonal banks are

Figure 2.6. **Total domestic mortgage lending by type of bank¹**
Year-on-year growth rates



1. Displayed data start from July 2008 in order to avoid the effects of a previous break in series.

Source: SNB, *Monthly Bulletin of Banking Statistics*, November 2011.

StatLink  <http://dx.doi.org/10.1787/888932560493>

especially active in local markets with 21 out of the 24 cantonal banks covered by an unlimited state guarantee. One canton is in the process of revoking the guarantee of its cantonal bank. Most cantons require the banks to pay a compensation for the guarantee. The payments are typically low relative to the bank's capital (often below 1%). The guarantees are reflected in the rating of these banks, which are considerably more favourable when the rating agencies take the guarantees into account (Table 2.2). The widespread guarantees of cantonal banks by cantonal governments, which lower their funding costs, may help them gain market shares in the current context of diminishing interest margins, and may encourage them to take on excessive risks. These risks are potentially heightened by the dependence of these banks on revenues from mortgage lending and the concentration of cantonal banks in their respective local markets, some of which have overheated. Government guarantees to the cantonal banks should be eliminated.

Table 2.2. **Currency deposit (CD) ratings by bank category, 2011¹**

		CD rating	Implied CD rating without external support	Implied downgrade (Notches)	Average implied downgrade (Notches)
Cantonal banks	Banque Cantonale Vaudoise	A1	Baa1/Baa2	-3.5	
	St. Galler Kantonalbank	Aa1	A2	-4	
	Zuercher Kantonalbank	Aaa	A2	-5	-4.17
Regional banks	Clientis AG	A3	A3	0	
	Valiant Bank AG	A1	A2	-1	-0.50
	Raiffeisen Schweiz	Aa1	Aa3	-2	
Big banks	Crédit Suisse AG	Aa1	Aa3	-2	
	UBS AG	Aa3	A3	-3	-2.50

1. Mars 2011.

Source: SNB.

Current legislation requires cantons to own at least a third of the capital and to control as much of the voting shares of a bank labelled a *Cantonal bank*. Cantonal banks are subject to FINMA's supervision, as are all banks. Appointments of senior management staff are subject to review by the supervisor to ensure they are "fit and proper". Hence the regulatory requirements regarding corporate governance limit the direct political influence on the cantonal banks activities. Some cantons have also made efforts to reduce political influence following the housing crisis in the early 1990s, in which some cantonal banks experienced a deterioration of their financial situation. Nonetheless, appointment procedures are subject to political influence; for example staff are elected by parliament and party affiliation plays a role. Such political influence generates a risk of cantonal banks' lending policies being used for political ends. Although cantonal banks face no restrictions on merging with each other, they have resisted the general trend in the Swiss banking sector to concentrate, including among the small banks. Political influence may also have prevented mergers taking place. Consideration should be given to further reducing political influence in appointment procedures for cantonal management, for example, by introducing independent appointment commissions consisting of experts.

In the wake of the financial crisis, deposit insurance has become more generous, as in other OECD countries, covering deposits up to CHF 100 000. The overall ceiling was raised from CHF 4 billion to CHF 6 billion. Deposit insurance is mostly relevant for the small,

domestically-oriented institutions, as the Big-2 benefit from implicit guarantees owing to their TBTF status. Requirements to strengthen the ability of the system to cover any required insurance payments have been strengthened only marginally, with banks required to hold liquid Swiss assets equivalent to 125% of insured deposits. The banks guarantee each others' deposits but deposit insurance remains unfunded *ex ante*. The government's proposal to introduce a scheme funded to the order of 3% of the insured sum, backed up by government in the case of higher funding needs, was defeated in parliament. The current unfunded arrangement makes deposit insurance ill-suited for situations in which individual institutions fail in the context of a system-wide crisis, in which it may be difficult for banks to fund each others' deposit withdrawals. The deposit insurance scheme should be partially funded by bank contributions and backed up by the government.

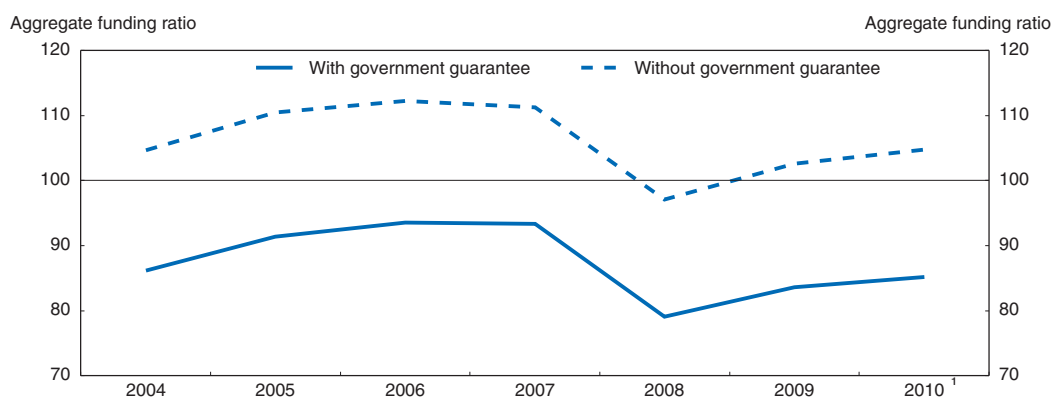
Reform of pension funds needs to progress further

An important component of the Swiss financial system is the funded pension schemes. All Swiss workers – except those with incomes below a legally-set threshold – are required to build up pension assets in the second pillar, and many make contributions beyond the minimum or build up assets in life insurance. Funds in the compulsory pillar are jointly managed by worker and employer representatives. Pension funds have accumulated assets worth close to 150% of GDP. As experienced in other countries, such as the Netherlands, pension fund losses in the context of a financial market crisis could imply sizeable macro-economic or fiscal consequences; for example, increases in contribution rates may be required in periods of financial crises, thereby aggravating a downturn by damping consumption (for the case of the Netherlands, see OECD, 2009b). In Switzerland, the preferred measure to deal with underfunding of pension liabilities is to lower expected pension payments by lowering the pension fund's guaranteed rate of return on contributions rather than increasing contributions. This approach would reduce the risk of damping consumption.

The funding ratios dropped sharply in 2008 but have improved steadily since then (see Figure 2.7). At present, overall, covering funding ratios does not require substantial increases in contribution rates. Table 2.3 provides a detailed distribution of the funding

Figure 2.7. **Funding ratios of pension funds in Switzerland**

Registered pension funds



1. The estimate refers to information available up to May 2010.

Source: FOS and FSIO; estimations for 2009 and 2010.

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Table 2.3. **Breakdown of funding ratios of Swiss pension funds (May 2010)**

Share of PF with a funding ratio	%	
	Without state guarantee	With state guarantee
Below 90	2.5	38.4
90-100	15.4	23.3
100-110	46.3	31.5
110-120	22.9	6.8
Above 120	12.8	None

Source: FSIO estimation.

ratios, as of May 2010. In the context of private pension funds without state guarantee, some 18% of pension funds have assets which do not fully fund projected liabilities. Some public sector worker funds are at present only partly funded and benefit from an explicit government guarantee to cover unfunded liabilities. That explains the lower funding of pension funds with state guarantees in Figure 2.7. The government has taken steps to fully capitalize them. The pension funds not backed up by government funding and whose funding ratios have dropped below 90% funding should be watched closely. Managers of these funds may face incentives to attempt to raise rates of return in order to raise funding ratios with a riskier investment strategy.

Payment promises do not adjust automatically to a decline in fund worth or changes in life expectancy. Rules determine the level of pension payments, making the system partly *defined benefit*. In particular, parliament fixes the *conversion rate*, which determines the level of annual pension payments relative to accumulated assets upon requirement, and the minimum rate of return. The conversion rate was lowered from 7.2% to 6.8% in 2010. However, this reduction in the conversion rate appears insufficient in view of developments in the residual life expectancy of retirees, as the government noted in 2006 (FDHA, 2006) and a further reduction of the conversion rate was rejected by referendum. It would also be desirable to adjust the conversion rate and the required minimum rate of return on the basis of actuarial and market developments, as recommended in previous *Economic Surveys*.

The current discount rate used to determine the present value of future benefit payments by the pension funds to compute their funding ratios is determined by a supervisory expert committee. However, it is not based on fair-value accounting. At present it is set, on average, at 3.6%, which is relatively high compared to long-term market interest rates. While the current practice reduces the volatility of the pension funding ratio, it may also lead to under-valuation of pension liabilities. New rules for setting the discount rate will be introduced in January 2012. The reference discount rate will be based on an index of market rates. The index will be calculated on the basis of average returns in asset markets in which pension funds typically invest over the past 20 years (2/3 weight) and the 10-year government bond rate (1/3 weight) with a deduction of 0.5% (CSAC, 2010). While the new index marks progress in incorporating market conditions, it relies on developments long in the past. To move closer to a fair-value rate while avoiding excessive volatility, a somewhat shorter period for asset market performance would be an option worth considering. Alternatively, the return on Swiss government bonds with longer maturity, such as 30 years, could be included, while raising the weight of these government bonds in the calculation of the discount rate.

Pension fund supervision used to be the responsibility of the 26 cantons. Switzerland has embarked on a major reform of the occupational pension funds. In 2010, new

legislation was passed providing for increased oversight, governance and transparency. The key elements of the reform are:

- Strengthening the supervisory system, merging cantonal into regional supervisory authorities. Clarifying the responsibilities and obligations of the various parties involved such as fund trustees, auditors and actuaries. New regulation which will enter into force in January 2012 foresees requirements of professional expertise at the level of the supervision of pension funds, particularly by the creation of a new supervisory body which will consist of independent experts.
- Strengthening of the supervisory system by establishing an overarching independent federal commission which has the power to issue binding standards for the local supervisory authorities.
- Additional legal provisions stipulating further governance and transparency requirements to avoid conflicts of interest for managers of pension funds.
- Regulation of investment foundations that manage the assets of Swiss pension funds.

The reform will be implemented in two stages (Towers Watson, 2011). The first stage dealing with the stricter governance rules has become effective as of 1 July 2011. The introduction of the new supervisory structure as well as the new rules for the investment foundations will become effective on 1 January 2012. The powers of the new federal commission are helpful to harmonize pension fund supervision across cantons. Pension fund supervision requires to some extent similar expertise as insurance supervision. As a minimum, the new pension commission should therefore co-operate with FINMA, which is responsible for federal banking and insurance supervision, to share supervisory experience.

Insurees cannot freely choose the pension fund within the compulsory funded pension pillar and the option of making additional voluntary contributions may not induce much competition among funds. Lack of competition may result in excessive costs in fund management. The reform therefore requires more transparency in the reporting of the administration costs and the management fees for asset management. Such transparency is welcome, as it facilitates a critical assessment of management cost and performance. But there have not been requirements about professional expertise on the trustees of pension funds, as there are for banking or insurance directors. Given the large investments managed by pension funds, specific requirements about professional expertise should be considered for pension fund trustees, who take the ultimate investment decisions. Such financial knowledge at the level of trustees is helpful to establish a critical assessment of the financing and performance of their pension fund and to prevent full reliance on outside experts, such as auditors, actuaries and investment managers. As not all members of the board of trustees have to be experts, new rules could stipulate that a minimum number of trustees has sufficient professional financial knowledge. The Government decided to include these requirements into a new regulation which will enter into force in January 2012.

Towards a new macroprudential policy framework

The macroprudential framework should be reviewed

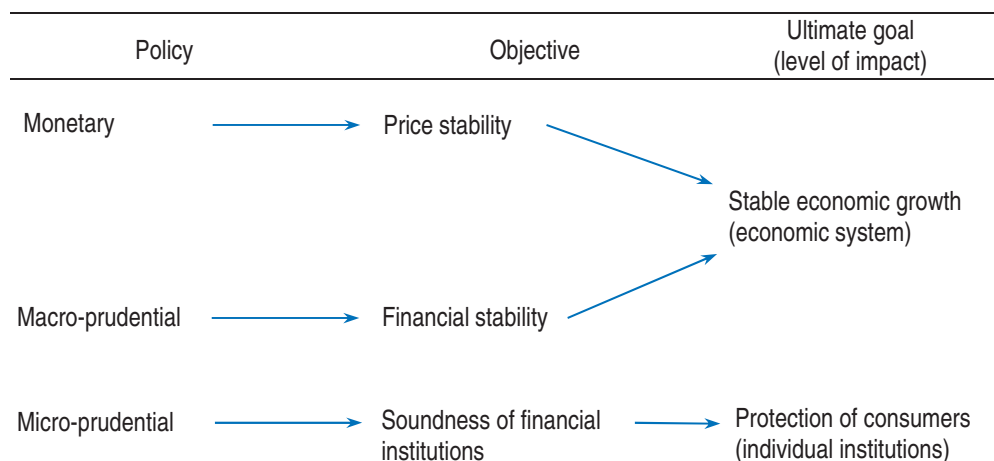
As the crisis revealed, a micro-prudential framework (*i.e.* a framework focusing on individual banks) cannot address the imbalances building up across the system. The need for macroprudential policy arises because financial institutions do not internalise the spill-

overs of their behaviour to the financial system as a whole and to the real economy. As the global financial crisis illustrates, ample credit can lead to imbalances, such as asset price bubbles. Underpricing of risk and herding behaviour contribute to the build-up of financial imbalances over time. When imbalances unwind, shocks quickly propagate through the financial system due to the high degree of interconnectedness and fire sales (*e.g.* Kashyap, Berner and Goodhart, 2011, Perotti and Suarez, 2009). Monetary policy is not always available to address excessive credit growth. Macroprudential tools are needed to fill this void. They can be split into, *first*, time-variant or counter-cyclical tools that aim to mitigate the build-up of financial imbalances and, *second*, structural tools that address externalities within the financial system (Schoenmaker and Wierds, 2011).

At present, all prudential regulation is the responsibility of FINMA. It can set requirements for individual banks on the basis of legislation, which sets system-wide rules. FINMA can – but is not required to – consult the SNB on new microprudential rules, following the revision of the bilateral Memorandum of Understanding in 2010. The SNB is responsible for price stability and contributes to financial stability. The revised Memorandum defines common areas of interest, which includes the soundness of systemically important banks, major regulation as well as crisis prevention and planning. In such areas, both institutions work together in common projects. In such projects, both institutions are required to consult each other before taking a final decision.

The Federal Department of Finance (FDF), SNB and FINMA also signed a Memorandum of Understanding on Financial Stability in January 2011. This memorandum improves the exchange of information. The FDF, FINMA, and the SNB agreed to meet at least twice a year to discuss their views on financial stability and issues of current interest in financial market regulation and to exchange information on i) the macroeconomic environment, ii) the situation in the financial markets and in the banking sector, and iii) national and international regulatory initiatives concerning the financial markets and the banking sector. In a financial crisis a joint high-level committee of representatives is expected to meet and the three institutions will take due consideration of the impact of their actions on the sphere of responsibility of the other authorities and co-ordinate their activities. A committee which meets on a regular basis has also been set up to discuss crisis prevention. The three authorities' responsibilities and powers established by law remain unchanged. Swiss macroprudential instruments are planned to be introduced in 2012 by ordinance changes. Delegating decisions on such tools to an independent institution with a mandate to contribute to financial stability, such as the SNB, could result in more timely decisions and strengthen the independence of decisions from the political process. Preventive action by timely application of macroprudential tools is crucial to mitigate financial imbalances.

A further question is which institution should be responsible for the new macroprudential tools. Monetary policy and macroprudential policy both have an effect on the whole financial system (Figure 2.8) and require macroeconomic analysis. FINMA is responsible for microprudential policy, which is aimed at individual institutions and is therefore not focussed on system-wide risks. It does therefore not produce expertise on macroeconomic analysis. Central banks have an advantage in applying time-variant or counter-cyclical macroprudential tools, related to the cyclical behaviour of the financial system and the wider economy. Until now, the only precautionary measure the SNB could employ was to issue a warning. Experience has shown that warnings alone are not enough (Jordan, 2010).

Figure 2.8. **Policy framework**

These arguments suggest that the SNB should be responsible for designing and implementing new macroprudential tools. A single authority for macroprudential policy would foster efficient and timely decision-making. The SNB could put in place a committee in which FINMA and officials from the Federal Finance Department participate. In addition, independent outsiders may be useful to avoid group thinking. However, the committee would need to be integrated in the SNB, similar to the envisaged Financial Policy Committee that will be part of the Bank of England.

The Swiss government should prepare a legal basis for the use of time-variant or cyclical macroprudential tools by the SNB. The role of the SNB in microprudential regulation should also be strengthened to help ensure that external effects of financial intermediaries are adequately taken into account. For example, the SNB could be required to propose measures to incorporate system-wide risks in regulation. FINMA could be required to either comply or explain, while retaining its ultimate regulatory competence.

The FDF, FINMA and the SNB have created a working group to further review macroprudential regulation and supervision. It will review availability of data, the adequacy of existing macroprudential instruments and the need for new instruments, including a countercyclical capital buffer, which could be introduced in 2012. The working group also discusses governance issues related to the implementation of macroprudential measures.

Specific macroprudential tools should apply to mortgage markets

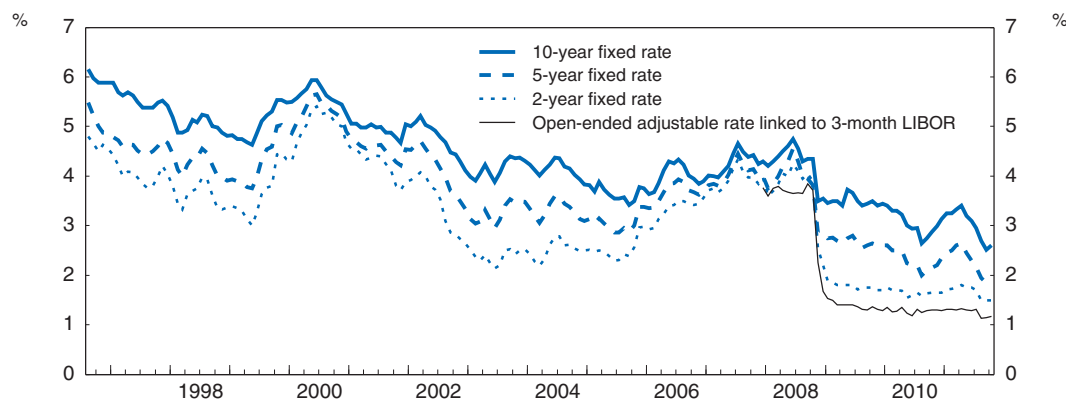
The new Basel III framework provides for a countercyclical capital buffer, ranging from 0 to 2.5% of risk-weighted assets that can be adjusted over time. If lending growth relative to GDP growth is above trend, the buffer should be increased. This countercyclical buffer is a major step in the right direction. But the question is whether the size of the countercyclical buffer is large enough to damp credit cycles. In addition, the buffer is crafted in terms of capital adequacy requirements (CAR). It may be useful to include a countercyclical component in the leverage ratio as well. This is in particular important for Switzerland, as the planned leverage ratio may be more binding than the capital ratio for the Big-2 Swiss banks. Other macroprudential tools can be targeted at sub-sectors. Margin requirements can, for example, be increased to mitigate rising equity prices, while loan-to-

value ratios or debt service-to-income ratios can be regulated to damp mortgage lending. The Basel III capital buffers will be phased in from 2016 onwards, which may be too late to prevent persistent excessive mortgage growth (see below). Beyond this capital buffer, specific macro-tools should apply to mortgage lending as mortgage debt has risen more than GDP in recent years (Figure 2.6), from high levels. Gross household debt relative to GDP in Switzerland is among the highest in the OECD, which may aggravate the consequences of a credit crunch or a sudden rise in interest rates, even if net household wealth is high. It is welcome that the working group set up by the authorities is considering the introduction of counter-cyclical capital buffers especially to be able to address excessive lending growth, which may take effect in 2012.

Low interest rates have contributed to the growth in mortgages. Interest rates on mortgage loans have fallen to historically low levels across the whole spectrum since 2008 (see Figure 2.9). Flexible rates fixed for 3 month or 2 years, for example, have even dropped below 2%. Mortgage funding costs fell to historically low levels by mid-2010, making mortgage financing very attractive to the public. The low interest rates not only reflect low policy rates and the attractiveness of Swiss debt issuance in international capital markets, but also unusually low risk premia on domestic mortgage loans, as reflected in the spread between mortgage rates and the corresponding maturity swap rate. Strong housing demand has pushed up prices, which have grown by 5% according to recent data (Figure 2.10). Fundamental factors, in particular, immigration, have contributed to demand pressure. Nonetheless, persistent strong growth of house prices could result in a housing bubble. There are certain “hot spots” such as Geneva, Zurich and central Zug, with higher increases than the overall average of 5%, where such a bubble may have emerged already.

Figure 2.9. **Interest rates on mortgage loans, 1996-2011**

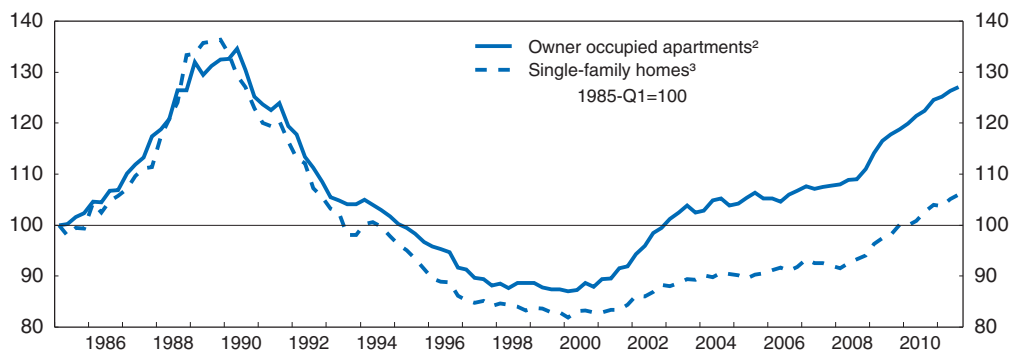
Monthly data



Source: SNB.

StatLink  <http://dx.doi.org/10.1787/888932560531>

The SNB may need to apply macroprudential tools, such as limiting the loan-to-value ratio or the debt service to income ratio, to mitigate mortgage growth. The Swiss Banking Association has issued a non-binding code for mortgage financing (Swiss Banking Association, 2003). The code recommends that the loan-to-value ratio should be limited to 100%, which is rather high. By comparison, Sweden has recently introduced a maximum permitted loan-to-value ratio for residential mortgages of 85%. The Swiss voluntary code is

Figure 2.10. Real house price developments in Switzerland¹

1. Deflated by CPI.

2. Two to five rooms.

3. Four to six rooms.

Source: SNB, Monthly Statistical Bulletin November 2011.

StatLink  <http://dx.doi.org/10.1787/888932560550>

currently under review. However, a code based on self-regulation cannot be enforced. It is important that the Federal Council prepares the legal basis for macroprudential instruments, including a loan-to-value ratio and a debt service-to-income ratio. The SNB should also make preparations for implementing legally binding loan-to-value ratio and/or debt-to-income ratio instruments. Such instruments will require improvements in data availability. In particular, data on average loan-to-value ratios or their distribution are only available for newly issued mortgages since the beginning of 2011. At present, the SNB does not have powers to require banks to provide data in a way that allows such aggregate indicators to be constructed. The SNB should be enabled to collect all the necessary data for effective oversight over the domestic mortgage market.

Box 2.1. Summary of main recommendations for strengthening financial regulation

Reducing financial risks stemming from the largest banks and insurance companies

- The amount of loss-absorbing capital the Big-2 hold as a percentage of total assets should be raised rapidly.
- A stricter leverage ratio requirement should be implemented. Preferably, common equity should contribute a larger share to the capital requirement.
- Credible and internationally co-ordinated resolution mechanisms at the group level should be in place for the Big-2 before any reductions in capital requirements are granted. Authorities should prepare a scenario in which the Big-2 banks would convert their CoCos simultaneously.
- The envisaged resolution plans for the Big-2 should be extended to the group-level of the large Swiss financial institutions and discussed in the supervisory colleges.
- The authorities should require resolution plans to be developed for the large Swiss insurers.

Box 2.1. Summary of main recommendations for strengthening financial regulation (cont.)

Improving regulation of other financial institutions

- Consideration should be given to improving appointment procedures for cantonal management, for example, by introducing independent appointment commissions consisting of experts.
- Explicit government guarantees to the cantonal banks should be eliminated.
- The deposit insurance scheme should be partially funded.
- The governance rules for pension funds should include requirements about the financial expertise of pension funds' boards of trustees.
- The discount rate for valuing pension fund liabilities should be moved closer to market rates, for example by shortening the period over which asset market performance is assessed. Alternatively, the return on Swiss government bonds with longer maturity, such as 30 years, could be included while raising the weight of government bonds in the calculation of the discount rate.

Strengthening the macroprudential policy framework

- Instruments should be introduced that allow macroprudential requirements to be imposed, such as time-variant counter-cyclical capital buffers or temporary measures to slow excessive lending growth. The SNB could be given the powers to introduce such counter-cyclical or time-variant requirements.
- The authorities should monitor closely further developments in mortgage lending and house prices. The SNB should be enabled to collect all the necessary data for effective oversight over the domestic mortgage market. If mortgage lending growth is excessive, regulatory measures should be taken, for example, to limit the loan-to-value ratio or the debt service-to-income ratio.
- The role of the SNB in microprudential regulation should be strengthened to ensure that system-wide risks are taken into account in such regulation. For example the SNB could be required to propose measures to incorporate system-wide risks in regulation.

Notes

1. Note that Crédit Suisse reports on the basis of US GAAP, which allows netting. UBS reports on the basis of IFRS, which is gross.
2. Under replacement value netting, the net present value (replacement value) of contracts will be netted when enforceable netting agreements are in place. This is allowed under US GAAP. However, the underlying gross positions are then not transparent. IFRS therefore requires to report on a gross basis.
3. The direct fiscal costs to support the financial sector have been estimated to amount to 5% of GDP while the loss in output was 25% of GDP in the recent financial crisis (Laeven and Valencia, 2010).

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Chapter 3

Reducing greenhouse gas emissions in a cost effective way

Switzerland has low greenhouse gas emissions per capita as compared to other countries, which reflects the strong reliance on energy sources emitting few greenhouse gas emissions, especially in electricity generation, and little heavy industry. Greenhouse gas emissions have remained almost the same since 1990, as emission reductions in the residential and industrial sector were offset by increases from the transport sector. It is estimated that, in aggregate, marginal abatement costs are relatively high in Switzerland and meeting the 2020 target of a 20% emission reduction below the 1990 level will necessitate more cost effective policies. In particular, more needs to be done in the road transport sector, the domestic sector with the largest potential for emission reductions at relatively low cost. The incentive for energy-saving renovations in rented dwellings could be raised by a better design of existing policies. And the policies in the industrial sector could be made more effective with the transition towards linking the Swiss and the EU emission trading systems.

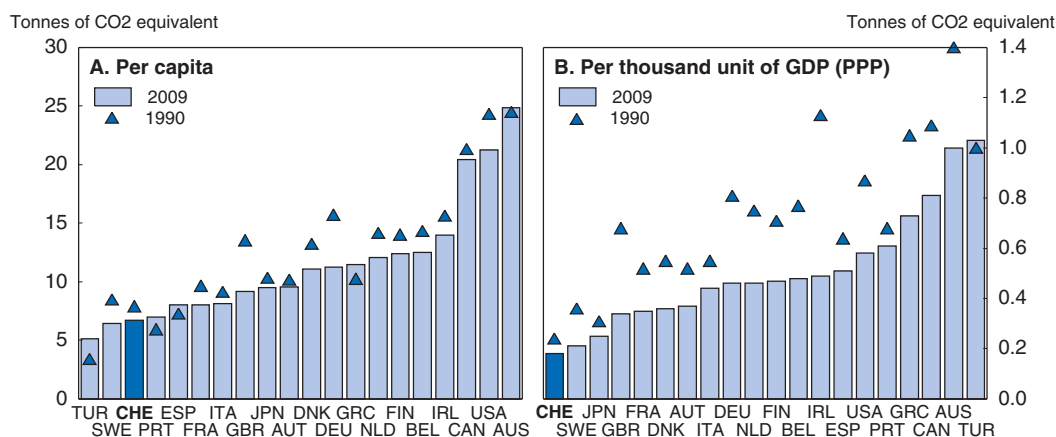
Greenhouse gas emissions reduction – meeting new challenges

Switzerland has been a forerunner in climate change mitigation


Switzerland is characterised by a relatively low level of Greenhouse Gas (GHG) emissions as compared to other countries. In 2009, Switzerland emitted around 7 tonnes of GHG per capita, as compared to the average of 11 tonnes of GHG per capita across OECD countries (Figure 3.1, left Panel). The low level of greenhouse gas emissions reflects to some extent the strong reliance on renewable or less polluting energy sources, such as nuclear energy and hydro power. It also reflects an industrial structure which is concentrated on service sectors and has a negligible weight of heavy industries.

Figure 3.1. **GHG emissions in a selection of countries, 1990 and 2009**

Excluding land-use emissions



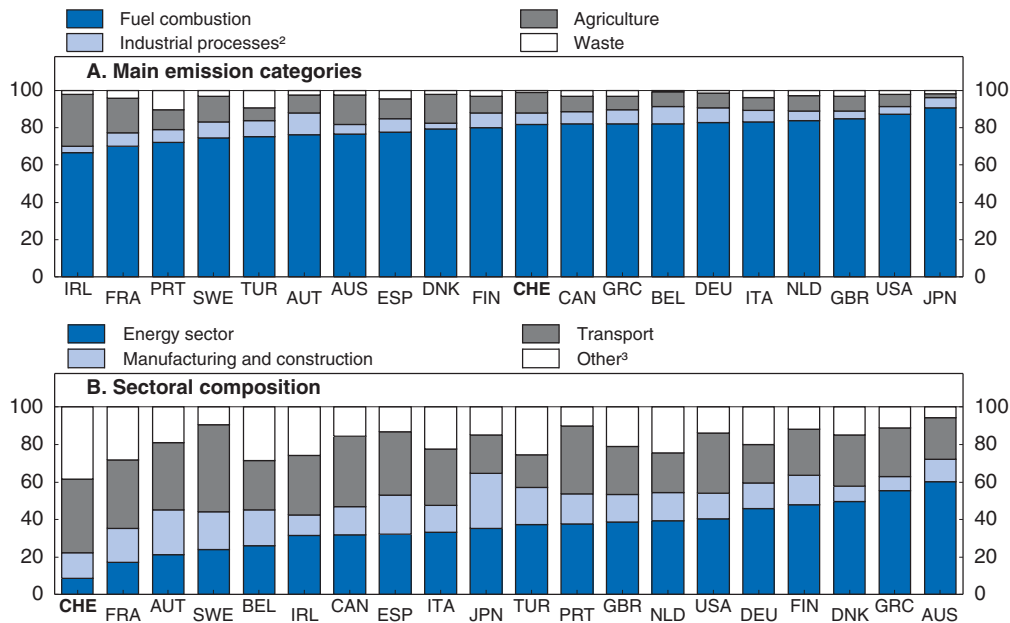
Source: UNFCCC Database.

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The total level of Swiss greenhouse gas emissions has remained almost constant since 1990, the reference year for the Kyoto Protocol. Emissions were just over 10% lower than in 1990 in per capita terms and more than 20% lower as a ratio to GDP (Figure 3.1, right Panel). As emissions of CO₂ account for more than 80% of Switzerland's GHG emissions, the level and change in CO₂ emissions explains most of the patterns in total GHG emissions (FOEN, 2010a).


About 85% of all greenhouse gas emissions in Switzerland come from the generation and the use of energy. Another 10% come from the agricultural sector in terms of non-CO₂ emissions which are not caused by energy use (Figure 3.2, Panel A). Due to early and effective measures, emissions from waste management are small. Within the energy generation and use category, the largest source of GHG emissions in Switzerland is the transport sector (Figure 3.2, Panel B), mainly related to high and increasing road transport.

Figure 3.2. **Structure of GHG emissions, 2009¹**
Excluding land use emissions



1. The solvents and the residual other sectors categories are not shown due to their absence of quantitative significance.
2. Does not include GHG emissions from fuel combustion in the industrial sector, which are covered within Energy.
3. "Other" covers emissions from fuel combustion in commercial/institutional, residential, and the agriculture, forestry and fishing sectors.

Source: UNFCCC Database.

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The second main source of GHG emissions within this category relates to emissions due to energy use for heating, especially in the residential sector (Figure 3.2, Panel B).

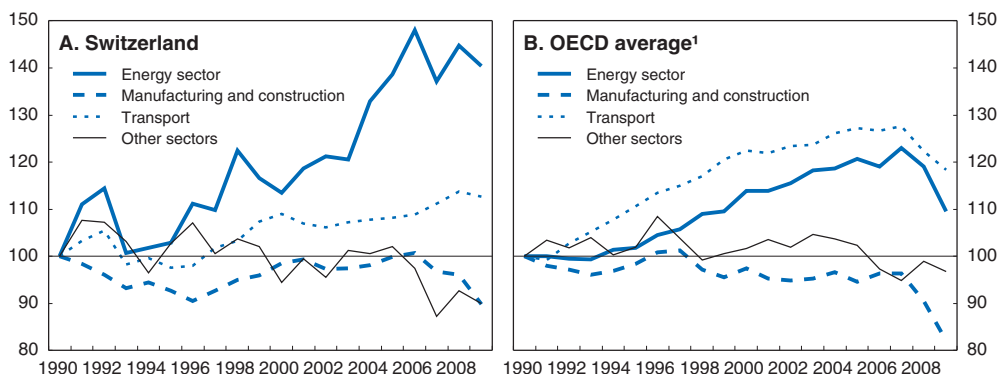
GHG emissions have been reduced significantly since 1990 in the residential and the industrial sector, although some recent reductions in the industrial sector were due to the economic downturn (Figure 3.3). However, these emission reductions have been offset by a continuous increase in GHG emissions from the transport sector of almost 14% over the same period. The latter is due to the growth in domestic and international traffic, which significantly outweighs other efficiency gains from more efficient engines (FOEN, 2010a). Moreover, while in absolute terms, GHG emissions from energy generation industry are still relatively low in Switzerland, they increased by almost 45% between 1990 and 2009, which is more than double the corresponding average increase in OECD countries.

The GHG emission reduction targets are ambitious, especially if nuclear energy will be phased out

Under the Kyoto Protocol, Switzerland committed to lower its greenhouse gas emissions compared to 1990 by 8% on average between 2008 and 2012. Towards this target, it is permitted up to a limited extent to credit the purchase of certified emissions reductions from climate protection projects abroad as well as certified sink effects from forest growth. Switzerland can use flexible mechanisms to achieve its emission targets, notably the International Emissions Trading system (IET), the Clean Development Mechanism (CDM), and Joint Implementation (JI).¹ If its emissions remain below the target

Figure 3.3. **GHG emissions from fuel combustion over time**

1990 = 100



1. Simple average excluding Switzerland and, due to unavailable data, Chile, Israel, Korea and Mexico

Source: UNFCCC Database.

StatLink  <http://dx.doi.org/10.1787/888932560607>

(48.25 million tonnes of CO₂ equivalent emissions), Switzerland can sell its excess allowances on the UN IET market or carry them over to the post-2012 commitment period. If it fails to meet its commitment, it risks being disqualified from participating in the flexible mechanisms and penalised by an additional deduction from allowed emissions in the subsequent round, with a 30% penalty factor (Grubb, 2003).

The CO₂ Act of 2000, the centrepiece of Swiss legislation concerning climate policy, specifies that the 8% GHG emission reduction target will be met through a 10% reduction of CO₂ emissions from fossil fuel use by 2010, with differentiated targets for heating and process fuels (-15%) and for transport fuels (-8%) (Federal Council, 2009).² To achieve this goal, the CO₂ Act accords the highest priority to voluntary action by individuals and firms; these quasi-voluntary actions often being induced or combined with financial incentives. If these measures are not sufficiently effective, market-based instruments, such as taxes or emission trading, are seen as the second most preferred option. Beyond 2012, the Parliament has set the greenhouse gas emission reduction target of at least 20% below the 1990 level by 2020 (Parliament, 2011a). The details of how the target should be met are currently under discussion. According to the proposal of the Federal Council of 2009, at least half of the 2020 target would need to be met through abatement at the domestic level (Federal Council, 2009). The policies and measures proposed aim mainly at a reduction in CO₂ emissions due to its large share in overall greenhouse gas emissions (Federal Council, 2009).

A particular challenge for setting and meeting the 2020 targets arises in the case of the recently decided phasing out of nuclear energy in the aftermath of the natural disasters in Japan in March 2011 (Parliament, 2011b, NZZ, 2011a). In Switzerland, nuclear power (39%) is the second largest source of electricity generation, after hydroelectric plants (56%) and greater than conventional thermal or other plants (5%) (FOE, 2011). Due to technological limits to a much greater use of renewable energy, a shift away from nuclear energy may require more use of gas or other power plants with less favourable GHG emission performance. Under current legislation, if such power plants are built, their operators will have to offset 100% of their emissions.

... and require more cost effective policies

Estimates suggest that additional action is necessary for Switzerland to meet its current Kyoto emission reduction target. According to a reference scenario, estimated net annual GHG emissions over the period 2008-12 would amount to 49.4 million tonnes CO₂ equivalent, 0.8 Mio tonnes more than targeted in the Kyoto Protocol. Under an environmentally more pessimistic scenario, based on stronger economic growth, lower energy prices and lower average temperatures between 2010 and 2012, the gap would amount to 1.3 Mio tonnes CO₂ equivalent. The government has started efforts to be able to certify a larger number of international emission compensation credits within the Kyoto target (FOEN, 2011a).

Meeting the reduction target of 20% until 2020 may be even more difficult and will necessitate more cost effective market-based instruments. The question at which cost the 2020 target could be achieved depends on the partition between domestic abatement and international compensation projects (e.g., CDM). While the Kyoto Protocol does not set explicit limits, countries typically prioritize domestic action (Grubb, 2003). The financing of international compensation projects has the potential to i) reduce emissions at very low cost; ii) reduce or at least compensate for carbon leakage;³ and iii) boost transfer of cleaner technologies to developing countries (Capoor and Ambrosi, 2008, Burniaux et al., 2008). However, for these projects to be effective, emission reductions need to be “additional”, i.e., on top of baseline reductions that would have resulted also without such projects. Assessing and proving additionality is difficult and creates large transaction costs (Burniaux et al., 2008). Moreover, domestic abatement can produce additional non-negligible benefits, for example in terms of reduced harmful effects for human health (Felder and Schleiniger, 2002).

Cost-effectiveness of climate change mitigation policies is particularly important as Switzerland is characterised by high marginal abatement costs as compared to other countries: model based estimations by Drouet et al. 2006 suggest that, by concentrating on CO₂ emissions in line with the government proposal, the 2020 target of a 20% reduction in GHG emissions by 2020 would require a 31% reduction in CO₂ emissions (Table 3.1). With an efficient policy, as modelled in the form of a uniform CO₂ tax on all firms and individuals as the sole instrument, and assuming 100% domestic reductions, this would imply a tax of 66 USD per tonne of CO₂ emissions in 2010 which would have to increase to more than 450 USD per tonne until 2020. In the EU, due to its higher level of emissions and stronger reductions over the past twenty years, the 2020 target could be achieved with an estimated uniform tax of 7 USD per tonne of CO₂ equivalent emissions in 2010, increasing to 18 USD per tonne by 2020.

Table 3.1. **Model based estimations of CO₂ prices under the 2020 scenario**^{1, 2}

Reduction in CO ₂ equivalent emissions in %	2010		2020		Uniform tax in USD per tonne of CO ₂ equivalent emissions	2010		2020	
	2010	2020	2010	2020		2010	2020	2010	2020
Switzerland	-10	-31	Switzerland			66		468	
European Union 25	-8	-17	European Union 25			7		18	
Other non-EU OECD	-4	-13	Other non-EU OECD			2		10	

1. 20% reduction of overall GHG emission by 2020 vis-à-vis 1990, based on the assumption of a uniform CO₂/GHG tax.

See Drouet et al. (2006) for more assumptions concerning GDP growth rates, energy use and energy prices.

2. Other non-EU OECD: United States, Canada, Australia, New Zealand

Source: Drouet et al. (2006).

In order to achieve cost-effective policies, the following general weaknesses in the Swiss climate policy would have to be addressed:

- One step towards overall efficiency consists in applying the same implicit carbon price within and across broad sectors or uses to ensure that GHG emissions are reduced where it is least costly (Burniaux *et al.*, 2008, de Serres *et al.*, 2010). This is not yet the case in Switzerland. In particular and as discussed below, there is currently no carbon price for transport fuels in private passenger road transport. Hence, more could be done at lower costs for the economy in this sector.
- The focus of current Swiss climate change policy on “quasi-voluntary” measures as first priority before recourse to more effective price-based instruments may produce insufficient and sub-optimal incentives and may also reduce political acceptability of more effective price-based measures. For instance, a broader use of (and higher rates of) CO₂ taxes would create an incentive to invest in new technologies and innovation, and the use of the least-cost technologies (de Serres *et al.*, 2010).
- Part of revenues from taxes and levies are earmarked for the financing of specific projects which may reduce their effectiveness and waste resources. Such earmarking should in particular not be used if these taxes and levies are aimed at internalising external effects such as those arising from CO₂ emissions.⁴

In what follows, the policy mixes in road transport, in the residential sector, and in industry and agriculture, are analysed and recommendations are derived on how to improve them so as to make the overall Swiss climate change mitigation policy more cost-effective.

More could be done at low cost in road transport

Emissions from road transport are not yet addressed adequately

Road passenger transport is the sector with the highest CO₂ emissions in Switzerland and CO₂ emissions from road transport have been continuously increasing (Figure 3.2 above). This is due to strongly increasing road traffic, notably on the national roads and highways where annual person kilometres have doubled between 1990 and 2010 (FOR, 2011). In 2009, about 78% of all private and public passenger transport was done on the roads. Public transport (on road or rail) accounted for 20% of total passenger transport. Also goods transport has been increasing continuously since 1990 and has been shifting more and more onto the roads, with 4% of total transport on roads due to heavy vehicles. Switzerland is important for goods transit transport: In 2009, 38% of all goods transport on roads was related to transit trade (FOR, 2011).

Addressing the problems resulting from increasing demand for private road transport would have a double benefit, as road transport is a main source of a much larger set of external costs for the society beyond CO₂ emissions. Model-based estimations suggest that, in Switzerland, already in 2005, the social costs from road transport in terms of noise, accidents, health, nature, time and climate effects, amounted to more than 9.8 billion CHF, equivalent to 2% of GDP (Table 3.2). These data are based on models, partly using “willingness-to-pay”-estimates, but may still underestimate the actual costs from transport.

Negative effects for the society result especially from traffic congestion, and this not only refers to time spent on roads that could be used more productively elsewhere, but also in terms of increased CO₂ emissions. CO₂ emissions are particularly high in traffic jams, as

Table 3.2. **Estimated external costs from transportation in 2005**
in Mio CHF

	Total	Road transport		
		Total	Passenger	Freight
Total	9 769	9 315	6 136	1 940
<i>Of which:</i>				
Accidents	2 047	2 017	1 893	124
Noise	1 174	1 101	768	333
Health	1 954	1 834	1 047	787
Buildings	289	274	144	130
Climate	1 264	1 256	1 030	226
Nature and Landscape	797	687	592	95
Other environment	1 004	906	662	245
Congestion	1 240	1 240	–	–

Source: Federal Office for Regional Development, Transport Policy (2009 estimations).

fuel consumption is up to two or three times as high in stop-and-go traffic as compared to fluid traffic. In Switzerland, congestion has increased eight-fold over the past 15 years, from 2 000 hours in 1995 to 15 910 hours in 2010, two-thirds of which are due to overuse (FOR, 2011).

The current road transport policy does not address CO₂ emissions optimally. The government puts strong emphasis on the mandatory energy label to increase fuel-efficiency of cars and recent legislation sets a new maximum limit on average emissions from new passenger cars by 2015 (Box 3.1). Such standards and labels can be effective as complementary information and signalling devices if combined with a CO₂ tax on transport fuels (de Serres *et al.*, 2010). However, increased fuel efficiency of the vehicles reduces vehicle usage costs and stimulates additional car use – when not combined with a CO₂ tax or a sufficiently high fuel taxes; the latter is not the case in Switzerland. Furthermore, the label is applied to new cars only. It takes several years before the stock of cars is renewed to a sufficiently large extent for this measure to affect CO₂ emissions significantly.

Moreover, existing car-related taxes and levies do not appear to produce a sufficient incentive to reduce emissions, especially from congestion. This is in particular valid for taxes on the purchase or ownership of cars. Typically, excise duties on fuel consumption (including the climate cent, see below) can be seen to some extent as a substitute for a CO₂ tax due to the close relationship between fuel consumption and CO₂ emissions. However, while high for diesel, the level of the Swiss excise duty on gasoline which is used by the large majority of cars is low as compared to other countries (Figure 3.4). The effectiveness of the fuel tax is further reduced as long-distance commuting costs are tax deductible. And while the Swiss heavy vehicle fee (HVF, Box 3.1) is an effective policy instrument, it is only applied to freight transport which constitutes less than 10% of total road transport volume.

The policy mix in road transport also relies heavily on investing in road and rail transport infrastructure to meet increasing demand for road transport, and not enough on reducing congestion. Several extension projects are currently being implemented or planned, amounting to about 8% of GDP in total (NZZ, 2011b-d). One problem related to infrastructure investment is the specific earmarking of tax revenues in special funds to

Box 3.1. **Current policies in the transport sector impacting climate policy goals**

Price-based measures

The federal government levies a fuel tax and surcharge on motor fuels of about 0.7 CHF per liter. Bio-fuels are exempted from the tax subject to ecological standards. The cantons levy car ownership taxes depending on cylinder volume, horsepower or weight of vehicles and passenger cars; some also take CO₂ emissions into account. The Swiss highway system requires the purchase of a flat rate vignette (toll sticker) for one calendar year, for both passenger cars and trucks (IEA, energy efficiency policies database). It is planned to raise the vignette from the current 40 CHF to 100 CHF per year and to switch to an electronic vignette to reduce the loss of revenues due to fraud, which is estimated at around 10% of annual revenues (NZZ, 2011c). It is also envisaged to introduce a lower rate vignette to reduce the costs for tourists who use the Swiss highways only for a relatively short period per year.

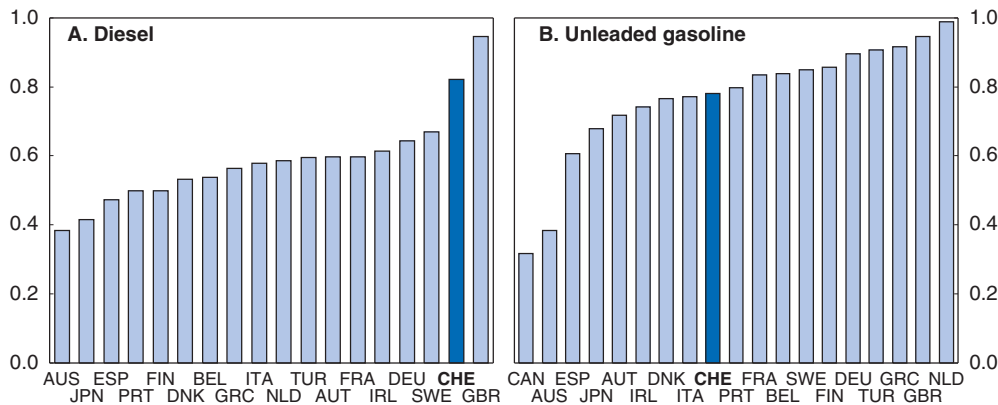
A distance-related electronic heavy vehicle fee (HVF) has been levied in Switzerland since January 2001 (FOSD, 2010a). The HVF applies to heavy vehicles with a permissible laden weight of more than 3.5 tonnes and is calculated based on the number of km driven on Swiss territory, the permissible weight of the vehicle, and vehicle emissions. From an initial rate of 1.68 cents per tkm upon introduction, the charge has been increased to an average 2.70 cents per tkm from 2008. In 2009, the revenues were estimated at around CHF 419 Mio, i.e., about 0.1% of GDP (FOSD, 2010a). The HVF has led to a significant reduction in road use by heavy vehicles over the past ten years. By accepting to raise the weight limit for vehicles at the same time, the fee met the regulations of Switzerland and those of the EU (Balmer, 2004). With Switzerland having been a forerunner, a similar distance-related heavy vehicle fee was introduced in Austria in 2004, in Germany in 2005, and in the Czech Republic in 2007.

Between 2004 and 2007, a research project on “mobility pricing” was undertaken, requested by the government, to analyse whether and how road user charges could help to deal with increasing pressures due to growing traffic. Thereby, the concept of mobility pricing aims at controlling and reducing overall road traffic, by looking also at the interdependencies between private road transport and public transport and the shift from road to rail. After rather positive results (FOR, 2007), the government gave green light to test the introduction of road user charges in 2007. However, the proposal was rejected by Parliament.


Regulation and information measures

The energy label (Energieetikette) was introduced in October 2002 to help reduce the average fuel consumption for new cars through more transparency and information for customers at the car purchase. It provides information about fuel consumption in liters/100 km, CO₂ emissions in g/km and the energy efficiency based on the weight of the empty vehicle. The target is a reduction of fuel consumption by 3% on average per year, from 8.4 liters in 2000 to 6.4 liters per 100 kilometers in 2008. As of March 2003, all dealers and car importers had to post the label on all new passenger cars on the market (IEA, *Energy Efficiency Policies Database*). Parliament has recently passed legislation for more stringent emission performance standards for new passenger cars, which are analogous to the EU regulation. The objective is to improve the fuel consumption of cars and to ensure that the average emissions from new passenger cars in Switzerland do not exceed 130 g CO₂/km by 2015. The ordinance is expected to enter into force in July 2012.

Figure 3.4. **Excise duties on transport fuels across selected countries, 2010**
USD per litre



Source: IEA.

StatLink  <http://dx.doi.org/10.1787/888932560626>

finance particular infrastructure projects. While earmarking revenues from taxes or charges can be accepted if they can be justified by the user-pays-principle, earmarking creates the risks that money is spent on projects that are neither necessary nor desirable from an economic point of view, undermining efficiency and potentially leading to over-investment (Blöchliger, 2002, FDF, 1999).⁵ The problem arises in particular as the special funds are limited in scope, since they comprise only certain parts of the overall infrastructure costs.

Appropriate road pricing would create an incentive for reduced traffic

CO₂ emissions from increasing road transport should be addressed by introducing a CO₂ levy on transport fuels, and phasing out the tax deductibility of long-distance commuting. Both would best be combined with a congestion charge, which would be most effective in the form of a period – and area – dependent charge so as to tackle traffic congestion at peak demands. Congestion pricing provides an incentive to use the roads in an efficient way (Persson and Song, 2010; and Vickrey, 1992). It shifts demand for road use to times outside peak periods. It would also shift demand for traffic to other modes of transport. This would bring transport prices closer to marginal costs and make the subsidies for public transport less relevant. By reducing and redistributing demand for road use, both, the CO₂ levy on transport fuels as well as congestion pricing can also help to reveal where infrastructure extension or maintenance is necessary, potentially rendering some costly extensions of road infrastructure redundant. It is hence important that the revenues from the CO₂ levy on transport fuels and from the congestion charge are not earmarked for infrastructure financing as this would be counterproductive and would waste resources.

The more flexibly a congestion pricing system can react to traffic flows, the more effective and efficient it would be. The best system would consist in an electronic system which uses satellite navigation technologies as variable pricing based on such technologies would allow pricing close to marginal costs. Even if investment costs for such a system are still relatively high, empirical evidence suggests that such close-to-marginal-cost-pricing would lead to substantial gains in welfare and public revenues, rendering this investment strongly positive financially (OECD, 2008). Pricing should be area wide, for instance all of an

agglomeration, to discourage use of non-priced roads; an area-wide system turned out to be also the most preferred system in the mobility pricing project report (FOR, 2007, see below). Finally, an appropriate design of the congestion charge would alleviate possible confidentiality concerns, for instance by transferring the whole management process to an independent regulator.⁶

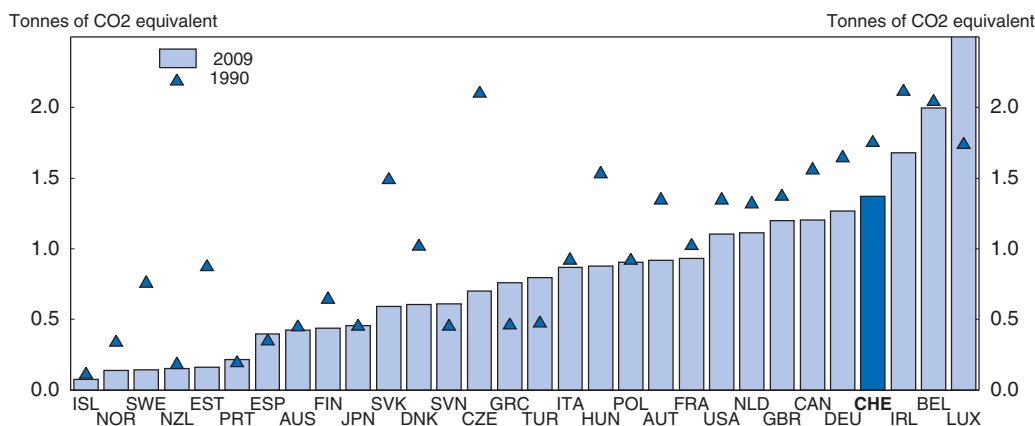
The government has begun efforts to introduce a larger mobility pricing framework in the longer run (see Box 3.2). While this attempt is promising, more rapid action would be desirable. For instance, a congestion charge could be introduced already together with the introduction of the CO₂ levy on transport fuels. In this case, the level of the CO₂ levy would not have to be as high, since the congestion charge would internalise a large part of the CO₂ emissions. This solution might hence also be more easily acceptable in the general public.

The policy mix in the residential sector could be made more cost effective

Incentives for energy-saving renovations are weak

The Swiss government puts strong emphasis on the reduction of CO₂ emissions in the residential sector. The main objective of the Swiss climate policy is to fully exploit the potential for reduced energy use through increases in the energy efficiency or the broader use of renewable energies for heating. About 20% of all Swiss domestic GHG emissions arise in the residential sector, the highest proportion among OECD countries (Figure 3.1 above). Furthermore, Switzerland is still characterised by very high emissions per person in the residential sector as compared to other countries (Figure 3.5).

Figure 3.5. **Role of residential per capita GHG emissions across countries, 1990-2009¹**



1. 2008 for Belgium and Greece.

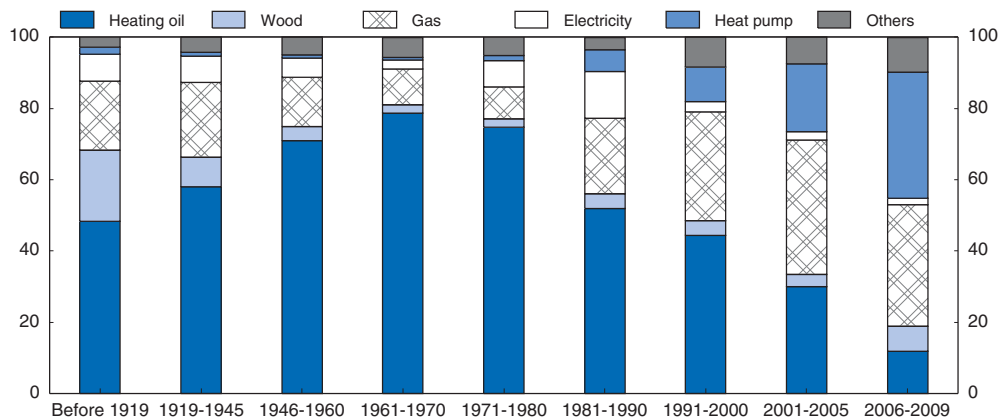

Source: UNFCCC Database.

StatLink  <http://dx.doi.org/10.1787/888932560645>

Over the past twenty years, emissions in the residential sector have been reduced by 9%, through a reduction in energy consumption and change in the energy mix (Drouet *et al.*, 2005). However, oil remains by far the most important energy source for heating. More than half of all buildings are heated with heating oil, nearly one fourth are heated with electricity (10.4%) or wood (12.2%), 15% of the buildings have a gas heater and 8% have a heat pump (FOS, 2011). Figure 3.6 suggests also that heating oil is the dominant form of

Figure 3.6. **Principal energy sources for residential heating**

All dwellings by construction period, per cent

Source: OFS, *Buildings and Dwelling Statistics*, 2011.StatLink  <http://dx.doi.org/10.1787/888932560664>

heating in dwellings that have been built before the 1980s, while new houses are increasingly equipped with less polluting sources, such as gas and heat pumps.

Renovating dwellings can reduce heat demand by more than 50% and substituting traditional energy sources with renewable energy can create an even larger effect in terms of an aggregate reduction of greenhouse gases (FOEN, 2010a). Relatively strict regulation for new construction is in place which creates an incentive for owners of new houses to use energy sources that produce little CO₂ emissions (Drouet *et al.*, 2005). However, there seem to be little incentives to renovate older buildings so as to reduce energy consumption, with adverse impacts on CO₂ emissions: about 85% of dwellings are built before the 1980s, with about 45% of all dwellings being more than 50 years old, while only 10% of dwellings have been constructed within the past 10 years (FOS, 2011). And only about 1% of all dwellings are renovated for energy-saving reasons each year (FOEN, 2010c).

While an important reason for this disincentive can be found in high investment costs and the lack of awareness about the financial advantages from energy-saving renovations, the structure of the Swiss housing market also matters. Two thirds of Swiss households live in rental dwellings, mostly in multi-household buildings. Furthermore, unfavourable rent regulation used to reduce the incentive of home-owners or tenants to invest in renovation so as to reduce energy consumption, since home-owners could not pass on investment costs onto higher rents (Drouet *et al.*, 2005). Up to 2008, rent increases due to renovation projects were possible only to the extent to which they induced actual and observable cost savings for the tenants. This led to uncertainties on the side of the owners because such cost savings were difficult to assess a priori, they depended on the energy consumption of the tenant, and were often overshadowed by fluctuating energy prices (Platzer *et al.*, 2008).

Rental policy should take into account environmental needs more appropriately

Incentives to invest in renovation of rental dwellings should be strengthened by further improving rental regulation (OECD, 2010). Since 2008, an amendment of the rental law aims to make it easier for owners to pass on the costs from energy-related investments to the tenants (Box 3.2). However, there may remain uncertainties at the side of the owners

Box 3.2. Swiss climate change mitigation policy in the residential sector

Financial incentives

During ten years, the government provides financial incentives (in the framework of the buildings programme) to promote climate-friendly renovations of residential and commercial buildings, the use of renewable energies, the utilization of waste heat, and building engineering (FOEN, 2010a). The buildings programme is financed by the federal and cantonal governments, and the cantons are responsible for its implementation. The total budget amounts annually to CHF 280 to 300 million, to which the federal government contributes about CHF 200 Mio. Revenues from the CO₂ levy on fossil fuels and the cantons contribute another CHF 80 to 100 Mio per year.

Regulation and information measures

Since 1998, the Swiss Federal Office for Energy has worked in partnership with cantons to promote the “Minergie building standard” and label. This is a voluntary energy-efficient construction standard which sets an overall limit on energy use for heating, hot water, ventilation and air-conditioning for new (38 kWh per m²) and renovated buildings (60 kWh per m²) (IEA, *Energy Efficiency Policies Database*). Generally, the adoption and enforcement of regulations regarding energy consumption of buildings largely falls within the competency of the cantons. This is reflected in the adoption of model regulations by the Conference of Cantonal Energy Directors, which serve as recommendations to the Cantons in this area. For new buildings, the currently valid model regulations (MuKEN, 2008) correspond to the MINERGIE standard. For renovations, MuKEN aims at approximating the MINERGIE standard. The next revision is foreseen in 2014 (MuKEN, 2014).

Application of the CO₂ levy on fossil fuels in the residential sector

On 1 January 2008, a levy on CO₂ emissions from fossil heating and process fuels came into force (see also Box 3.3). The revenue from the levy is restituted to Swiss households through a lump sum per capita transfer (disbursed through the administration of health care insurance fees) In 2010, the levy was raised from originally 12 CHF to 36 CHF per tonne of CO₂, and, since 2010, one third of the revenues from the levy are used for financial incentives in the framework of the buildings programme.

Amendment to rental law

In January 2008, an amendment to the rental law came into force which specifies that certain energy-saving renovation efforts of living spaces and premises undertaken by the owner are to be treated as value-enhancing investments that entitle to rent increases (Rohrbach, 2009). These include efforts but are not limited to i) use energy efficiently; ii) reduce energy losses linked to the structure of the building; iii) reduce emissions from technical equipment; iv) use renewable energy; and v) replace energy intensive household appliances. The reference used to estimate the “additional investment” by the owner that would justify a rent increase concerns these costs that exceed pure reconstitution or maintenance costs (Platzer *et al.*, 2008).

as to whether the renovations can be justified as “value-enhancing”, especially as concerns small renovation projects. In the case of large renovation projects, between 50 and 70% of the total renovation costs can be declared as “value-enhancing”. The definition of large renovations is, however, subject to strict requirements that may not be fulfilled for energy-saving renovations: they have to concern several parts of the dwelling at the same time; the total renovation costs have to exceed a multiple of (typically at least three times) the

annual income from rents; and the owner must have undertaken regular maintenance renovations of the dwellings before, as otherwise even a large renovation would be considered as pure maintenance, for which no rent increase would be justified (HEV, 2010). Within rental regulation, the definition of energy saving renovations should be based on clearly defined criteria, such as the potential gains in energy efficiency and reduction of CO₂ emissions that could be achieved through the renovation. If also the extent to which rents can be raised was linked to the potential energy efficiency, this would allow house owners to appropriate a higher return from the investment, further increasing the incentive for energy-saving renovations.

The use of the CO₂ levy in the residential sector should be revised

In January 2008, an income-neutral CO₂ levy on heating and process fuels came into force when it turned out that the pre-existing measures, notably the federal and cantonal financial incentives and the voluntary energy efficiency (Minergie) standard and label (Box 3.2), were not effective by themselves in achieving the originally set emission reduction targets. However, there is a need to further raise the CO₂ levy. The level of the CO₂ levy is likely not high enough to induce a sufficient incentive effect for energy saving renovations. Even the higher level of 36 CHF in 2010 is still substantially lower than the estimated efficient uniform CO₂ tax.

From 2010 onwards, one third of the revenues from the CO₂ levy are used for the buildings programme: during ten years, the central government provides additional subsidies to individual households and firms to promote climate-friendly building and renovations of residential and commercial buildings. If rent regulation is improved as outlined above, and a higher level of the CO₂ levy is eventually put in place, the financial incentives for individual renovation projects in the framework of the buildings programme will become redundant and should be phased out. While the buildings programme may address some informational barriers at the side of the households, it risks having large deadweight losses, as it would finance projects which may have been undertaken anyway, and may create thus substantial budgetary costs. The risk of deadweight losses arises in particular since the subsidies in the buildings programme apply to all energy saving renovations and are not targeted at renovations of rented dwellings, where the main market failures arise. Furthermore, it is not guaranteed that the most suitable projects are selected due to incomplete or asymmetric information, further reducing the effectiveness of the subsidies.

During the phase-out period of this programme, the government should make payments allocation gradually more restrictive. The subsidies should be better targeted at energy-saving renovations in rented dwellings. They should also be based on more objective and well-defined criteria, for instance potential gains in energy efficiency, similar to the rental law (above). Furthermore, instead of direct subsidies to individual households, the government should consider a stronger use of market mechanisms so as to reduce the unfavourable effects linked to incomplete information. One possibility here would be to design the subsidies in terms of interest rate reductions for bank credits, depending on the level of potential energy efficiency achieved, as applied for instance in Germany (FMTBU, 2011).

Improving rent regulation and the use of the CO₂ levy should be complemented with better information

Awareness about options for improved energy efficiency in buildings needs to be improved. Since 1998, the Swiss Federal Office for Energy and the Cantons aim to promote the “Minergie” standard and label for energy-efficient construction and renovation (Box 3.2). However, only about 13% of new buildings and 2% of renovations in Switzerland have been certified according to this standard so far. Providing information on energy efficiency of dwellings for sale or for rent should be compulsory. This could be achieved, for instance, by designing the Minergie label similar to the EU energy labels where energy efficiency is rated according to a set of classes, and by requiring that it be clearly displayed whenever a dwelling is offered for sale or rent. This would make the Minergie Standard more effective as complementary signalling advice for both home-owners and tenants. Finally, if it was also used for the definition of potential energy efficiency gains in rent regulation and to improve targeting of the subsidies in the buildings programme (above), this would raise the effectiveness of both policies even further.

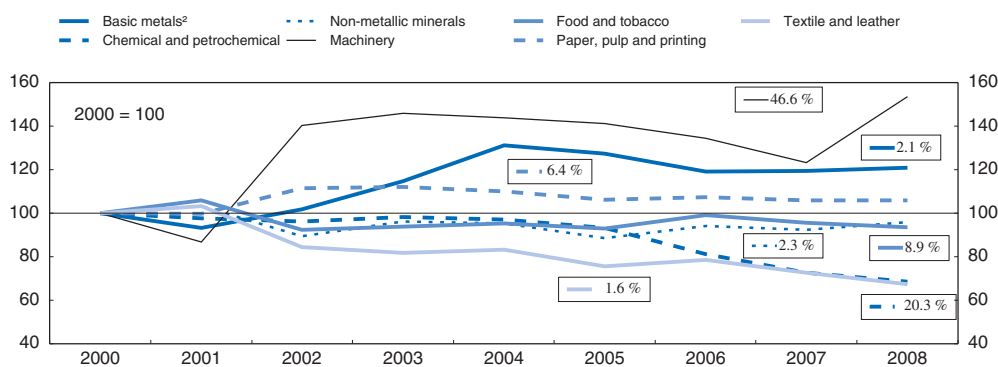
Incentives to reduce emissions would have to be improved in industry and agriculture

In industry, market based instruments are in place...

In Switzerland, the industry sector is not the primary source of greenhouse gas emissions. Indeed, it appears that the industrial sector has been able to decouple greenhouse gas emissions somewhat from production, as reflected in greenhouse gas emissions per unit of output that have stabilised over the past 10 to 20 years (Figure 3.3 above). Some of this effect is due to reduced energy consumption in several industrial sectors, amongst which are those that are typically relatively energy-intensive, such as non-metallic minerals, chemicals, and textiles and leather production (Figure 3.7). However, energy use has increased substantially relative to production in the energy intensive sectors “basic metals and paper” and “pulp and printing”. In particular this is the case for the machinery sector which contributes to about 47% of overall industrial value added (Figure 3.7).

Figure 3.7. Energy intensity in the manufacturing sector

Energy consumption as a share of value added in volume¹



1. Figures in boxes refer to the sectors' 2008 shares in total manufacturing value added at current prices.

2. Iron, steel and non-ferrous metals.

Source: IEA, International Energy Balances; OECD, STAN Database.

StatLink  <http://dx.doi.org/10.1787/888932560683>

In principle, the current policy mix to reduce CO₂ emissions in the industrial sector goes in the right direction as it involves to a large extent market-based instruments (Box 3.3). *First*, fossil heating and process fuels are subject to the CO₂ levy, which applies also to the industrial sector (but not to the transport sector) (see also Box 3.2). *Second*, firms that are exempted from the CO₂ levy for competitiveness reasons can (but are not required to) participate in the recently established Swiss emission trading system. *Third*, the so-called Climate Cent Foundation (CCF), a quasi-voluntary initiative by the Swiss oil industry, uses the revenues from a very low additional levy on imported petrol and diesel fuels for domestic and international emission reduction projects (*e.g.* CDM). The latter projects should help compensate for carbon emissions embodied in imports.

Box 3.3. Swiss climate change mitigation policy in industry

Application of the CO₂ levy on fossil fuels to industry

The CO₂ levy on fossil fuels (Box 3.2) applies also to the industrial sector; the revenues are restituted to non-exempted firms in proportion to the total payroll of the firms' employees, via the old age insurance system, thereby putting a relatively higher burden on combustible-energy intensive firms to the advantage of relatively labour intensive ones. Firms can ask to be exempted if they conclude an agreement with the federal government to reduce their CO₂ emissions to a level negotiated bilaterally or in a group. These agreements are typically tailor-made contracts between the firm or groups of firms and the regulator, specifying targets, the timetable for compliance, and penalties (Thalmann and Barazini, 2004).

Emission trading system

The decree on the CO₂ law establishes a limited emissions trading scheme (ETS) for firms that are exempted from the CO₂ levy. The Swiss ETS is a baseline-and-credit system in which each participant has the right to emit a certain level of CO₂ emissions which is individually computed for each participant on the basis of projected production and emissions. When participants fall below their baseline level, they earn emission reduction credits for the additional abatement of CO₂ emissions which they can transfer to the next trading period or sell to other participants. If a firm emits CO₂ in excess of its target, it can buy allowances from other companies (Schürch, 2005). Emission allowances are allocated to the companies free of charge, in accordance with the negotiated targets (FOEN webpage). To cover excess emissions, allowances have to be purchased on the domestic or international markets and/or earned through emission reduction projects abroad. As a rule, foreign certificates may be used to cover a maximum of 8% of the target. In the event of non-compliance, the CO₂ levy is to be paid retroactively for each tonne of CO₂ emitted since exemption was granted. Small companies, for which no reduction target has been stipulated, but which have set a specific target value for their emissions, do not receive any emission allowances. However, they can buy emission credits to fulfill their commitment (FOEN webpage, Schürch, 2005).

Switzerland and the EU entered in negotiations, in March 2011, in view of the linking of the Swiss ETS with the one of the EU. The EU Directive establishing a scheme for emissions trading stipulates that agreements can be concluded with third countries that have ratified the Kyoto Protocol to provide for the mutual recognition of allowances.

Box 3.3. Swiss climate change mitigation policy in industry (cont.)**Financing of international emission reduction projects**

The Climate Cent Foundation is an initiative of the Swiss oil processing industry, introduced so as to avoid the introduction of a CO₂ tax on transport fuels. It is funded by a charge levied on all transport fuel imports at a rate of 1.5 cent per liter, generating an annual revenue of around 100 million Swiss francs. The foundation has committed vis-à-vis the Swiss Confederation to reduce CO₂ emissions by 12 million tonnes over the period 2008 to 2012, of which at least 2 million tonnes within Switzerland, the latter stemming from the transport and industrial sectors. Projects for emission reduction abroad concern those approved by the UN accreditation body generating tradable emission certificates, which Switzerland can claim towards the fulfillment of its reduction target. Thereby, the CCF purchases emission certificates in accordance with the Kyoto Protocol, applying stringent quality requirements (*e.g.* no certificates from projects regarding certain industrial gases). The Swiss authorities do not perform additional substantive evaluation of the projects (FOEN webpage.)

In March 2011, Switzerland and the EU started negotiations with a view to linking their emission trading systems (FOEN, 2011b). This would allow Swiss firms to trade in a much larger and liquid system, which has the potential to produce efficient and less volatile prices, and would improve participation of firms in the emission trading system. Most importantly, it provides for a cost effective way to reduce greenhouse gas emissions, which will be crucial in the process of the phasing out of nuclear energy. Currently, the Swiss trading market is too small, as it is limited to those energy-intensive firms that have been exempted from the CO₂ levy on fossil fuels and which voluntarily participate in the system. The government should continue its efforts to link the Swiss system with the EU emission trading system (ETS).

... but incentives to reduce CO₂ emissions remain suboptimal

There is neither a definition of “competitiveness” nor objective “energy intensity” criteria that would justify firms being exempted from the CO₂ levy. In order to qualify for exemption, firms have to conclude an agreement with the regulator to meet a negotiated level of emission reductions. As a result, a relatively large number of firms may receive exemption from the levy for little reason, and even if they compete with foreign firms that have to incur a CO₂ tax, thereby reducing the efficiency of the levy.⁷ Based on an econometric evaluation, a similar model, the UK Climate Change Agreements, has proven to perform much worse as concerns CO₂ emissions, and indirectly innovation, as compared to the full application of the UK Climate Change Levy to all firms (OECD, 2008b). The results also suggest that subjecting all firms under the UK Climate Change Levy had no negative impacts on competitiveness (OECD, 2008b). These results would similarly apply to the Swiss case: since the revenues from the Swiss CO₂ levy are restituted to the firms (Box 3.3), the overall burden on firms, and hence the impact on competitiveness, is limited, reducing the need for exemptions from the levy for competitiveness reason (OECD, 2001). Swiss firms should be obliged to either pay the levy or participate in the emission trading system. For instance, firms in sectors covered by the EU ETS could participate in the emission trading system, while exemptions from the levy should be phased out for firms

in sectors not covered by the EU ETS. The government's plan to set up a list of criteria to be met by firms requesting exemption from the CO₂ levy is a first step in the right direction.

Moreover, emission allowances are given for free and emission reduction targets are negotiated bilaterally between the individual firm (or a group of firms of the same sector) and the regulator. These targets are then used in the emission trading system (Box 3.3). Bilaterally negotiating targets tends to create unnecessary transaction and administrative costs. In particular, firms would have an incentive to negotiate emission targets that they can easily meet, especially since the regulator does not have the same set of information as the firm.⁸ Such individually fixed targets tend also to be too generous to create sufficient incentive for trading; hence they entail adverse selection in that only those firms participate that would have reduced their emissions in any case. Giving emission allowances for free is likely to reduce the incentives of firms to cut emissions and hence to participate in permit trading even further, because firms who made large cuts in emissions risk being granted fewer emission permits in the future. Emission targets should be set in the sense of binding emission caps that are valid for the industry as a whole. This would bring the Swiss baseline-and credit-system also closer to a cap-and-trade system which would be required for its linking with the EU ETS anyway. In line with the EU ETS, the government should also gradually start auctioning emission allowances, so as to avoid undesirable dynamic incentive effects that result from grandfathering.⁹ Steps in these directions are planned in the draft revision of the CO₂ Act.

The current Swiss ETS has not promoted an efficiently functioning market for credits yet. In particular, the Climate Cent Foundation (CCF) sets the price of the emission allowances, inhibiting emission trading (Schürch, 2005). It can do so owing to its obligation to reduce at least two million tonnes of CO₂ emissions domestically, which it does by purchasing CO₂ emission allowances in the Swiss ETS (Box 3.3).¹⁰ As a reaction to the Swiss Competition Commission's classification of the CCF as an illicit agreement that restrains competition and which cannot be justified on efficiency grounds, the government has granted a temporary exceptional authorisation, based on the superior, legitimate public interest of environmental protection (OECD, 2010b). The Climate Cent Foundation should not be allowed to distort the emission trading market. The right to collect the climate cent should be replaced by a CO₂ levy on transport fuels as recommended above.

For the post-Kyoto period, the government plans to supersede the voluntary Climate Cent initiative, by obliging fuel importers to compensate at least 25% of the emissions from their fuel imports through reduction measures in Switzerland or abroad (OECD, 2010b).¹¹ However, market power of individual (or groups of) firms within the Swiss emission trading system may still prevail, notably since importers will be free to arrange a joint procurement of the individually required emission allowances – subject to competition law. This is related to the relatively weak independence, powers and resources of the Swiss Competition Commission (OECD, 2006). Dominant positions or horizontal agreements which impair competition in the Swiss ETS should be prohibited and the powers of the Swiss competition authority and its independence should be further strengthened – as recommended in previous Economic Surveys. The plan by the government to reform the Cartel Act goes in the right direction.

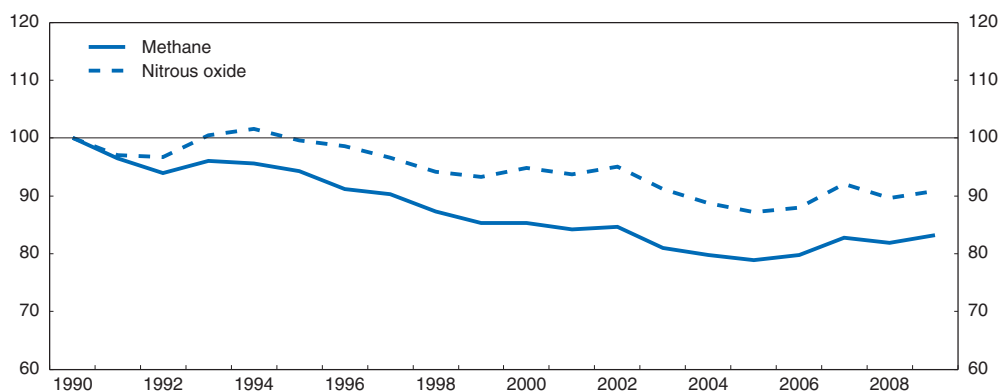
Finally, the financing of international Clean Development Mechanism projects, which is currently done through the Climate Cent Foundation, appears not cost effective, yet poses the risk of large deadweight losses. This is linked to the difficulty of assessing and

proving additionality as discussed above. In particular, Swiss authorities do not monitor and control the quality of the projects financed by the CCF beyond what is applied by the UN (FOEN webpage). There is scope for Switzerland to work towards improved environmental quality of the international emission reduction projects, for instance in the form of more active co-operation or involvement towards the set-up of quality standards of UN projects, as is envisaged already.

There is still potential for GHG emission reductions beyond CO₂ in agriculture

Current Swiss climate policy is focussed on the reduction of greenhouse gas emissions via a reduction in CO₂ emissions only. In the CO₂ Act, this is justified by the fact that, in 2008, 84% of all greenhouse gas emissions were CO₂ emissions and by claiming that there would be little potential for further reductions in non-CO₂ greenhouse gas emissions (Federal Council, 2009).¹² Some progress has indeed been made in reducing methane and nitrous oxide which stem almost entirely from the agricultural sector and which together contributed, in 2008, to more than 13% of all greenhouse gas emissions in Switzerland (Figure 3.8, UNFCCC Database). However, more could be done still. A further reduction of these greenhouse gas emissions could have a sizeable effect in terms of total CO₂ equivalent emission reductions. The impact of one tonne of methane (CH₄) emissions on climate change is equivalent to 21 tonnes CO₂ emissions, and the impact of one tonne of nitrous oxide (N₂O) emissions is equivalent to 310 tonnes of CO₂ emissions (WWF, 2007).

Figure 3.8. **Developments in non-CO₂ greenhouse gas emissions in Switzerland**
1990 = 100



Source: UNFCCC Database.

StatLink  <http://dx.doi.org/10.1787/888932560702>

There are currently only limited incentives for emission reductions in the agricultural sector. Neither the CO₂ Act nor the proposal for its revision for the period after 2012 specify a target for greenhouse gas emission reductions in the agricultural sector, and the agricultural sector is exempted from the emissions trading system. To some extent, this can be explained in that currently known and applicable technological measures to reduce GHG emissions in the agricultural sector are limited or mitigation using those measures may be very costly.¹³ However, empirical studies point to measures that are already in the pipeline and which could have – once further developed – large mitigation potential (Peter et al., 2009, see also OECD, 2011a).

Moreover, in Switzerland, support to the agricultural production remains high in international comparison (OECD, 2011b). Half of the payments are based on commodity output or input use, some of which with potentially detrimental effects for the environment, especially if they are directly or indirectly linked to the use of fertilisers in the production process or the number of animal stock. Over the past 20 years, efforts have been undertaken to redirect producer support towards direct payments which are typically less distortive (OECD, 2011b) and have less negative environmental effects (WWF, 2007). However, between 2008 and 2010, the largest part of these direct payments consisted still in general direct payments which are mainly granted in the form of payments per hectare of farmland and payments per cattle head (OECD, 2011b).

For the period 2014-17, while the nominal budgetary outlays for support to agriculture are expected to remain broadly constant, draft legislation foresees to continue shifting towards direct payments, and within direct payments, towards those payments that support environmentally friendly production processes (Box 3.3). These measures go in the right direction. Empirical evidence suggests that decoupling, i.e. the move towards direct payments, tends to foster more extensive forms of land management under otherwise similar conditions. This can lead to a reduction of emissions especially from nitrogen fertilisation and therefore the nitrous oxide emissions from fertilised agricultural land (WWF, 2007). The redirection of payments to more environmentally friendly production has the potential to further reinforce this positive effect in terms of greenhouse gas emission reductions.

The government should consider reducing input- and output-based support further (OECD, 2011), as well as targeting remaining support at those projects with the highest potential for environmentally friendly production processes. This should be combined with the introduction of a levy on the emission-producing inputs. Further reducing producer support would induce farms to produce more efficiently, and the levy would induce firms to invest in those efficiency improvements that are also good for the environment. By putting a price on the emission of greenhouse gases that result from agricultural production, this would also increase the overall efficiency of the Swiss climate change policy and would free up resources. Thereby, the CO₂ levy could be based for instance on the use of synthetic fertilisers as is already introduced in Sweden, Finland, Denmark and Austria (WWW, 2007). International standards that regulate the use of synthetic and commercial fertilisers in agriculture would provide for the set of information that is necessary for setting the adequate level of the levy (WWW, 2007). An alternative and possibly less costly way would consist in a system that addresses nitrogen surpluses (OECD, 2004).

Besides environmental effects, such a policy mix would contribute to raising aggregate productivity growth through increased efficiency of farming – as recommended already in earlier Economic Surveys (OECD, 2007c, OECD, 2009). Estimations suggest strong potential for efficiency improvements of Swiss agricultural firms. If all firms produced as efficiently as the currently 25% (50%) best ones, overall efficiency would increase by an average 6% (10%). On aggregate, this would amount to an efficiency gain of 700 Mio CHF, i.e., more than 1% of GDP. This does not take into account future technical improvements which would push the potential for efficiency gains even further (FOA, 2011). Another study that compares Swiss efficiency with the one of farms in the neighbouring German state Baden-Württemberg, characterised by similar topological conditions, reveals that only the best 17-24% of Swiss farms are as efficient as the neighbouring ones (FOA, 2011).

Box 3.4. Main policy recommendations for reducing greenhouse gas emissions in a cost effective way

General

- There is a need to increase the CO₂ levy in line with the national greenhouse gas emission reduction target.

Road transport

- A CO₂ levy on transport fuels should be introduced in order to address strongly increasing emissions from road transport. This would best be combined with the introduction of a variable congestion charge that would be higher in geographical areas under stress and periods of peak demand. Revenues from the CO₂ levy and the congestion charge should be fed into the general budget or restituted.

Residential sector

- The definition of energy-saving renovations and the extent to which rents can be raised should be based on clearly defined criteria, *e.g.*, potential gains in energy efficiency achievable through the renovation.
- Once more effective rent regulation in place, the buildings programme should be phased out by making payment allocation progressively more restrictive.
- Providing information on energy efficiency of dwellings should be compulsory.

Industry

- The government should continue its efforts to link the Swiss emission trading system with the EU system.
- Swiss firms should be obliged to either pay the levy or participate in the emission trading system.
- Within the emission trading system, emission targets should be set in the sense of binding emission caps that are valid for the industry as a whole. The government should also gradually auction emission allowances, in line with the EU ETS.
- The Climate Cent Foundation should not be allowed to distort the emission trading market. The right to collect the climate cent should be replaced by a CO₂ levy on transport fuels as recommended above.
- Dominant positions or horizontal agreements that impair competition in the Swiss ETS should be prohibited.
- There is scope for Switzerland to work towards improved environmental quality of the international emission reduction projects, either domestically or through stronger co-operation with the UN or the EU.

Agriculture

- The government should further reduce input- and output-based support and target remaining support at those projects with the highest potential for environmentally friendly production processes.
- This should be combined with the introduction of a levy on the emission producing inputs, *e.g.* in the form of a levy on fertilisers.

Notes

1. See Grubb (2003) for more detail on the economics of the Kyoto Protocol. IET allows Annex I countries to meet their emission reduction commitments at a reduced cost as it allows emissions to be abated first in countries where the costs of abatement are lowest, increasing the efficiency of the Kyoto agreement. The CDM and JI are “project-based mechanisms” that generate emission reductions from particular projects. The CDM is designed to encourage production of emission reductions in non-Annex I countries, while JI encourages production of emission reductions in Annex I countries (Grubb, 2003).
2. See OECD (2007b) for an overview of the institutional setting of climate change policy in Switzerland.
3. While the risk of environmental leakage may not be as relevant, Switzerland produces to a large extent emissions abroad embodied in imports and this would justify more compensation abroad, either within or on top of its total emission reduction target. Empirical estimations suggest that, in 2004, the level of CO₂ equivalent emissions of Switzerland would have been about 10.7% higher if emissions embodied in imported goods had been taken into consideration (Federal Council, 2009).
4. In its fiscal guidelines, the Federal Department of Finance states: “Earmarking restricts the leeway in setting up fiscal policy priorities and it can create incentives for waste. Moreover, special-funded mechanisms lack especially the necessary transparency” (FDF, 1999).
5. Estimations suggest indeed a financing gap of the infrastructure fund of about CHF 1.5 billion (0.3% of GDP) in 2020 (Federal Council, 2009).
6. Confidentiality was one of the main reasons for which for instance the Dutch road pricing system could not be introduced (Kozluk, 2010).
7. According to FOEN (2007a), more than 1 600 companies, from ceramics, glass, paper, chemicals, metal and mechanical engineering, plastics, aluminium, food, lime, foundries, and the graphic arts industry, had set voluntary emission reduction limits before (or in the anticipation of) the decision that a CO₂ tax would come into force.
8. Competition-hampering horizontal agreements may also arise as emission reduction targets are set by group discussions of firms of the same industry (Thalmann and Baranzini, 2004, Brau and Carraro, 1999).
9. The EU trading scheme foresees the auctioning of all allowances. Transitional measures are in place for particular sectors, for which in 2013, 80% of the emissions would be free, coherent with the ration valid during 2005 and 2007. Thereafter, the free allocation should decrease each year by equal amounts resulting in 30% free allocation in 2020, with a view to reaching full auctioning in 2027 (EC, 2009).
10. In a first round, the foundation paid 70 CHF for one emission allowance, equal to a reduction of one tonne of CO₂, and 100 CHF in a second round (Schürch, 2005). This price is definitively higher than the spot price of 23 CHF that establishes for instance on the EU ETS (Schürch 2005). Interpreting the latter as the market price would raise the question why the foundation sets the price so high. A monopoly buyer of allowances (as which the foundation can be seen) would restrict the amount purchased so as to drive down the price. However, the EU ETS is seen as a very competitive system with a large number of participants which is not the case for the Swiss ETS, notably given its small size and different abatement cost structures (OECD, 2007a). In addition, the foundation is obliged to reduce a certain amount domestically and the only way to do so is by buying allowances. Hence, it sets the price high enough to ensure the willingness of a sufficient number of firms to sell allowances.
11. The actual percentage of compensation will be defined in line with the requirements for the domestic reduction target by 2020. Whether the compensation will be realised by the CCF or a different initiative is left open.
12. Reductions of emissions that impact climate change have been achieved as concerns other gases that are not covered under the Kyoto Protocol and are hence not subject to this survey. A prominent example concerns volatile organic chemical compounds (VOC) that are used as solvents or propellant in various sectors. Once they combine with nitrogen oxides they produce high ozone concentration at low altitudes, which is highly harmful for human health, especially in good weather seasons (summer smog). Switzerland introduced an incentive tax on the production and importation VOCs in 2000. See for more detail Schoenberger and Mack (2008) and FOEN (2007b).
13. Nitrous oxide is produced mainly through fermentation and to a lower extent from synthetic and commercial fertilizers, while methane is produced mainly by crops and to a lower extent from

fertilization (WWF, 2007). As a reference, one cow produces on average about 112 kg of methane per year, which is equivalent to the average CO₂ emissions produced from the annual mileage of a standard private car. Examples for technical measures to reduce emissions are fat addition to beef cattle diet, the use of manure additives and the coverage of liquid manure storage facilities, anaerobic fermentation, and the spreading of slurry with drag hose technology (WWF, 2007, Peter et al., 2009).

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