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REPUBLIC OF SLOVENIA

Selected Issues

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Approved by European Department

June 13, 2006

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I. INTRODUCTION AND OVERVIEW

1. **This paper[1] provides background on the key policy challenges for Slovenia in the euro-zone**: dealing with an inflexible budget and inefficient spending, the effects of an aging population, encouraging labor participation, and more generally, strengthening competitiveness and long-term growth.

2. **Euro adoption will place a premium on public expenditure flexibility and efficiency**. Chapter II assesses the discretionary scope to adjust spending and proposes initial steps to enhance budget flexibility so that fiscal adjustment can be targeted on relatively inefficient spending. Inefficiencies in public spending are identified using a cross-country approach that maps spending inputs into performance outcomes to construct an efficiency frontier. This analysis suggests that relatively high spending in Slovenia has not achieved correspondingly better outcomes than other EU and new EU-member states (NMS).

3. **Expenditure reform is needed to contain large impending age-related spending pressures in Slovenia.** Chapter III examines the long-run fiscal sustainability position of Slovenia using a generational accounting framework. With one of the largest demographic shifts in Europe expected over the next few decades, age-related spending will lead to an unsustainable fiscal gap under current policies. The chapter also assesses the impact of policy changes on age-related government spending—in particular, pensions—and the cost of delaying implementation of reforms. The chapter concludes that early measures should seek to reform the pension system on a more systematic basis through an increase in the effective retirement age and a reduction in the generosity of benefits.

4. **The aging challenge is exacerbated by the retirement problem in Slovenia, as reflected in very high inactivity rates among the older individuals, and the lowest effective retirement age in Europe.** Chapter IV examines incentives to retire for an individual under the Slovene pension system following the 1999 pension reform. A simulation of retirement incentives suggests that the pension system will encourage men to retire earlier than the statutory full pensionable age, which is already low compared to the EU-15. In addition, these incentives are stronger for lower-income earners.

5. **As noted in the staff report, labor participation is also low for certain segments of the population**. Chapter V examines whether the tax and benefits systems create disincentives to work by calculating marginal effective tax rates (METRs) to assess incentives to work. It also evaluates the impact of a hypothetical tax reform on METRs. The

[1] We thank seminar participants at the Bank of Slovenia for very helpful comments.

chapter concludes that tax reform should take place simultaneously with a reform of the benefit system to improve incentives to work.

6. **Despite improving cost competitiveness and profitability indicators, Slovenia has not made significant gains in export markets**. Chapter VI analyses Slovenia's competitiveness by examining trade specialization patterns and quality indicators for Slovene exports compared to the NMS. Specialization patterns suggest that Slovenia is making some gains in higher technology exports, but the pace of technological and quality upgrading is lagging behind Central European neighbors, which may partly explain the mixed trade performance.

II. Budget Rigidity and Expenditure Efficiency in Slovenia[2]

A. Introduction

7. **Budget rigidities in Slovenia constrain the scope to reduce relatively inefficient spending.** Slovenia is facing a sharp increase in age-related spending estimated at 8 percent of GDP by 2050. To help ease this pressure, the medium-term fiscal strategy envisages an expenditure rationalization totaling 4 percent of GDP by 2012. Successful implementation of this strategy will require greater budget flexibility so that spending cuts can target relatively inefficient spending without compromising the quality of public services. Euro adoption in 2007 will also place a premium on greater budget flexibility to help accommodate shocks. This chapter identifies budget rigidities that could hamper future expenditure adjustment, and proposes initial steps to foster greater flexibility. The chapter also applies a cross-country technique to identify relatively inefficient spending on health, education and social protection as a tool to guide expenditure rationalization. In this manner, Slovenia can avoid distortionary across-the-board cuts or excessive restraint in traditionally flexible areas, such as capital investment and other goods and services.[3] The key questions, findings and recommendations in this chapter are summarized in Box 1.

8. **This chapter considers budget rigidities as factors that limit the discretionary scope to adjust spending in line with shifting policy priorities or macroeconomic circumstances.** Budget rigidities in Slovenia include institutional and legal structures such as quasi-autonomous spending units that are beyond direct government control (e.g., hospitals and schools), the funding mechanism for social services, the wide coverage of social entitlements and inflexible collective agreements. As most spending becomes flexible over the long run, this chapter focuses on factors that limit the fiscal room to maneuver within one to two fiscal years in the absence of a major structural reform or the reopening of collective agreements.

9. **Enhancing budgetary flexibility is essential so that the envisaged expenditure rationalization can better target spending inefficiency.** Efficiency is assessed in this chapter by comparing expenditure on health, education and social protection to outcome indicators, such as mortality rates, standardized test scores and poverty risk. Based on a cross-country technique called Data Envelopment Analysis (DEA), an efficiency frontier is constructed to assess if equivalent outcomes could be achieved with less spending. This relative notion of technical efficiency provides a tool to assess how spending could be

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[2] Prepared by Todd Mattina and Victoria Gunnarsson and based on an ongoing FAD research project on expenditure rationalization and efficiency in new member EU states by Marijn Verhoeven, Todd Mattina, Alejandro Simone, and Victoria Gunnarsson.

[3] Potential distortions from restraining capital spending and goods and services include underinvestment in infrastructure, inadequate teaching aids (such as textbooks or computers) and medical supplies.

adjusted across sectors (health versus education) and within sectors (primary versus secondary education).[4]

Box 1. Summary of Key Questions, Findings, and Recommendations

1. Is the historical pattern of spending adjustment sustainable over the medium term?

- **Findings.** Expenditure adjustment has relied on restraining traditionally flexible spending areas rather than reducing rigid social benefits, employee compensation and subsidies. This approach will not be sustainable given the envisaged scale of adjustment and small share of traditionally flexible areas.
- **Recommendations.** Slovenia needs to improve overall spending flexibility to facilitate medium-term expenditure rationalization on inefficient spending rather than rely on continued restraint in capital investment and other goods and services.

2. Does Slovenia spend efficiently compared to other EU and New Member EU States?

- **Findings.** Spending on health, education and social protection is relatively high and inefficient based on a cross-country comparison of spending inputs and outcomes, suggesting there is scope to trim spending without sacrificing the quality of public services.
- **Recommendations. Health sector** efficiency could be enhanced by (i) reducing the broad basket of services covered by compulsory contributions; (ii) reorienting voluntary insurance from covering co-payments to insuring tertiary and other health services; (iii) refining compensation mechanisms that encourage health care providers to economize resources; and (iv) cautiously extending health clinic concessions to increase the share of private provision. **Education sector** efficiency could be enhanced by (i) moving the funding formula for schools and universities to a per capita basis to encourage the rationalization of excess capacity; (ii) implementing a selective hiring freeze on primary teachers; and (iii) seeking greater cost recovery in preprimary child care and university tuition. The efficiency of **social protection transfers** in reducing the risk of poverty could also be strengthened by better targeting benefits to low-income households.

3. Does the rigid structure of public spending explain the observed stability of expenditure?

- **Findings.** The relative stability of spending in Slovenia largely reflects a rigid structure of public spending rather than cyclical factors. Quasi-autonomous institutions, the financing mechanism for social services, the wide coverage of social benefits and rigid collective agreements are the main rigidities that limit greater discretionary variation in spending.
- **Recommendations.** Indirect budget users should be consolidated and fully integrated in the budget process to strengthen control over spending. The wide coverage and long duration of key social benefits should be better targeted to low-income households. More flexible work arrangements are also needed, such as fixed-term employment contracts.

[4] This approach is analogous to an aggregated form of performance-based budgeting.

The remainder of this paper is organized as follows: the next section summarizes key stylized facts to motivate key questions, Section C explores the major sources of budget rigidity in Slovenia and outlines initial steps to enhance flexibility; Section D assesses the relative efficiency of health, education and social protection; and Section E concludes.

B. Key Questions and Stylized Facts

10. **The composition and level of public spending in Slovenia compared to other EU countries raises a number of concerns regarding efficiency and budget rigidity.** For instance, it is unclear if the ambitious medium-term target to reduce expenditure can be achieved if past approaches to expenditure adjustment continue to be followed. The high level of spending might also reflect inefficiencies that would allow for lower spending without sacrificing outcomes. Finally, the relative stability of spending in Slovenia raises concerns that budget rigidities could hamper future consolidation efforts. This section outlines these questions in the context of the stylized facts on public expenditure. Data sources and coverage are detailed in an Appendix.[5]

Is the recent pattern of expenditure adjustment sustainable over the medium term?

11. **Slovenia will need to adopt a different pattern of expenditure adjustment compared to previous approaches.** For instance, primary spending as a share of GDP was unchanged during 2000-05 as traditionally flexible areas of expenditure were restrained to make room for other spending items (Figure 1). Specifically, cuts in capital transfers and intermediate consumption of 1.4 percent of GDP fully offset higher spending on subsidies, social benefits, and employee compensation all of which tend to be rigid to short-term expenditure adjustment. Moreover, spending reductions were concentrated in categories that represent a relatively small share of total spending (Figure 2).

12. **High taxes and the small share of flexible spending limit the scope to accommodate emerging spending pressure through higher revenue or expenditure restraint.** The tax burden in Slovenia was over 40 percent of GDP in 2005 while total spending was over 6 percent of GDP higher than the eight New Member States (NM-8) and 4 percent of GDP higher than the advanced EU-15 countries (Figure 2). Moreover, the relatively small share of traditionally flexible spending limits the scope for rapid expenditure restraint. Section C identifies potential budget rigidities that should be addressed in this regard and outlines initial steps to enhance spending flexibility.

[5] Fiscal data correspond to the general government sector and are drawn from Eurostat.

Figure 1. Slovenia: Composition of Expenditure Adjustment, 2000-05
(Change in percentage points of GDP)

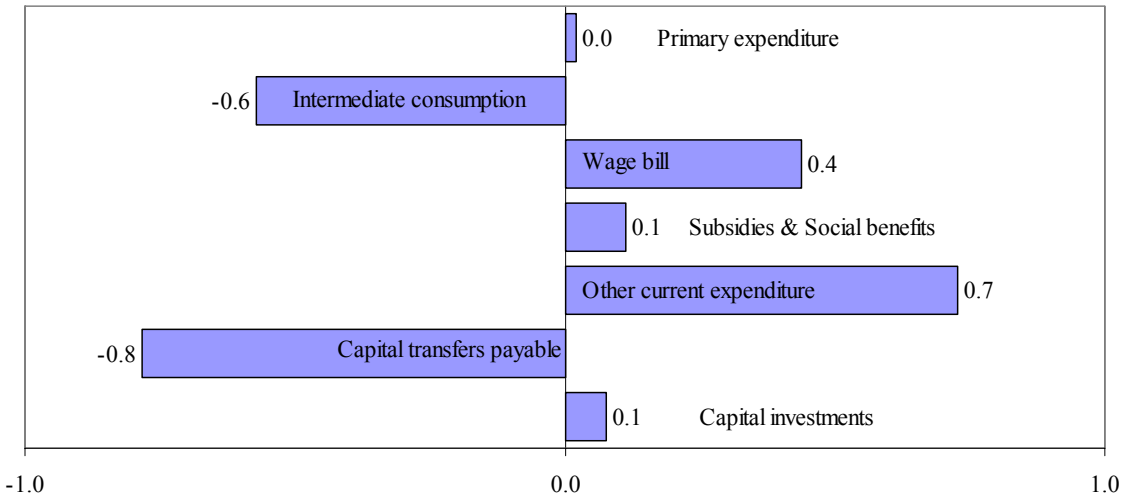
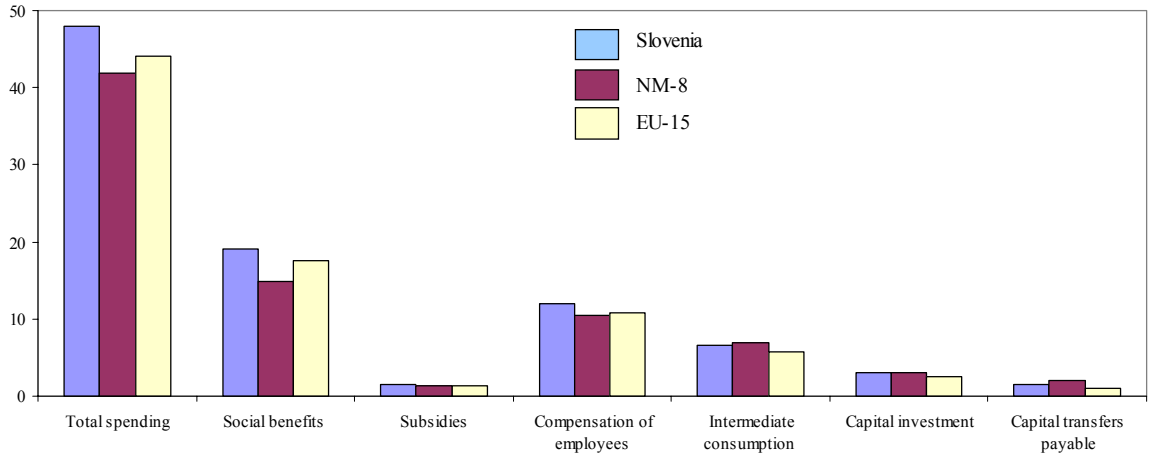


Figure 2. Average Expenditure by Economic Category, 2000-05
(As a percent of GDP)



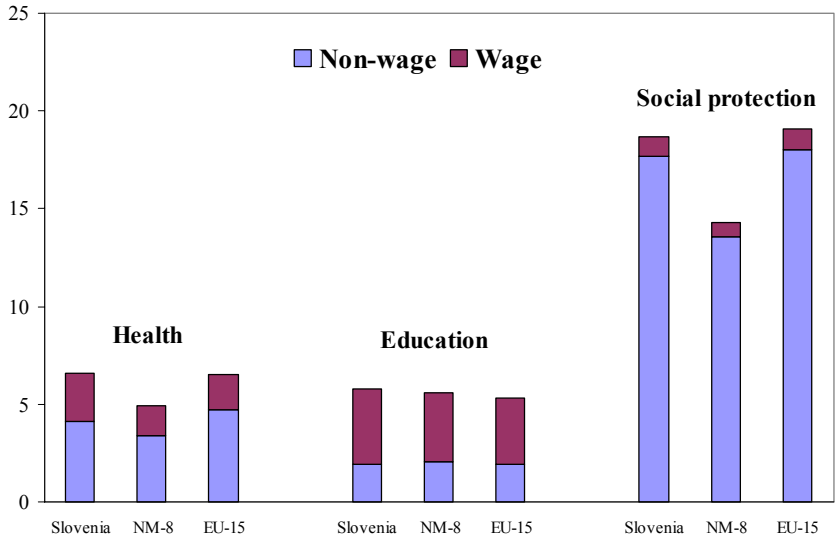
Sources: Eurostat

Does Slovenia spend efficiently compared with EU and NM-8 countries?

13. **Expenditure is higher than in other NM-8 countries.** Total spending averaged 48 percent of GDP during 2000-05 compared to an average of 42 percent of GDP in the NM-8 countries. The main drivers of higher average spending in Slovenia include generally rigid social benefits and employee compensation (Figure 2). Spending in major functional categories also appears higher than in other NM-8 countries. For instance, Figure 3 illustrates that social protection spending was higher in Slovenia than the NM-8 average by 6.4 percent

of GDP in 2004. Health and education spending were also higher than the NM-8 average, by 1.7 and 0.2 percent of GDP, respectively.

Figure 3. Comparison of Major Functional Spending Categories, 2004
(As a percent of GDP)



Source: Eurostat

14. **The share of employee compensation in health and education spending is also relatively large in Slovenia.** Figure 3 illustrates that in 2004 employee compensation (a typically rigid area of spending) represented 38 percent of health spending in Slovenia compared to 31 and 28 percent in the NM-8 and EU-15 countries, respectively. Employee compensation in education also appears relatively high in Slovenia at 67 percent of spending compared to 63 percent in the NM-8 countries. The high level and composition of these functional spending categories point to potential inefficiencies that are the focus of Section D. Specifically, if higher spending has not achieved correspondingly better performance compared to other EU countries, then there might be scope to trim spending without sacrificing outcomes.

Does budget rigidity explain the stability of spending in Slovenia?

15. **Spending appears relatively stable in Slovenia compared to other EU countries.** For instance, social benefits in the NM-8 countries exhibit almost twelve times the variation of Slovenia as measured by the coefficient of variation (Table 1).[6] Similarly, total expenditure and employee compensation in the NM-8 countries are over three times as volatile as in Slovenia. Traditionally flexible areas of expenditure also exhibit significantly less variance in Slovenia. This broad pattern highlights potential budget rigidities that might

[6] The pattern of results in Table 1 is robust to detrended expenditure data using the Hodrick-Prescott filter.

constrain the discretionary scope for policy makers to adjust spending. This will be explored in Section C.

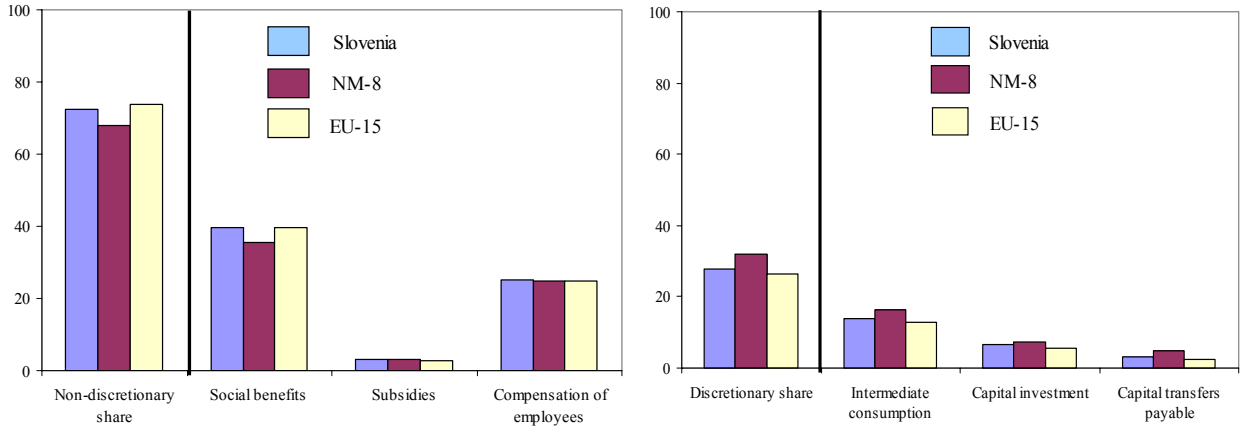
Table 1. Variation in Key Expenditure Categories, 2000-05
(Standard deviation to the mean in percent)

	Slovenia	NM-8	EU-15
Total spending	1.2	4.0	2.6
Intermediate consumption	4.9	6.9	5.0
Compensation of employees	1.6	4.9	2.9
Subsidies	7.4	19.3	7.8
Social benefits	0.4	5.2	3.4
Other current expenditure	12.1	40.7	8.1
Capital transfers payable	37.7	86.6	20.1
Capital investments	8.1	16.0	14.5 1/

Source: Eurostat data and Fund staff estimates
1/ Excludes Germany.

16. **The high share of nondiscretionary spending also points to potential budget rigidities.** Non-discretionary spending includes generally rigid areas of expenditure owing to collective agreements, legislation governing social entitlements, subsidies and interest.[7] The relatively large share of nondiscretionary spending in Slovenia, at 72 percent of total spending, stems largely from generous social benefits (Figure 4). This compares with nondiscretionary spending in the NM-8 countries of 68 percent of total spending on average. Section C explores factors underlying the relative stability of spending in Slovenia, including budget rigidities.

Figure 4: Discretionary and Nondiscretionary Share of Expenditure
(As a percent of total spending)



Sources: Eurostat data and Fund staff estimates

[7] Non-discretionary spending is defined as social benefits, interest, compensation to employees and subsidies.

C. Sources of Budget Rigidity in Slovenia

17. **Limited spending flexibility in Slovenia could reflect budget rigidities that would hamper future expenditure rationalization.** The stylized facts outlined in Section II depict a highly stable pattern of spending (Table 1) and relatively high share of non-discretionary spending (Figure 4). Although the optimal degree of spending flexibility is unclear, additional flexibility appears warranted in Slovenia to help achieve the large envisaged expenditure rationalization. This section adopts different approaches to explain the stylized fact that spending appears inflexible in Slovenia. As a first step, the first subsection explores the cyclical sensitivity of spending to the output gap to assess if spending stability simply reflects relatively smooth growth or unresponsive spending. As cyclical variation appears insufficient to explain the stability of spending, the second subsection identifies rigidities arising from institutions, financing mechanisms, social protection, and employee compensation. The third subsection outlines initial steps to enhance flexibility.

18. **There is growing interest among policymakers in tackling rigid budget structures that limit the discretionary scope to adjust expenditure.** Despite its importance in operational work, there has been surprisingly little focus on this problem in the literature. However, Alier (2006) recently found in a sample of Latin American countries that revenue earmarking is particularly problematic in reducing the discretionary scope to adjust spending. His analysis is based on the share of nondiscretionary spending and the subset of spending that is financed by earmarked revenue. While earmarking is less prevalent among NM-8 countries, other forms of budget rigidity are important as discussed below in the subsection on budget rigidities.

Cyclical variation in spending appears modest in Slovenia

19. **Output gaps have been relatively stable in Slovenia compared to other EU countries, contributing to reduced cyclical variation in spending.** The cyclical responsiveness of spending in Slovenia appears relatively weak compared to the NM-8 average given the low ratio between the volatility of primary spending and the output gap (Table 2).[8] Specifically, the relative volatility ratio in Slovenia was less than half the NM-8 average, suggesting that primary spending might not be highly responsive to fluctuations in the output gap. Moreover, other authors have argued that automatic stabilizers play a modest

[8] The output gap is measured using the Hodrick-Prescott (1997) filter on logged real GDP. This approach is consistent with the EC methodology until 2002 and Schadler and others, (2005). This differs from official estimates of the output gap presented in the main Article IV staff report. The HP filter is also applied to primary spending as a percent of GDP to remove stochastic trends that would bias the results in Table 2. Regression analysis would be unreliable to estimate the relationship between primary spending and the output gap given the limited number of time-series observations for most NM-8 countries (11 or fewer) and significant structural shifts during the 1990s that could lead to spurious results in small regression models.

role in NM-8 countries generally (Schadler and others, 2005), implying that cyclical factors are not the key determinants in understanding spending variation.[9]

20. **A simple simulation suggests that mild output growth volatility in Slovenia does not fully explain the relatively modest variation in primary spending.** To assess the impact of smoother growth performance on spending volatility, Table 2 outlines an exercise that holds the volatility ratio between primary spending and the output gap fixed at the observed level of 1.2 but assumes a more volatile output gap matching the NM-8 average of 0.9. Although this experiment suggests that the variation in primary spending in Slovenia would have been higher by more than 50 percent, it remains less than half as volatile as the actual NM-8 average (Table 2 simulation). In other words, the relatively smooth growth performance in Slovenia appears an insufficient explanation for the overall pattern of expenditure stability summarized in Table 1. As a result, other factors are needed to explain spending stability, such as budget rigidities which are the focus of the next subsection.

Table 2. Variation in Primary Spending and the Output Gap, 2000-05
(Standard deviation of Hodrick-Prescott filtered data)

	Primary Spending (percent of GDP)	Output Gap (percent of potential)	Relative Volatility
NM-8 average	2.4	0.9	2.7
EU-15 average	1.7	0.9	1.9
Slovenia	**0.6**	**0.6**	**1.2**
percent of NM-8	27	63	43
percent of EU-15	39	66	59
Simulation: Setting output gap volatility equal to the NM-8 average			
Slovenia	**1.0**	**0.9**	**1.2**
percent of NM-8	43	100	43
percent of EU-15	62	104	59

Sources: Eurostat data and Fund staff estimates.

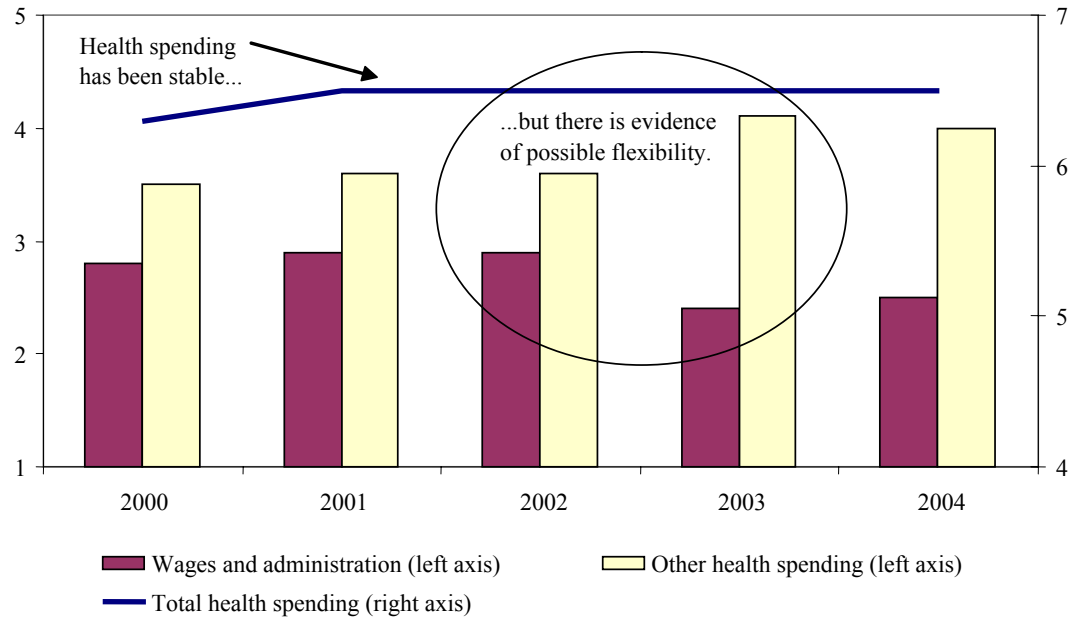
[9] While primary spending appears relatively volatile in the NM-8 countries compared to the EU-15 (Table 2), this could reflect structural as well as cyclical factors.

Budget rigidities in key sectors

Health

21. **The pattern of health spending reflects a blend of discretionary policy targets and budget rigidities.** The medium-term health financing strategy of the Health Insurance Institute of Slovenia (HIIS) envisaged an upper threshold in public health spending of about 6.9 percent of GDP over the medium term. This discretionary target effectively anchored the health budget by motivating initiatives to contain employee compensation and accommodate cost pressures from pharmaceuticals and medical equipment. As a result, the stability of health spending as a share of GDP (solid line in Figure 5) masks potential underlying flexibility as the composition of health spending changed (circled area). This emphasizes that discretionary policies to maintain stable spending are observationally equivalent to budget rigidity. But, the changes in the composition of health spending during 2002-03 are not all due to budget flexibility. Instead, a large share of this apparent flexibility can be linked to a shift in the accounting of pharmaceutical expenses.

Figure 5. Slovenia: Composition of General Government Health Spending, 2000-04
(As a share of GDP)



22. **Despite potential flexibility in health spending, there are also significant rigidities that hamper the discretionary room to trim spending.** For instance, the quasi-autonomous legal status of hospitals constrains government efforts to rationalize costs. Moreover, the costs of primary health clinics that are established by local governments are difficult to control by the central government, which covers operating expenses including wages. The funding and compensation mechanism for hospitals and health care providers are

another source of rigidity that limits discretionary spending variation. Annual collective bargaining determines the scope of activities and volume of services to be carried out by public health care providers, which represents 80 percent of total health care providers (Chakraborty, Bultman, and Chawla, 2005). For instance, hospital transfers are based on collectively agreed rates of compensation for treating various medical diagnoses as recorded by the Diagnosis-Related Groups (DRGs) system.[10] In addition, the compensation scheme for primary care doctors depends on a collectively agreed capitation rule adjusted for factors such as age that affect the average cost of service delivery.[11] These schemes imply that the government lacks short-term discretionary scope to adjust health care spending without reopening collective agreements or adjusting compensation rates.[12]

Education

23. **The relatively high share of compensation to employees compared to other EU countries is an important rigidity that constrains the discretionary scope to adjust short-term education spending** (Figure 3). Institutional and funding mechanisms have also fostered rigidities. For instance, local governments establish primary schools while the federal government finances a significant share of operational and employment costs. As these facilities typically serve multiple community functions, local governments are reticent to rationalize excess facilities despite high overhead costs. In addition, the federal funding mechanism does not provide a strong financial incentive to rationalize excess capacity. Funding of the primary school system is generally based on the number of departments or classrooms rather than a per-capita based formula linked to the average cost of service delivery. Although secondary schools are directly controlled by the central government, funding arrangements are still gradually shifting toward per capita based formula. Similarly, a significant share of federal transfers to universities is set according to an incremental-cost budgeting formula, constraining discretionary room to adjust spending.

Social protection transfers

24. **The wide coverage and weak targeting of social benefits compared to other EU countries represent major budget rigidities.** For instance, the duration of maternity leave, child allowances and unemployment benefits are on the high side compared to other NM-8

[10] The DRG system was implemented during 2002-04 and is now operating in all 19 acute-care hospitals.

[11] There is also a minimum service requirement, however most service providers easily fulfill this condition. Deviations from budgeted compensation also depends on an incentive and penalty scheme to discourage an overprescription of medication and over-referral of patients to secondary care specialists relative to the norm. Although individual compensation varies by 50 percent, overall health spending is generally within 3 percent of the budget target.

[12] Although there might be economically sound reasons to structure health care financing in this manner as discussed in section IV, the implication of the arrangement is that the funding mechanism limits the scope to reduce health care spending in the short term on a discretionary basis. This problem points to a potential trade-off between greater budget flexibility and efficiency in some circumstances.

countries and most EU-15 countries (Table 3). Moreover, pension benefits represent about three quarters of total social protection outlays. This adds further rigidity to overall social spending as pension reforms typically reduce spending with a long lag. Another concern is the wide coverage of poorly targeted social benefits that weakens the counter cyclicality of spending. Political resistance is perhaps the greatest rigidity in terms of reducing generous social entitlements given the strong consensus-driven approach to policy making in Slovenia.

25. **Multiple and complex indexation rules have also contributed to social spending rigidity.** There are multiple indexation formula pertaining to different social benefits, which have resulted over time in different real benefit levels. These rules have also increased administrative costs. Indexation formula are another potential source of budget rigidity to the extent that the key variables are beyond direct government control, such as foreign price indices, exchange rates or private-sector wage growth. The recent proposal to harmonize and rationalize the number of indexation formula is a welcome step, although it would be prudent to select variables in the indexation formula cautiously with an eye to minimizing rigidities.

Table 3. Benefit and Duration of Key Social Benefits in Selected EU Countries

	Maternity Leave Benefit		Child Allowance		Unemployment Benefit	
	Benefit (percent of earnings)	Duration (weeks)	Duration (Age Limit)	Student (Age Limit)	Benefit (percent of earnings)	Duration (months)
Slovenia	**100 percent**	**52**	**18**	**26**	**60-70 percent**	**3-24**
NM-8						
Czech Republic	…	28-37	…	26	40-50 percent	…
Estonia	100 percent	20-22	16	18	…	6
Hungary	70 percent	24	16	20	65 percent	9
Latvia	100 percent	16	14	20	50 percent	9
Lithuania	100 percent	18	…	…	…	6
Slovak Republic	…	28	…	…	…	6
Poland	100 percent	16	18	21	…	6-18
EU-15						
Austria	100 percent	16	18	26	55 percent	20-52
Denmark	…	52	18	18	…	52
France	100 percent	16-34	20	…		4-60
Germany	100 percent	14	18	27	60-67 percent	3-32
UK	90 percent for 6 weeks	26	16	19	...	6

Source: US Social Security Administration

Compensation to employees

26. **The strong collective bargaining tradition in Slovenia imposes a major rigidity that constrains short-term expenditure flexibility.** The civil service grew by one-third during 1992-2004 and one study estimated that the average wage is 34 percent higher than comparable private sector wages (Kastelec, 2005), even though stronger job security in the civil service typically allows for a discount of 10-20 percent relative to private sector wages.[13] In addition, centralized personnel management fosters additional rigidities, such as fixing the number of civil service positions, centralizing pay scales, and effectively providing tenure to civil servants (Davies, Verhoeven, and Gunnarsson, 2006). The seniority-based system of career advancement also introduces an upward bias in the wage bill as the civil service ages. However, Davies, Verhoeven, and Gunnarsson (2006) demonstrated that wages and salaries are not inherently rigid to adjustment, as widely perceived, suggesting there remains scope to reduce the wage bill significantly over the medium term.

Initial steps to enhance budget flexibility

27. **Slovenia could enhance budget flexibility by reforming institutions, the financing mechanism for social services, and accelerating the adoption of flexible work arrangements and performance-based budgeting.** The following measures could enhance flexibility to facilitate medium-term expenditure rationalization and offset pressure to compress public investment and other goods and services:[14]

- **Implementing institutional reforms.** Consolidating indirect budget users such as hospitals and schools in the budget process would enhance the government ability to contain costs.

- **Reforming social services financing.** The funding mechanisms for health and education should provide incentives to rationalize excess capacity. For instance, education financing at all levels should increasingly shift towards per capita based formula to penalize spending units with high relative costs.

- **Targeting social benefits.** Improved targeting of social benefits would direct additional resources to low-income households while fostering greater counter cyclicality in overall expenditure. The long duration and wide coverage of social benefits should also be carefully reviewed.

- **Accelerating flexible work arrangements.** Plans to increase flexible and part-time employment arrangements in the civil service should be accelerated to enhance

[13] The social agreement approach to collective bargaining is not without benefits as the previous agreement restrained real wages below productivity growth to facilitate a smooth adoption of the euro.

[14] Compression of capital spending can lead to under-investment in infrastructure and hinder medium-term growth (see *Public Investment and Fiscal Policy—Lessons from the Pilot Studies,* IMF, 2005).

budgetary flexibility. For instance, fixed-term contracts in primary education could facilitate medium-term consolidation given the declining primary school-age population and excess number of teachers in that sector.

- **Adopting performance-based budgeting.** Implementing performance-based budgeting can expand managerial flexibility in reallocating inputs to better achieve performance targets.

28. **Institutional reforms and revising the funding mechanisms for social services could require a review of intergovernmental fiscal relations and budget coverage.** Indirect budget users with multiple revenue sources and possibly quasi-autonomous legal status should be consolidated and integrated in the state and local budget process as appropriate. The exact delineation of spending units to either the state or local budget should be consistent with inter-governmental expenditure assignments and the financing mechanism, which might need to be updated. The planned review of the Budget System Law is one possible modality to address this issue. The federal government would need to proceed cautiously to minimize potential service disruption. The next section turns from the need to address budget rigidities to a methodology that can guide medium-term expenditure rationalization based on the relative efficiency of public spending in key areas.

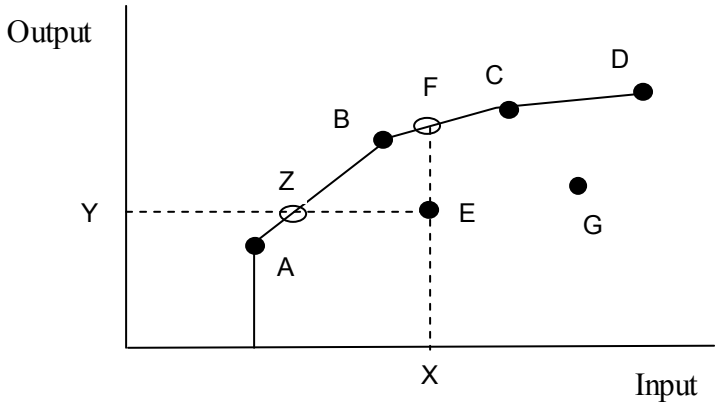
D. Assessing Efficiency as a Benchmark to Guide Expenditure Rationalization

Methodology

29. **Efficiency is assessed in this chapter using a cross-country approach that measures the effectiveness of spending in producing outcomes.** The relative efficiency of spending inputs and outcomes in each country is assessed using the Data Envelopment Analysis (DEA) technique developed by Farrell (1959) and popularized by Charmes, Cooper, and Rhodes (1978). Based on the assumption of a convex production possibilities set, a piecewise linear "efficiency frontier" is constructed as the linear combination of efficient input and output combinations in the cross-country sample. Figure 6 illustrates an efficiency frontier that connects points *A* to *D* as these countries dominate other input-outcome pairs, such as countries *E* and *G* in the interior. The convexity assumption allows an inefficient input-output pair such as point *E* to be assessed relative to a hypothetical position on the efficient frontier like point *Z* by taking a linear combination of efficient country pairs, such as points *A* and *B*. In this manner, an input-based technical efficiency score that is bounded between zero and one can be calculated as the ratio of *YZ* to *YE*. The score corresponds to the proportional reduction in spending that is consistent with relatively efficient production of a given outcome. Similarly, an output-based technical efficiency score for point *E* can be calculated as the ratio of *FE* to *FX*, consistent with the proportional increase in the outcome indicator given current spending if production is relatively efficient. This would correspond to the hypothetical point *F* on the efficient frontier that is calculated as a linear combination

of actual country pairs *B* and *C* on the frontier. This chapter limits its focus to input-based efficiency scores in line with the policy focus on medium-term expenditure rationalization.[15]

Figure 6. DEA Single Input and Output Diagram



30. **Although the DEA avoids econometric pitfalls in assessing expenditure efficiency, the technique also involves important caveats.** The DEA is a powerful tool to assess spending efficiency as it does not require an assumption about unknown functional forms or complex distributional properties. However, as a relative measure of efficiency, the DEA is highly sensitive to sample selection and measurement error. As a result, outliers can exert a large effect on the efficiency scores and shape of the frontier. For this reason, proper sample selection is critical to ensure that cross-country input-output bundles are comparable. Also, because the methodology focuses on inputs and outputs that can be quantified, it may overlook important factors that are harder to measure, such as quality. In addition, it is important to ensure that spending inputs are compared with outcomes that are actually targeted by policymakers. Further, many public policy targets are also impacted by private spending. As a result, large differences across countries in private health or education spending could bias efficiency scores. This chapter focuses on public spending as an initial step toward assessing spending efficiency. In addition, exogenous factors beyond direct government control should be considered when interpreting efficiency scores, such as variation in initial conditions.[16]

31. **The literature on the DEA and related techniques is well developed.** Gupta and Verhoeven (2001) adopted an efficiency frontier approach to assess education spending in 37 African countries during 1984-95. They found evidence of significant inefficiencies in

[15] The input- and output-based efficiency scores are equal assuming constant returns to scale. The DEA models in this chapter permit variable returns to scale given the sharp decrease in outcomes at higher spending levels. See Zhu (2003) for a detailed technical treatment of the DEA approach.

[16] For instance, differences in geography could affect the efficiency of motorway investment as a mountainous country could spend more per kilometer while still operating efficiently. Similarly, countries with higher initial GDP per capita levels tend to have better technology and stronger initial education and health outcomes.

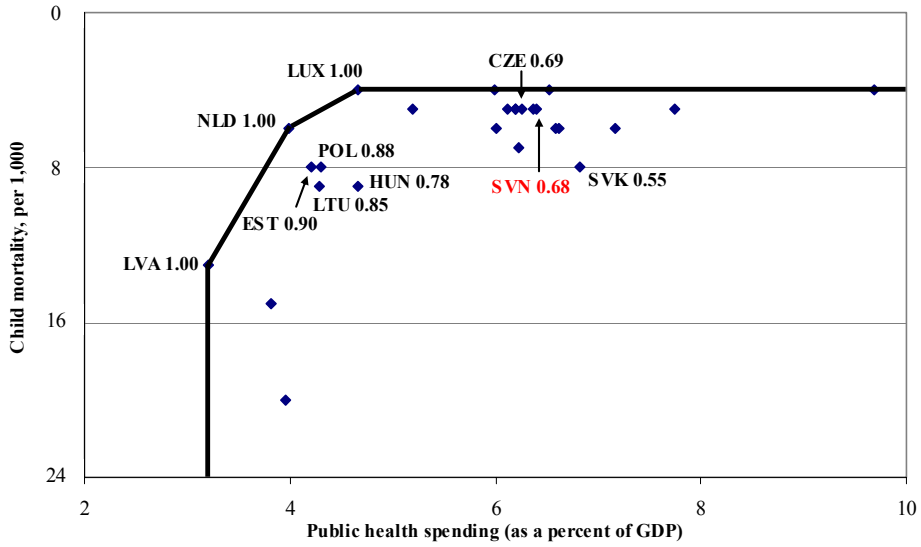
African countries compared to Asian and Western Hemisphere countries, suggesting the need for greater efficiency rather than higher spending. Afonso and St. Aubyn (2004) assessed the efficiency of education and health spending in OECD countries using both the DEA and a related technique. They found that countries with low public spending tend to overperform higher-spending countries in terms of outcomes. Herrera and Pang (2005) evaluated spending in 140 countries using the DEA technique and found that (i) high-spending countries appear less efficient; (ii) countries with a relatively large wage bill perform less efficiently; and (iii) countries with higher aid dependency achieve lower efficiency results. Finally, Afonso, Schuknecht and Tanzi (2006) applied DEA to assess the efficiency of public spending in a sample of emerging market and EU countries. A novel feature of their work was the use of Tobit regressions to control for exogenous factors affecting efficiency results that are beyond government control.

Relative efficiency of public health spending in Slovenia

Child and maternal mortality

32. **The efficiency of public health spending is sensitive to the level of government coverage and sample selection.** Based on consolidated central government data, health spending attains the efficient frontier in terms of reducing child mortality compared to other EU countries. However, Slovenia appears less efficient based on general government data and a broader sample of countries (Figure 7). In this scenario, Slovenia ranks 18th out of 26 countries with an efficiency score of 0.68; this implies that expenditure could be 32 percent lower and achieve an equivalent outcome. However, efficiency scores should be interpreted cautiously. This analysis assumes that reducing the child mortality rate is an explicit goal of health spending. Moreover, reducing overall health spending would impact other health outcomes as well. The efficiency frontier also exhibits sharply decreasing returns to scale once health spending exceeds about 5 percent of GDP, suggesting that marginal resources could be reallocated to other areas which would generate a larger impact.

Figure 7. Efficiency of Public Spending in Reducing Child Mortality



33. **Maternal mortality rates are relatively high in Slovenia given the level of public health spending.** The average maternal mortality rate in the EU-15 countries is 42 percent lower than in Slovenia even though public health spending is comparable at 6.3 to 6.4 percent of GDP. Although maternal mortality is 20 percent lower than the NM-8 average, average public health spending in Slovenia is higher by almost 30 percent. Consequently, Slovenia's efficiency score is 0.62, ranking it 24th out of 26 countries in the sample. These results raise major concerns regarding the effectiveness of relatively high health care spending. However, one problem with this indicator is that a single outlier in a small country like Slovenia could significantly affect the mortality rate.[17]

Standardized death rates (SDRs)

34. **Based on a range of SDRs from different causes, Slovenia also appears relatively inefficient compared to NM-8 and EU-15 countries.** For example, Slovenia ranks 19th out of 25 countries in the sample based on reducing the SDR from all causes with an efficiency score of 0.6. This result reflects the SDR from all causes is about 15 percent higher in Slovenia compared to the EU-15 average while health spending is comparable as a share of GDP. Moreover, the SDRs in Slovenia from circulatory and digestive disorders are 20 and 80 percent higher than the EU-15 average, respectively. Although the SDR from all causes is about 20 percent lower in Slovenia than the NM-8 average, public health spending is about one-third higher. These results suggest either that lower health spending in Slovenia could potentially achieve comparable outcomes or that current spending could potentially achieve better outcomes.

Multiple outcome health model

35. **Public health spending appears particularly inefficient based on a multiple outcome model.** Table 4 demonstrates that Slovenia ranks 18th out of 22 countries in a multiple outcome model including child and maternal mortality rates, the SDR from all causes, and years of healthy life expectancy. Nine countries were identified as relatively efficient in the sample, reflecting in part the nature of the multiple outcome approach that ranks countries as efficient if they perform strongly in at least one outcome. The results in Table 4 also demonstrate that both low-spending and low-outcome countries (Latvia, Poland) and high spending and high-outcome countries (Sweden, Italy) are relatively efficient. These results suggest that outcomes could be strengthened in Slovenia or that spending could be significantly reduced while remaining consistent with current outcome indicators.

[17] The maternal mortality rate is measured per 100,000 births. There are only about 18,000 births each year in Slovenia. As a result, a single outlier could result in sharp swings.

Table 4. Multiple Outcome Health Sector Efficiency Model

	Maternal mortality (per 100,000)	Child mortality (per 1,000)	Healthy life expectancy (years)	SDR: all causes (per 100,000)	Health spending (percent of GDP)	Efficiency Score	Rank
Latvia	61	13	60.9	1113.6	3.2	1.00	1
Netherlands	16	6	70.3	666.2	4.0	1.00	1
Poland	10	8	64.8	891.5	4.3	1.00	1
Luxembourg	28	4	70.8	706.4	4.7	1.00	1
Spain	5	5	71.4	600.1	5.2	1.00	1
Finland	5	4	70.4	660.1	6.0	1.00	1
Ireland	4	6	69.3	721.3	6.0	1.00	1
Italy	5	5	71.6	576.3	6.1	1.00	1
Sweden	8	4	72.3	598.5	6.5	1.00	1
Lithuania	19	9	61.8	1008.3	4.3	0.92	10
Hungary	11	9	62.8	1048.0	4.7	0.91	11
Estonia	38	8	62.7	1090.6	4.2	0.90	12
Germany	9	5	70.7	665.2	6.2	0.81	13
Denmark	7	5	69.9	749.1	6.4	0.80	14
Czech Republic	9	5	67.1	899.6	6.3	0.80	15
Austria	5	6	71.0	652.3	7.2	0.73	16
Portugal	8	6	67.6	727.1	6.6	0.72	17
Slovenia	**17**	**5**	**68.2**	**759.5**	**6.4**	**0.72**	**18**
France	17	5	71.5	605.5	7.7	0.68	19
United Kingdom	11	6	69.8	675.7	6.6	0.68	20
Norway	10	4.0	71.1	608.2	9.7	0.66	21
Slovak Republic	10	8	64.8	971.5	6.8	0.63	22

Sources: World Health Organization and Eurostat data; Fund staff estimates

Enhancing health sector efficiency

36. **Health care efficiency could be strengthened by extending a number of existing initiatives.** For instance, monitoring quality and safety indicators of hospital service delivery could be extended by gradually linking performance to the budget process. In addition, initiatives to reform the compensation mechanism for primary health and hospital services should continue to shift operational risk to providers as an incentive to economize resources. For instance, the DRG system for hospital financing involves collectively negotiated compensation rates for over 600 diagnoses based on the expected cost of service delivery rather than the actual cost. Similarly, the capitation rule for compensating primary health care providers is based on the expected cost of service delivery. Performance indicators suggest implementation of the DRG system has coincided with a decline in the average duration of hospital admission and a lower number of inappropriate admissions. Ensuring that hospitals properly input and code diagnoses in the DRG system could yield additional efficiency savings. Other reform initiatives should continue to be actively pursued, such as establishing reference price lists for “mutually interchangeable” drugs to save up to an estimated 10

percent of drug costs and centralizing pharmaceutical and medical equipment procurement to benefit from bulk buying to save an estimated 10 to 30 percent. Finally, expanding private concessions from local governments of primary health facilities can provide an opportunity to enhance competition among providers and lower costs. However, the design of concessions should be cautious by ensuring that fees are sufficient to cover capital and depreciation costs, and avoids contingent liabilities for government.

37. **Additional measures to restructure the health care financing system could also generate efficiency savings.** Specifically, the system of compulsory public insurance by the Health Insurance Institute of Slovenia (HIIS) and the voluntary health insurers (VHIs) should be carefully reviewed. Compulsory social contributions to the HIIS are allocated towards the cost of providing a broad basket of health care services. Co-payments ranging from 15 to 95 percent of the cost of services are covered by the VHIs. As over 90 percent of the population is covered by voluntary co-payment insurance, co-payments have not effectively rationalized demand. Moreover, the private insurance system acts effectively like an arm of the compulsory HIIS as it also sets premiums based on earnings. Future reforms to enhance health sector efficiency should include reviewing the broad coverage of basic benefits covered by the HIIS and reorienting the coverage of voluntary health insurance from co-payments to excluded services from the publicly provided basket, tertiary services, dental care and pharmaceuticals. In this manner, out-of-pocket co-payments will better rationalize excess demand. Moreover, VHIs should be permitted to establish insurance premiums based on risk attributes to strengthen efficiency (Tajnikar and Bonča, 2005).[18]

The relative efficiency of public education spending

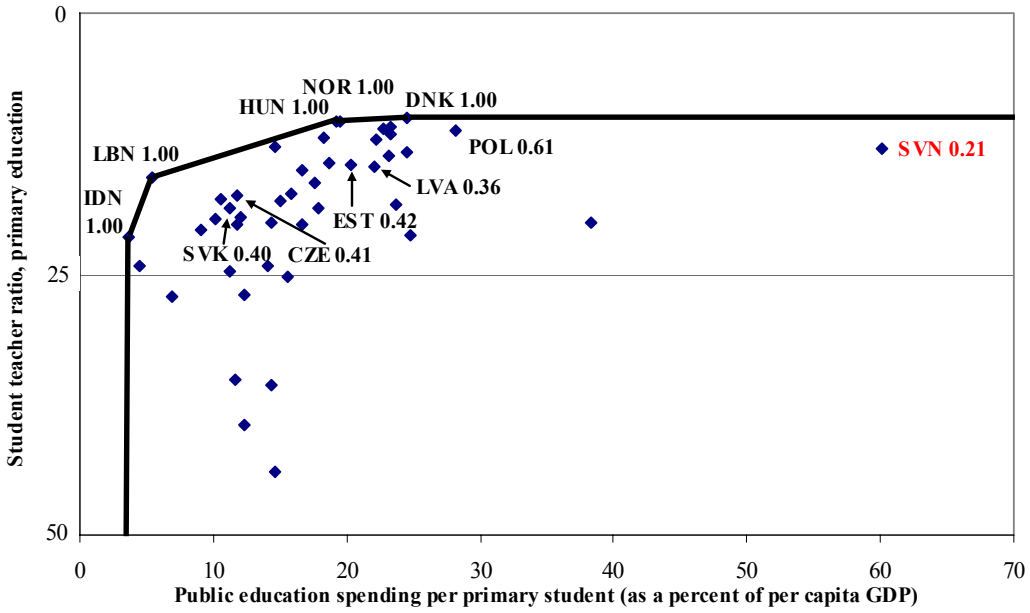
Primary education

38. **Primary education spending appears particularly inefficient in Slovenia.** Slovenia spent about 2½ times more than the NM-8 countries on average based on UNESCO data for primary education spending per pupil as a share of GDP per capita during 1998-2002. Part of this higher spending could reflect the inclusion of preprimary child care costs that might not be included in other country data. However, higher primary school spending in Slovenia also reflects the excess number of primary school teachers and facilities that have not matched the declining primary school-age population, resulting in high overhead costs.

[18] As the cost of voluntary health insurance for co-payments currently depends only on earnings rather than risk characteristics such as age and lifestyle, the private system is comparable to charging a higher social contribution rate through the compulsory insurance system. This was also a conclusion of the 2003 white paper on health care reform. Private insurers also face moral hazard, adverse selection and higher administrative costs compared to the mandatory insurance fund. This explains the need for a complex risk-adjustment mechanism that compensates private insurers for the risk attributes of their customers. For instance, the current rate structure pools risk so that younger workers subsidize older beneficiaries. However, companies with younger customers on average earn greater profits under this pooled-risk system, which requires compensating transfers between insurance companies.

Figure 8 illustrates that in terms of the average pupil-teacher ration,[19] Slovenia ranks 42nd out of 45 countries with an efficiency score of 0.21. This finding reflects that the higher level of primary education spending in Slovenia has not produced a significantly lower pupil-teacher ratio.

Figure 8. Efficiency of Primary Education in Lowering the Pupil-Teacher Ratio



Secondary and tertiary education

39. **Secondary education also appears relatively inefficient in terms of international standardized test scores.** Slovenia achieved an average score on the TIMSS[20] standardized test in mathematics that was about 5 percent lower than the average for five NM-8 countries with available test score data.[21] However, Slovenia spends almost 50 percent less than these same countries in terms of secondary school spending per pupil as a share of GDP per capita. Secondary schools fall more directly under central government control compared to locally established primary schools, which might partly explain why secondary school funding per pupil is just 20 percent of the respective primary education amount. Slovenia generated an efficiency score of 0.46 and ranks 10th out of 19 countries in the sample.

[19] The pupil-teacher ratio is a proxy for an outcome indicator, such as quality or effectiveness of primary education.

[20] Based on the U.S. Department of Education's *Trends in Mathematics and Science Study (TIMSS)*.

[21] The NM-8 countries with available TIMSS scores include Estonia, Hungary, Latvia and the Slovak Republic.

40. **Slovenia ranks relatively better in producing university graduates.** Slovenia registered an efficiency score of 0.58 and ranked 13th out of 44 countries in the sample based on the effectiveness of increasing the proportion of graduates as a share of the school-age population. Compared to the NM-8 countries in the sample, the proportion of university graduates of the school-age population is about 10 percent higher in Slovenia. Tertiary education spending per pupil as a share of GDP per capita is just 4 percent higher.

Multiple outcome education model

41. **The efficiency of education spending in Slovenia remains weak in a multiple outcome model.** The model assessed the efficiency of average public spending as a share of GDP in yielding strong outcomes in the primary pupil-teacher ratio, secondary school enrollment rates and the proportion of university graduates relative to the school-age population. Slovenia ranks 22nd out of 23 countries with an efficiency score of 0.69 (Table 5).

Enhancing education sector efficiency

42. **Slovenia could pursue a number of initiatives to enhance efficiency in the education sector.** The monitoring of key outcome indicators should be formalized and gradually linked to the budget process. As a pilot ministry for the implementation of performance-based budgeting, spending at the individual school level could be increasingly linked to outcome indicators.[22] This process would build on existing work to monitor selected outcome indicators, such as the graduation and drop-out rate by level of education, pupil-teacher ratio, academic results and scores on international standardized tests. In terms of primary education, a key measure would be to trim the number of primary teachers through natural attrition and implement a selective hiring freeze for new teachers. Plans to merge small primary schools over the coming years are another welcome step. The funding mechanism for primary and secondary schools should also shift increasingly to a per capita based formula that is linked to the expected cost of service delivery to encourage more efficient use of budgeted resources.[23] As the primary and secondary school-age populations are expected to decline over the medium term, schools should also consider pooling resources by jointly hiring and sharing new teachers. In addition, greater cost recovery of preprimary child care costs and university tuition should be pursued. Scholarships should also be targeted to lower-income students to insulate them from the impact of higher tuitions.

[22] With about 900 schools, educational facilities represent about half of all public sector institutions.

[23] Secondary schools are more advanced in this direction, as they are more firmly under central government control.

Table 5. Multiple Outcome Education Efficiency Model

	Primary student-teacher ratio	Secondary enrollment (percent)	Tertiary total graduates (percent)	Public education spending (percent of GDP)	Efficiency Score	Rank
Hungary	10.4	94.9	7.3	5.89	1.00	1
Italy	10.9	76.7	5.8	5.02	1.00	1
Sweden	11.6	104.1	8.5	6.86	1.00	1
Spain	14.4	98.3	8.8	4.24	1.00	1
Poland	11.2	63.7	12.5	5.58	1.00	1
Ireland	20.3	105.2	13.0	4.2	1.00	1
Bulgaria	17.3	68.1	7.8	3.87	1.00	1
United Kingdom	18.0	81.4	15.3	5.19	1.00	1
Denmark	10.0	93.2	11.5	8.05	1.00	1
Germany	15.1	78.5	6.7	4.3	0.96	10
Slovakia	18.7	59.6	5.5	4.04	0.96	11
Norway	10.3	75.8	11.0	7.68	0.95	12
Czech	17.4	57.2	4.9	4.11	0.94	13
Romania	17.9	59.3	4.6	4.15	0.93	14
Croatia	18.4	56.4	4.8	4.48	0.86	15
Portugal	12.1	97.6	8.5	6.97	0.81	16
Austria	13.3	63.7	5.8	5.69	0.79	17
France	18.7	81.4	13.4	6.12	0.75	18
Latvia	14.7	79.0	10.9	6.3	0.74	19
Finland	16.2	82.8	11.6	6.44	0.71	20
Belgium	12.0	66.1	10.0	7.24	0.70	21
Slovenia	**13.0**	**63.1**	**8.5**	**6.68**	**0.69**	**22**
Estonia	14.5	79.8	8.1	7.2	0.59	23

Sources: UNESCO and Eurostat data; Fund staff estimates

The relative efficiency of social protection transfers

Poverty risk

43. **Although social protection transfers are relatively large in Slovenia, the additional spending has not resulted in a significantly lower risk of poverty before transfers.** In a sample of 26 countries, Slovenia ranked 19th in terms of the efficiency of social protection outlays in reducing the proportion of the population at risk of slipping into poverty.[24] This may reflect a relatively more equalitarian earnings structure in Slovenia

[24] The outcome indicator is calculated by comparing the proportion of the population at risk of poverty before and after social protection transfers.

before transfers. Consequently, the high level of social benefits might be less effective due to decreasing returns to scale in reducing poverty risk compared to economies with greater earnings dispersion before transfers. This inefficiency imposes a potentially large fiscal burden as social protection transfers were over 18 percent of GDP during 2002-03 compared to the sample average of 16.7 percent of GDP. While high spending countries generally ranked poorly, Denmark reached the efficiency frontier despite social protection spending over 20 percent of GDP as it successfully lowered poverty risk by almost 20 percentage points (more than any other country in the sample). This suggests that there is substantial scope to better target social spending in Slovenia to improve outcomes.

Effectiveness of targeting social benefits

44. **The wide coverage of social benefits in Slovenia is not well targeted to low-income households.** The 2002 household budget survey provides information on market income and social protection transfers for a random sample of over 1,100 individuals.[25] Table 6 demonstrates that the earnings distribution by quintile is largely unaffected by social protection transfers other than pensions (the first quintile in the table corresponds to the lowest-income quintile). As a result, the efficiency of nonpension social benefits in reducing earnings inequality could be strengthened by trimming benefits to upper-income households and re-directing the savings to low-income households. For instance, the top income quintile (denoted fifth quintile) receives 16 percent of total nonpension social benefits, which does little to address social outcomes, such as lower poverty risk. Improved targeting of nonpension social benefits could reduce overall spending while improving outcome indicators.

Table 6. Impact of Social Benefits in Reducing Earnings Inequality
(In tolars, unless otherwise indicated)

	Income, Pensions and Other Receipts		After Social Transfers		
	Avg Income in Quintile	Share of Total Earnings in Sample (in percent)	Avg Income in Quintile	Share of Total Transfers (in percent)	Share of Total Earnings in Sample (in percent)
First quintile	1,135,256	7	1,376,294	23	7
Second quintile	2,315,159	13	2,584,891	26	14
Third quintile	3,200,545	18	3,410,876	20	18
Fourth quintile	4,240,799	24	4,384,495	14	24
Fifth quintile	6,546,620	37	6,714,641	16	36
Overall	**3,484,990**	**100**	**3,691,588**	**100**	**100**

Sources: Authorities; and IMF staff Estimates.

[25] Income is defined as market earnings, pensions and nongovernment receipts, such as gifts and property sales. Transfers include social and unemployment benefits.

E. Conclusion

45. **This chapter demonstrated that public spending in Slovenia is relatively inflexible, inefficient and poorly targeted.** These findings suggest that there is scope to trim expenditure without sacrificing outcomes in health, education and social protection. However, a key initial step will be to address budget rigidities that constrain the scope to adjust spending. Rigidities will exert upward pressure on spending over the medium term unless measures are taken to offset new spending demands. Moreover, continued inflexibility would shift the burden of expenditure consolidation to traditionally flexible areas of the budget or result in poorly targeted across-the-board cuts. These measures can be distortionary and unsustainable over time, as they lead to underinvestment in infrastructure and a deterioration of public services.

46. **Implementing flexible work arrangements and rationalizing excess capacity should be accelerated to enhance budget flexibility** Collective wage bargaining and centralized personnel management limits the scope to adjust the wage bill over the short term. In addition, the funding mechanism of quasi-autonomous institutions, such as hospitals, health clinics, primary schools and universities should be carefully reviewed to encourage the rationalization of excess capacity as appropriate and identify scope to enhance spending flexibility.

47. **In terms of efficiency, the challenge moving forward will be "doing more with less" so as to maintain or even improve performance outcomes.** Slovenia appears to perform inefficiently due to its high spending rather than weak outcomes. Institutional reforms that consolidate indirect spending units in the budget process could unlock new savings. Implementing performance-based budgeting could also enhance managerial flexibility and efficiency. In addition, reforms to the health care and education financing mechanism to encourage the rationalization of inefficient service providers with high overhead costs should be considered.

48. **High social protection spending that has yielded moderate outcomes points to the need for strengthened targeting.** Initial steps in this direction include expanding cost recovery of preprimary child care and allowing higher university tuitions. Scholarships should be means tested so that overall spending can be lowered and redirected toward low-income students. In this manner, cost recovery need not prevent access to higher education. The wide coverage and long duration of social benefits compared to other NM-8 and most EU-15 countries should also be carefully reviewed to improve targeting and re-direct resources to those households most in need.

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Data Appendix

Data sources for the section on stylized facts

Eurostat is the main source of data in this section based on its Government Finance Statistics Template Table (Eurostat, 2006a). This database includes general government spending during the 1995-2005 period broken down by economic classification. Expenditure ratios are calculated using nominal GDP available from Eurostat. In order to calculate the sensitivity of spending to economic cycles we make use of GDP at constant prices from the World Economic Outlook (IMF, 2006). The wage share in 2004 of education, health and social protection is available from Eurostat (*Task Force on COFOG,* Eurostat, 2006c). General government health spending in Slovenia is drawn from the Slovenian state budget.

Data sources for the efficiency of spending section

Data on health and social protection transfers are drawn from the IMF Government Finance Statistics 2001 database (International Monetary Fund, Fiscal Affairs Department, 2006).[26] Education spending data is obtained from the UNESCO Institute for Statistics (UNESCO, 2006). Outcome indicators in the health, education and social protection areas are drawn from a variety of sources. Health outcome measures (e.g., child and maternal mortality rates, and SDRs) are obtained from the World Health Organization's *Core Health Indicators* and *World Health Statistics* 2005 (World Health Organization, 2005). The at-risk-of-poverty measures are taken from Eurostat's *Population and Social Conditions* (Eurostat, 2006b). Primary and tertiary education outcomes (e.g., pupil-teacher ratio at the primary level and number of tertiary graduates as a proportion of the school-aged population) are drawn from UNESCO Institute for Statistics (UNESCO, 2006) while the outcome measures for secondary education are the *Trends in International Mathematics and Science Study (TIMSS)* mathematics test scores (National Center for Education Statistics, 2003). Table A1 summarizes the coverage of countries and time periods of key input and output/outcome data.

[26] Both Eurostat and IMF Government Finance Statistics are used as the Eurostat database provides data by economic classification while the IMF database provides data by functional classification. In years where the Eurostat and IMF data sets overlap, the two sources were cross-checked to ensure consistency.

Table A1. Time Period and Country Coverage of DEA Models

	Spending	Output/outcome	Countries included
Education			
Primary education	1998-2002	1998-2002	Argentina, Austria, Belgium, Bolivia, Brazil, Bulgaria, Colombia, Côte d'Ivoire, Croatia, Czech Republic, Denmark, Ecuador, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, India, Indonesia, Ireland, Italy, Jordan, Latvia, Macedonia, Mexico, Norway, Peru, Philippines, Poland, Portugal, Romania, Serbia and Montenegro, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Thailand, Ukraine, United Kingdom and Uruguay.
Secondary education - test scores	1998-2002	2003	Belgium, Bulgaria, Estonia, Hungary, Indonesia, Italy, Jordan, Latvia, Lebanon, Netherlands, Norway, Philippines, Romania, Scotland, Serbia and Montenegro, Slovak Republic, Slovenia, South Africa and Sweden.
Tertiary education	1998-2002	2002	Argentina, Austria, Belgium, Bolivia, Brazil, Bulgaria, Colombia, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Ireland, Italy, Jordan, Latvia, Macedonia, Mexico, Norway, Peru, Philippines, Poland, Portugal, Romania, Serbia and Montenegro, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Thailand, Ukraine, United Kingdom and Uruguay.
Multiple output education	1998-2002	Primary student-teacher ratio and secondary enrollment 1998-2002, tertiary graduation rate 2002.	Austria, Belgium, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden and United Kingdom.
Health			
Child mortality	1998-2002	2003	Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden and United Kingdom.
Maternal mortality	1998-2002	2003	Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden and United Kingdom.
SDR: all causes	1998-2002	latest	Austria, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden and United Kingdom.
Multiple output health	1998-2002	Child and maternal mortality 2003, healthy life expectancy 1998-2002, SDR latest.	Austria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden and United Kingdom.
Social protection			
Reduction of poverty	2000-2003	2000-2003	Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden and United Kingdom.

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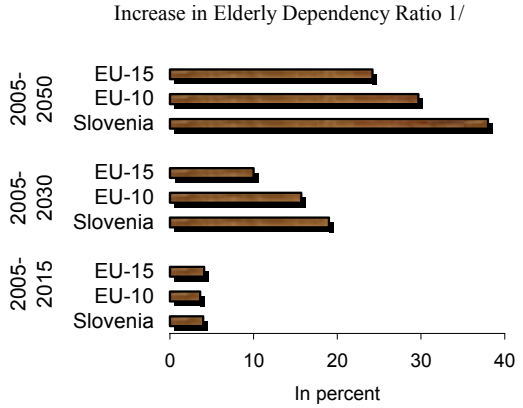
III. Impact of Aging on Fiscal Sustainability in Slovenia[27]

A. Introduction

49. **Over the next decades, Slovenia is projected to age at one of the fastest rates in Europe**. This demographic trend will put significant pressure on age-related spending. At the same time, a decline in potential growth will reduce income taxes and social contributions, pushing deficits and debt to unsustainable levels. This fiscal outlook is further dimmed by the generous eligibility conditions for pension benefits provided by the existing system, which encourage early withdrawal from the labor market, lower labor utilization, and dampen longer-term convergence prospects.



Source: United Nations.
1/ Measures the increment in the population aged above 65 as a share of population between 15-64 years, relative to the 2005 level. EU-10 includes the new member states of the European Union and EU-15 includes the old member states.

50. **To address these challenges, substantial reform measures have been introduced**. Starting in 2000, a number of pension reform measures lowering the benefits level and tightening the eligibility criteria for pensions were phased in (see Appendix 1). Nevertheless, these reforms will not be sufficient in restoring fiscal viability of the pension system, especially as some of these measures are being gradually rolled back.

51. **Against this background, this chapter seeks to assess the long-run sustainability of fiscal policy in Slovenia, given current policies and demographic projections.** Using a generational accounting model, it estimates the size of the fiscal gap implied by the current policies, taking into account the approved pension reform measures. In addition, it aims to examine the impact of various additional pension reform scenarios and the generational burden of fiscal policies. Projections show that, in the absence of further reforms, the social benefits system will place severe demands on public finances. Under current policies, the relatively low debt position will worsen, and it is estimated that taxes would need to increase by over 10 percent of GDP, in net present value terms, to address the fiscal solvency constraint. In order to achieve a target debt-to-GDP ratio of 60 percent in 2050, taxes would need to increase permanently by almost 5 percent of GDP. An early, integrated reform agenda needs to be implemented in order to reduce the burden of adjustment and restore fiscal sustainability. Expenditure reform that seeks to target fiscal balance or a small surplus over the medium term is also needed to accommodate the rising age-related spending pressures. This chapter is organized as follows. Section B provides background on the current fiscal policies, and the demographic and labor market developments. Section C

[27] Prepared by Anita Tuladhar. The author thanks Mr. Slaven Mickovic of the Ministry of Finance of Slovenia for providing valuable data for the model.

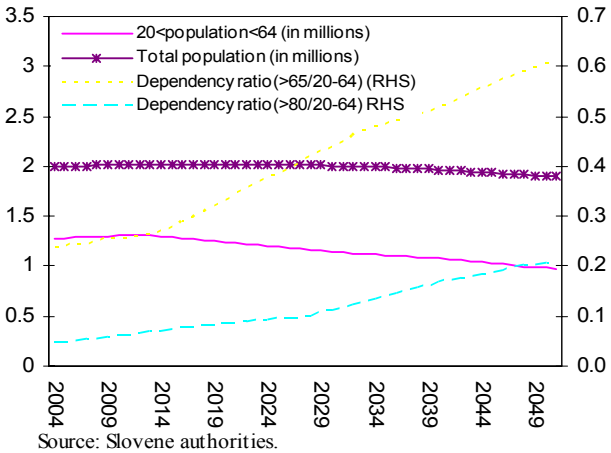
describes the model and the assumptions for the long-run projections. Section D presents the results, and Section E concludes.

B. Background

Demographic and labor market projections

52. **Slovenia's population is expected to age rapidly in the coming years**. The population is projected to decline, starting around 2015, and the elderly dependency ratio—the ratio of population aged over 65 years to the working population aged 20 to 64 years—to increase from around 23 percent in 2004 to over 60 percent in 2050. Of this increase, a large share will be due to the rise in the population of the elderly who are above 80 years. Although, they accounted for nearly 19 percent of the population aged over 65 years in 2004, by 2050, they are expected to comprise about 34 percent. These trends are driven by the very low fertility rate in Slovenia—among the lowest in Europe—and relatively high life expectancy, especially of women (text tables).

Demographic Trends, 2005-50



Source: Slovene authorities.

Demographic Indicators in Slovenia, 2004
(In percent, unless indicated otherwise)

	Net migration rate 1/	Fertility rate	Life Expectancy (Female) (In years)	Life Expectancy (Male) (In years)
Czech Republic	0.50	1.23	79.0	72.6
Estonia	-3.39	1.40	77.2	66.2
Euro Area	1.16	1.50	82.5	76.4
Hungary	1.00	1.28	76.9	68.6
Japan	0.22	1.29	85.4	78.4
Latvia	-2.36	1.24	77.7	65.5
Lithuania	-3.10	1.26	77.8	66.4
Poland	-0.18	1.23	79.2	70.0
Slovak Republic	0.17	1.25	77.8	70.3
Slovenia	0.40	1.22	80.5	72.8
United States	2.20	2.04	80.4	74.6

Source: World Development Indicators.
1/ Data are for 2000. Data represent percent of population.

53. **Current labor market trends pose additional challenges**. Labor force participation ratios have been declining, although this trend reversed slightly in 2005.[28] The inactivity rate among the elderly— above 50 years of age—is very high,[29] particularly among women. The employment rate for the elderly is also low, and flexible work arrangements more suitable for the elderly, such as part-time and fixed-term employment, are still relatively uncommon. These trends will exacerbate the fiscal burden as an increasingly large share of the population reaches retirement age.

Fiscal trends

54. **Although fiscal deficits are currently smaller, the budgetary structure leaves little room for maneuver in accommodating fiscal pressures.**[30] Slovenia's general government budget deficit has been low over the past decade, outperforming most Central European countries. Yet, the composition of expenditures shows that the share of pension and health care spending is larger than in the EU-25 countries. The Pension Fund has been in deficit since 1996, financed through general revenues of the state budget. In 2003, the state budget transferred the equivalent of 2.5 percent of GDP to finance deficits. The state also funds additional pension expenditure on noncontributory supplementary pension benefits, mandated under various laws such as those for farmers, police, and war veterans. In addition, nonpension benefits, such as recreation benefits and health insurance payments for pensioners, are substantial. Given the generous level of benefits and indexation mechanisms—the old-age pension net replacement rate in 2005 stood at 70 percent, and pensions and a number of noncontributory benefits are indexed to wages—the share of nondiscretionary spending remains large, posing further challenges for fiscal adjustment in the coming years.

55. **These trends are expected to affect fiscal deficits through several channels:**

- As the number of elderly increase, the resulting demand on pension and long-term health care benefits will rise dramatically. Although expenditures on other age-related spending such as education will decline, this will be more than offset by the increased spending through pensions and health care.

- With the number of young workers decreasing, the tax revenue base and the contribution base will also shrink, putting further pressure on pension finances. Since

[28] See Chapter III on "Slovenia: Tax and Benefits System and Incentives to Work".

[29] See Chapter IV on "Retirement Incentives in the Pension System in Slovenia".

[30] See Appendix I for details of the pension system. Chapter I on "Budget Rigidity and Expenditure Efficiency in Slovenia" discusses fiscal rigidities in further detail.

the contribution rates are already high, a further increase in the contribution rates would not be feasible, as it could drive down labor demand and reduce growth.

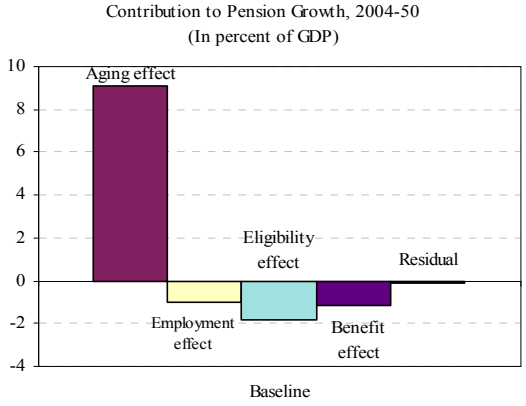
- A decline in the size of the labor force will lower growth, unless labor productivity improves significantly. The decline in potential growth will further reduce in tax revenues.

- As government borrowing increases to finance the fiscal gap, rising interest costs will put increasing pressure on deficits and debt sustainability, and undermine macroeconomic stability.

C. Model Simulations

56. **A generational accounting model is used to simulate the fiscal impact of aging** (see Appendix II for model details). This methodology is frequently used to assess long-run fiscal sustainability and the generational burden of fiscal policies (Cardarelli, Sefton, and Kotlikoff, 2000; Cardarelli and Sartor, 2000; and HM Treasury, 2004). The framework uses age and gender profiles (see Appendix III) that provide the distribution of taxes and transfers across age cohorts for a given year. These profiles, used in conjunction with the aggregate taxes and transfers in that year and the population distribution by age, provide estimates of the average taxes and transfers paid per person. These average per capita taxes and transfers, aside from pensions, are assumed to grow in line with wages, which, in turn, grow in line with labor productivity. Aggregate taxes and transfers are thus projected over the long run based on assumptions of productivity growth and population changes (text box). The projection of GDP is derived from the assumed productivity growth, labor participation rate, and employment rates.

57. **Pension projections are based on assumptions that consider labor market behavior, productivity growth, and the impact of pension benefit reform.** Pension expenditure as a share of GDP is determined by developments in four areas: (i) the aging effect, which captures the demographic change as shown by the relative number of elderly; (ii) the eligibility effect, which represents the number of elderly that receive pensions; (iii) the benefits effect, which captures the generosity of benefits received by pensioners; and (iv) the employment effect, which indicates the share of the working-age population that are employed and its productivity level. Based on the assumption that active labor market policies and the higher retirement age of the elderly will increase labor participation, the contribution of the employment effect in reducing pension expenditure as a percent of GDP is expected to rise. Similarly, the eligibility effect will also contribute towards lowering the pension expenditure. The effect of the pension reform



Source: Staff calculations.

implemented since 2000 will also gradually reduce benefits through 2024. Despite these positive developments, these factors are not expected to offset the demographic effect (text figure), and pension expenditures will rise from 11 percent of GDP in 2005 to almost 16 percent of GDP in 2050 in this baseline scenario. Alternative scenarios also show that pension expenditure will rise by 1½ percent in the optimistic case, with higher elderly labor participation and productivity growth and lower net replacement rate, and over 6 percent in a more pessimistic case with lower labor participation by the elderly (see Appendix IV for details). This central scenario of pension growth, adjusted for a constant labor productivity growth assumption, is incorporated in the baseline generational accounting model.

Box 1. Long-Run Fiscal Projections: Underlying Data Assumptions

The **demographic projections** produced by the Statistical Office of Slovenia are used. Longer-run projections over the period 2051-2150 assume the same population structure as in 2050.

Labor productivity growth in Slovenia has been close to 3.5 percent in recent years. Over the long run, this rate of growth will be difficult to sustain as the economy converges closer to EU levels. Labor productivity growth is thus assumed to decline to 3 percent by 2008 and, in the baseline case, stay at 3 percent over the long run.

Labor force participation is assumed to rise marginally due to active employment policies and an increase in activity by the elderly, and to stabilize at 73.6 percent in the long run. The unemployment rate is also assumed to be lowered to 5.4 percent, following the assumptions in the Convergence Program (Ministry of Finance, 2005). With the working-age population gradually declining, this translates into negative employment growth of -0.7 percent over the long run.

GDP growth, which is derived from labor productivity and employment growth, gradually declines and stabilizes around 2.5 percent.

A **discount rate** of 4 percent is assumed, based on an average nominal interest rate on public debt of around 7 percent and a long-run inflation rate of 3 percent.

The **relative age and gender profiles** for tax revenues, social security taxes, expenditures, and other revenues were obtained from Ministry of Finance (see Appendix II). Although there is uncertainty over the age profiles because of the populations' changing behavioral responses, it is assumed for simplicity that the age profiles remain stable. Since the age profiles are not adjusted over time to reflect certain policy changes, such as an increase in the retirement age, an upward bias is imported to the results through lower revenues.

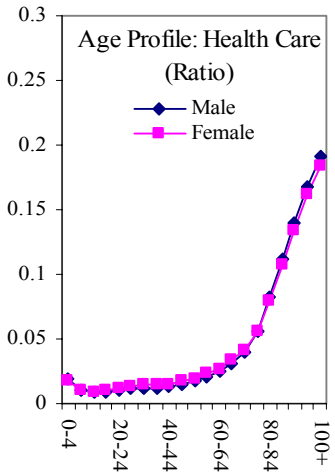
For **aggregate taxes and transfers**, consolidated general government fiscal data up to 2005 and medium-term budget projections through 2007, based on a functional classification, were obtained from the Ministry of Finance. Longer-term projections for fiscal aggregates are based on labor productivity growth assumptions, as described in the baseline scenario.

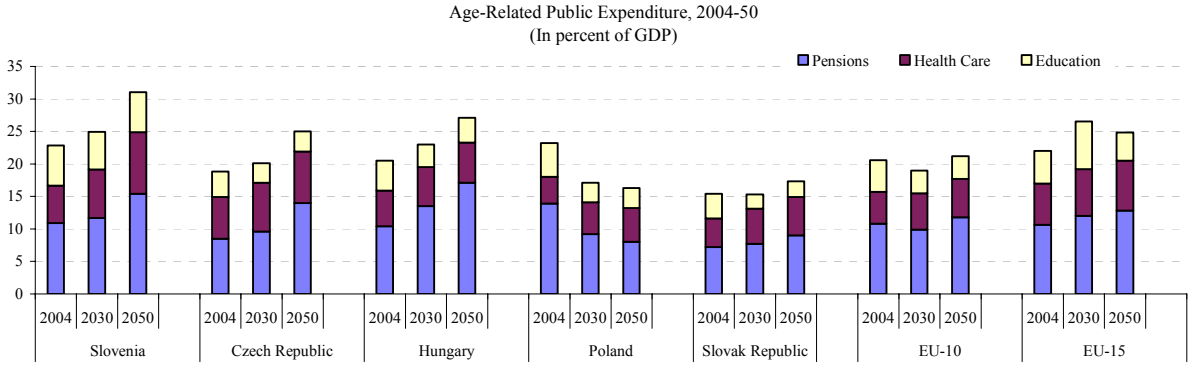
D. Simulation Results

Baseline scenario

58. **In the baseline scenario, age-related expenditures are expected to rise considerably while revenues as a share of GDP will remain more stable** (text figures). Income taxes and social security contributions, assumed to grow on a per capita basis at the same rate as labor productivity growth, decline. As the GDP growth rate is also declining due to the shrinking labor force, the decline in revenues as a share of GDP is relatively small. Consumption taxes, such as the value-added and trade taxes, also assumed to grow in line with productivity growth, increase as a share of GDP since consumption by the elderly population is expected to remain high.

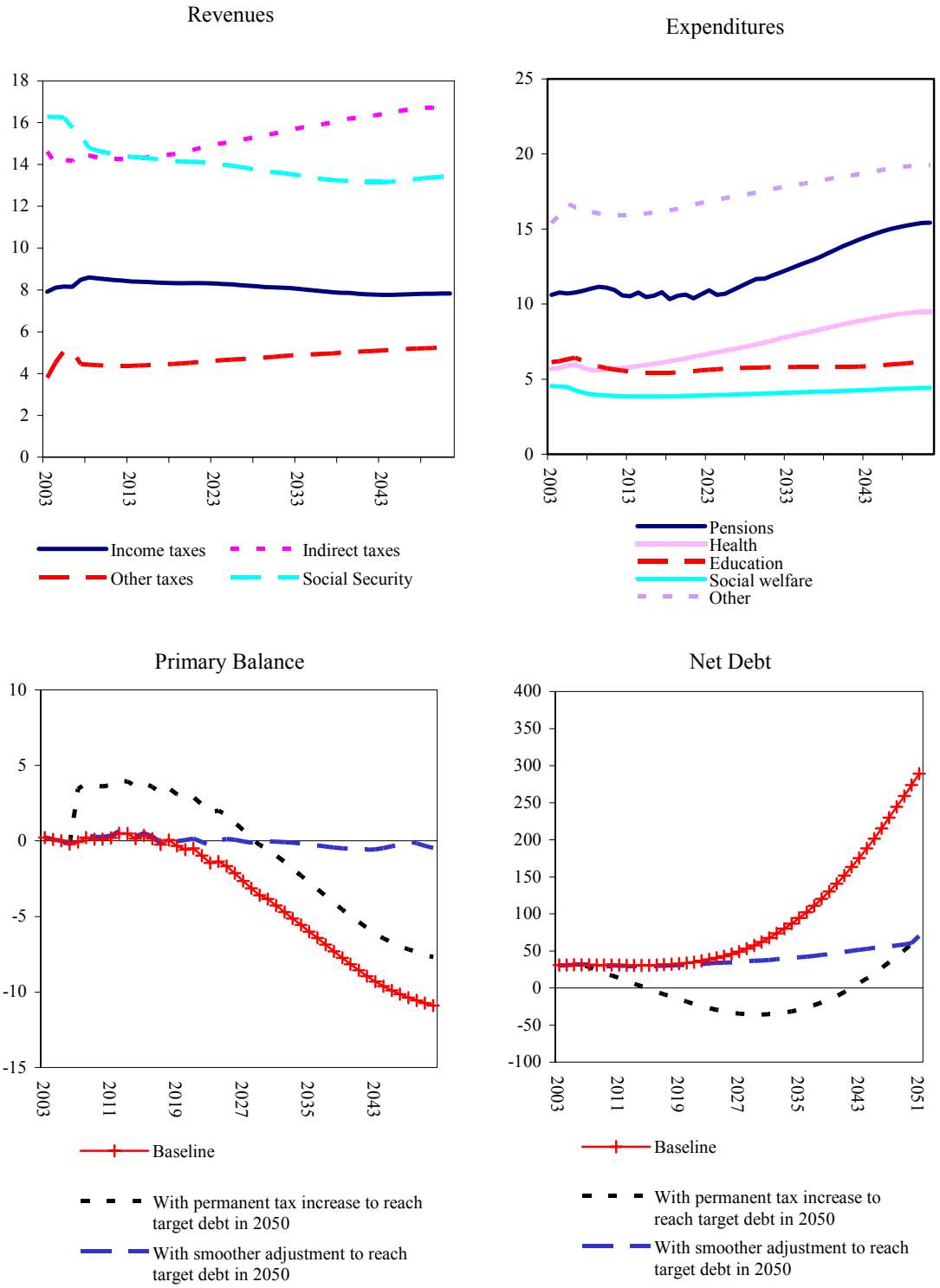
59. **On the expenditure side, pensions and health care expenditures are expected to rise by over 7 percent of GDP**. These costs will not be offset by the savings from education and social benefits. The simulations assume that health expenditures are also expected to grow at the same rate as wage growth. Historically, real per capita health spending has been higher than productivity growth in Slovenia. International experience has also shown that per capita health care costs usually rise faster than productivity growth, reflecting the high income elasticity of demand and rising costs of pharmaceuticals and advanced medical technologies. The increase in the population aged above 80 years will also drive up the costs of long-term care, as indicated by the age profile of health care costs (text figure). Another important factor affecting health care costs is the morbidity rate. If an increasing number of elderly are living healthier lives, the age profiles will show a gradual shift to the right, dampening the total increase in costs over the long run. Given these trends, total age-related expenditures in Slovenia is expected to rise to one of the highest levels in Europe by 2050 (text figure).





Sources:Aging Working Group (2006); Statistical Yearbook of Slovenia (2005); EUROSTAT; Convergence Program of the Slovene Republic (2005); and staff calculations.

Slovenia: Fiscal Impact of Aging, 2004-50
(In percent of GDP)



Source: Staff estimates.

60. **Consequently, a widening primary deficit will lead to an unsustainable debt position.** In this scenario, primary deficit and net debt are projected to reach around 10 and 300 percent of GDP, respectively, by 2050. Net debt is projected to pick up significantly beyond 2017, reaching a threshold of 60 percent by 2030. Rising interest costs will push debt up further to unsustainable levels. Calculations of the intertemporal fiscal sustainability gap—measured as the ratio of net present value of debt to the net present value of GDP over the next 150 years, indicating the permanent fiscal adjustment needed to fulfill the intertemporal budget constraint—corresponds to around 10 percent of GDP. An alternative measure of the fiscal gap, calculated as the size of permanent fiscal adjustment needed to reach a target debt-to-GDP ratio of 60 percent by 2050, is equivalent to nearly 5 percent of GDP (text figure). The same target debt-to-GDP ratio can also be achieved by a smoother adjustment path, which seeks to make incremental structural adjustments by offsetting the age-related spending pressures and targeting a position close to fiscal balance position.

61. **While these results are very sensitive to the underlying assumptions on productivity and interest rates, sensitivity tests using alternative values of productivity and interest rates also suggest a wide fiscal gap** (text table). In the model, productivity growth affects the fiscal gap measure through two different channels resulting in an asymmetric impact. First, a faster productivity growth leads to higher per-capita age-related expenditures since they are assumed to grow in line with wages, which, in turn, are set equal to productivity growth rates. On the other hand, it lowers the fiscal gap measure as it increases per-capita age-related revenue and also directly increases the level of GDP. The interest rate affects the fiscal gap measure through its impact on the discount rate. Under these alternative assumptions, the fiscal gap remains sizable.

Intertemporal Fiscal Gap 1/

(In percent of GDP)

Baseline scenario	10.2
(Productivity growth (3%) and interest rate (4%))	
Higher productivity growth (3.5%)	12.5
Lower productivity growth (2.5%)	10.5
Lower interest rate (3.5%)	17.1
Higher interest rate (4.5%)	7.9

1/ Immediate change in taxes needed to meet the intertemporal budget constraint.

62. **Delaying fiscal adjustment will be costly**. The demographic shift has already begun to exert fiscal pressure, though mitigated by the effect of the pension reform started in 2000. The costs are expected to pick up even more rapidly after 2023, when these reforms will be fully phased in. Given the lag with which pension and health care reform will have an impact, there is a need to use this window of 10 to 15 years to step up additional reform measures to ensure long-term debt sustainability. In fact, under the currently approved policies, the simulations show that if the tax or expenditure adjustment is delayed by a year, the additional adjustment needed to close the fiscal gap would rise by 1/8 percent of GDP.

Alternative scenarios

63. **Given these projections, a comprehensive reform agenda will be needed to restore fiscal sustainability.** To analyze the fiscal impact of reforms, several measures to reform the public pension system are considered (see Appendix IV). They include, over the

long run, (i) increasing the retirement age to 65; (ii) lowering the net replacement rate from 70 percent to 52 percent; and (iii) indexing pensions to prices. Under each of these scenarios, the intertemporal fiscal gap will be reduced but would still remain significant (text table and text figures). This underscores the need for systemic reform of pensions rather than marginal parametric reforms. The projections show that increases in health care costs and non-age-related spending relative to GDP are also key drivers of the fiscal gap. Hence, the impact of slower growth of per capita health and non-age-related spending, set to lag productivity growth by half a percentage point, is also simulated. These measures also help to narrow the fiscal gap considerably, which suggests the importance of containing these nonpension costs. Indeed, as an example, a scenario that closes the fiscal gap would require an integrated pension reform through lower net replacement rate and extended retirement age, along with adjustments to lower the growth of non-age-related spending.

Intertemporal Fiscal Gap 1/

(In percent of GDP)

Baseline scenario (Productivity growth (3%) and interest rate (4%))	10.2
Combined reform scenario: lower NRR, extended retirement age, lower non-age related spending	-0.3
Tighter non-age related spending	3.1
Extended retirement age	5.7
Lower net replacement rate	6.2
Lower pensions indexation	4.1
Tighter health care spending	6.4

1/ Immediate change in taxes needed to meet the intertemporal budget constraint.

Intergenerational burden

64. **To a certain extent, making fiscal adjustments to restore sustainability would be more fair across generations.** In the baseline case simulated above, we observe that fiscal policy is more generous to future generations, as implied by the intergenerational gap (text table and Appendix II). This measures the intertemporal fiscal gap under the hypothetical scenario that future generations pay the same net taxes as the current generation. In this case, the intergenerational fiscal gap is smaller than the intertemporal fiscal gap, which implies that the net taxes paid by the future generations were lower than the current generation, in the first instance. This corroborates the unsustainable outlook for current policies. In this situation, any fiscal adjustment policy that increases the net tax burden on future generations would serve to balance the burden across generations.

Generational Fairness (In percent of GDP)

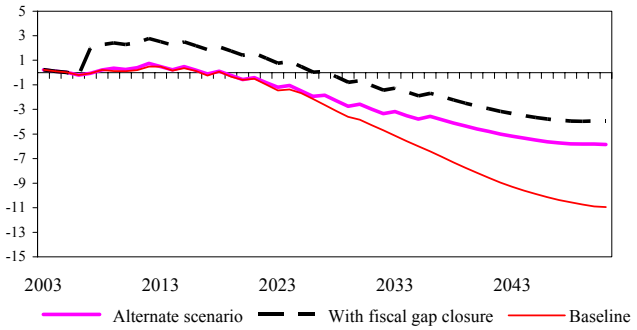
	Baseline	Integrated Reform
Intertemporal fiscal gap	10.2	-0.3
Intergenerational balance gap	0.7	1.6

Source: Staff calculations.

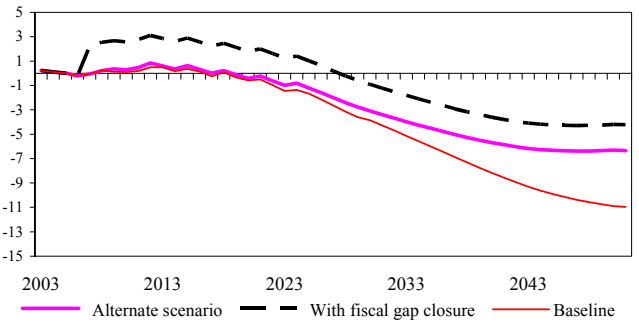
65. **Nevertheless, reforms that restore a sustainable fiscal position would need to go beyond this rebalancing, thereby imposing a heavier burden on future generations.** This can be seen in the scenario with an integrated pension and nonage spending reform, where the intergenerational gap becomes larger than the intertemporal fiscal gap. In other words, because the net tax burden on the current generation is lower under the reform scenario, if future generations paid the same net taxes as the current generation, the fiscal gap would widen. Any credible reform program would thus place a significant burden on future generations, and early implementation of fiscal reform is needed to minimize this burden.

Primary Balances
(In percent of GDP)

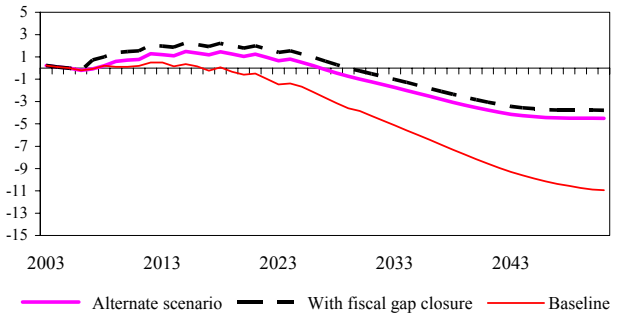
With Extended Retirement Age



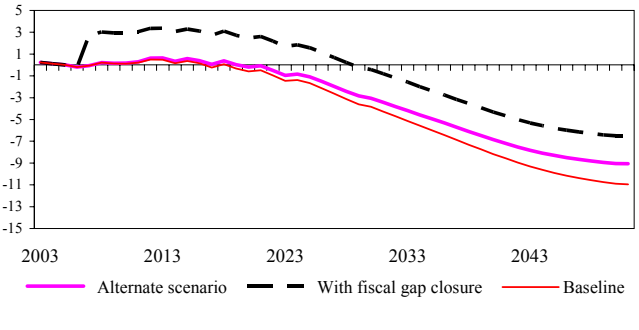
With Lower Net Replacement Rate



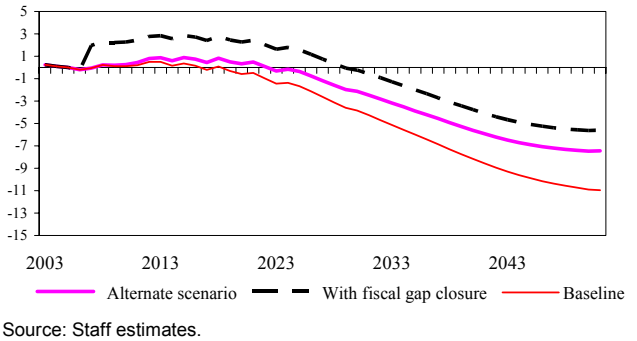
With Lower Indexation



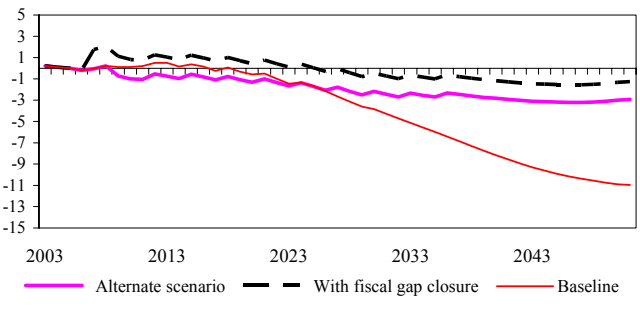
With Lower Health Care Costs



With Lower Non-Age Spending



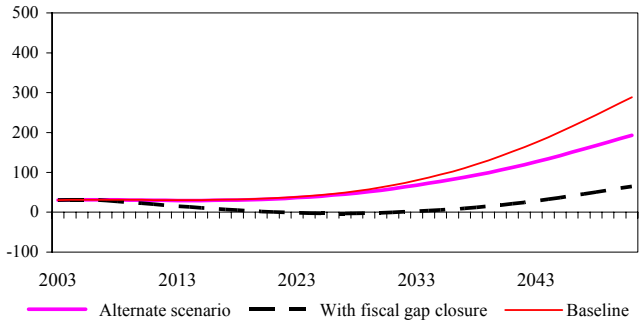
With Combined Reform



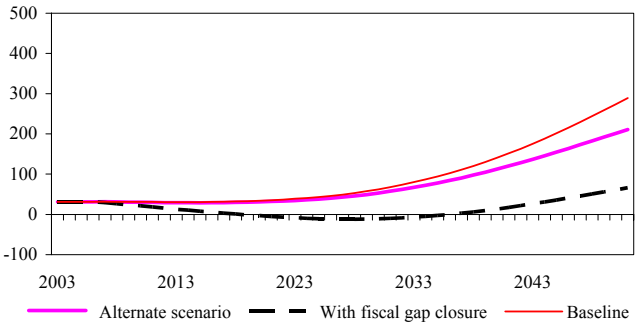
Source: Staff estimates.

Net Debt
(In percent of GDP)

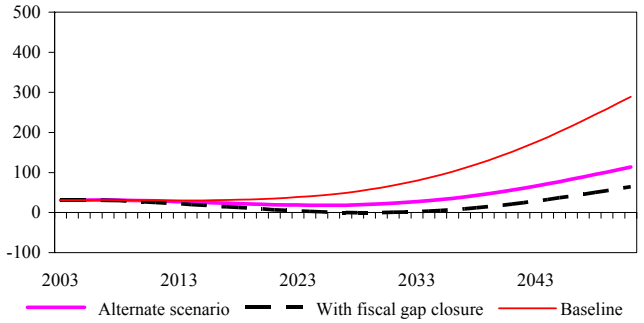
With Extended Retirement Age



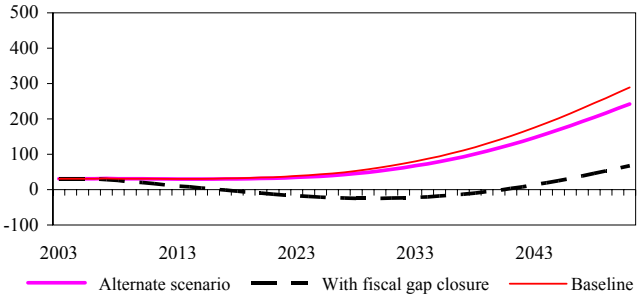
With Lower Net Replacement Rate



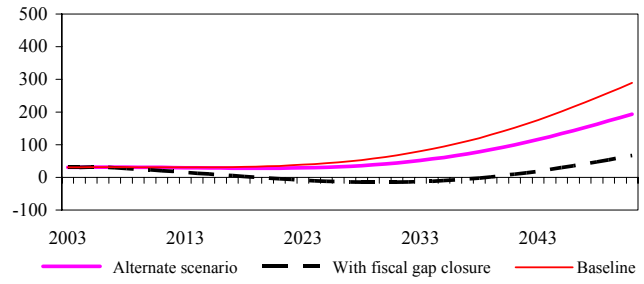
With Lower Indexation



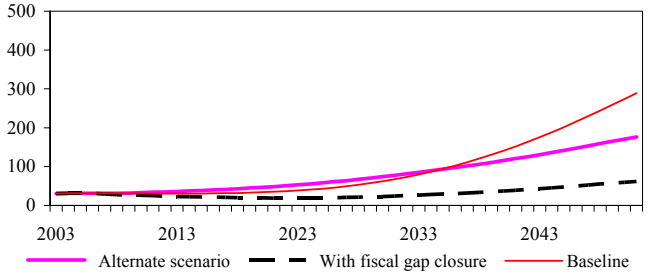
With Lower Health Care Costs



With Lower Non-age Spending



With Combined Reform



Source: Staff estimates.

E. Conclusions

66. **A large demographic shift, early retirement, and a rigid fiscal structure will pose significant challenges for fiscal policy in the coming decades**. These trends will lead to a significant deterioration of public finances and adversely impact debt sustainability and macroeconomic stability. This chapter draws the following conclusions:

- Early and comprehensive action is needed to deal with the age-related spending pressures. Such measures should seek to (i) reform the pension system on a more systemic basis through an increase in the effective retirement age and a reduction in the generosity of benefits, and, (ii) contain the costs of publicly provided health care and non-age-related spending.

- To withstand aging pressures and contain debt within the Maastricht criterion, fiscal adjustment plans need to be more ambitious in trying to reach fiscal balance or a small surplus over the medium term.

- Considering the long lags with which reforms have a fiscal impact, early action is warranted. Delays in reforms will be costly in terms of additional adjustment needed in the future to restore sustainability and will also pose a higher adjustment burden on future generations.

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Appendix I
The Pension System in Slovenia

The pension system in Slovenia comprises a mandatory, defined-benefit, pay-as-you-go public pension insurance scheme and a voluntary supplemental pension system. The pay-as-you-go scheme covers old-age, disability, survivors', and widow's benefits, provided through earnings-related benefits. In addition, a state pension is provided on a means-tested basis. The Pension Fund is also responsible for noncontributory state benefits for select groups, such as farmers, policemen, customs officers, and war veterans, through various legal mandates. In 2005, expenditure on pensions stood at 10.7 percent of GDP. In addition to this first pillar, fully funded voluntary supplemental pension schemes offered through mutual fund and insurance companies also exist. A key player is the state-owned Pension Management Fund (Capital Fund), which manages the Capital Mutual Pension Fund. The latter is a mandatory supplementary scheme for certain occupational groups and a pension fund where privatization certificates can be saved. The total assets of collective voluntary occupational schemes were 1.4 percent of GDP in 2004.

In 1999, the Slovene authorities approved a far-reaching pension reform program. Substantial parametric reforms were approved, to be phased in by 2024. Key measures included (i) lowering the accrual rate from 85 percent to 72.5 percent for full pension service years (40 years of service for men and 38 years for women); (ii) lengthening the period of assessment of wages from 10 to 18 best consecutive years of earnings; and (iii) increasing the full pensionable retirement age to 63 for men and 61 for women with a minimum 20 years of service (Majcen, Nieuwkoop and Verbic, 2005, Government of Republic of Slovenia, 2005). The reform plan also eschewed introduction of a mandatory second-pillar pension system. These reform measures were also applied to existing pensioners in order to ensure generational equity. With these reforms and given the indexation and valorization mechanisms, pension growth was set to lag wage growth at an increasing rate over time. In 2005, this indexation policy was changed, and pension indexation was set to grow at the same rate as wage growth, adjusted for the reduced benefits under the reform plans. It is envisaged that, after these measures are fully phased in, the net replacement rate will stand at 56 percent of wages.

Despite these reforms, which are being phased in very gradually, the pension benefits remain relatively generous. The average net replacement rate— the level of old-age pension benefits relative to wage levels—was close to 70 percent in 2005, one of the highest among new EU member states. Key parameters, such as the period for assessing wages that is used to calculate the pension base and the indexation of average pensions to wage growth, remain generous. The full pensionable age, even after the reforms, is still low by EU-15 standards, and workers can retire even earlier with full pensions depending on the number of children. Significant number of retirees also exit the system through disability pensions.

Appendix II
Generational Accounting Model

Projection methodology

Let X_t denote the aggregate transfer of health care benefits in the base year. This can be expressed as the sum of transfers to different age groups, i, as

$$X_t = \sum_1^{100} X_{i,t} ,$$

where $X_{i,t}$ is the transfer to the age cohort i at time t. $X_{i,t}$ can be calculated using the relative age profile, $R_{i,t}$, which attributes the share of the total transfers to the different age groups:

$$X_{i,t} = R_{i,t} X_t .$$

To project forward the age-specific transfers, the per capita transfers are calculated as

$$A_{i,t} = \frac{X_{i,t}}{P_{i,t}} ,$$

where, $A_{i,t}$ denotes the per capita transfer to an individual of age i at time t; and $P_{i,t}$ is the number of individuals in this age cohort. In other words, the aggregate transfers can also be calculated as

$$X_t = \sum_1^{100} A_{i,t} P_{i,t} .$$

The projection for each of the transfers would thus depend upon the growth of the per capita transfers, g, and the population growth within each cohort:

$$X_{t+1} = \sum_1^{100} A_{i,t+1} P_{i,t+1}$$

$$X_{t+1} = \sum_1^{100} A_{i,t} (1+g) P_{i,t+1} .$$

The growth of the per capita transfers is typically linked to per capita productivity growth to reflect the indexation to wages. If the transfers are indexed only to inflation, however, per capita growth would equal zero.

It is also assumed that the relative profile remains constant:

$$R_{i,t} = R_i .$$

Thus, transfers are projected as

$$X_{t+1} = \sum_1^{100} \frac{R_i X_t P_{i,t+1}}{P_{i,t}} (1+g) .$$

Under some scenarios, such as an extension of the retirement age, the relative age profile is allowed to vary for specific variables, such as income taxes, social security contributions, and pensions. Similarly, depending on the healthiness of the aging population, the age profile for health care can also be shifted to the right if more of the elderly are expected to live healthier lives..

Generational accounts

The generational account of an individual measures the present value at time t of the average remaining lifetime net tax payment. This is defined as

$$N_{t,k} = \sum_{s=\max(t,k)}^{k+100} T_{s,k} \frac{P_{s,k}}{P_{t,k}} (1+r)^{-(s-t)} .$$

Here, $T_{s,k}$ is the projected average net tax payment to the government in the year s by a member of the generation born in the year k, which essentially represents the sum of the per capita transfer (or tax) $A_{k,s}$ of an individual born in the year k across all the government taxes and transfers at time s. The term $\frac{P_{s,k}}{P_{t,k}}$ is the proportion of members of cohort k alive at time t who will also be alive at time s. The net tax payments are discounted using the real discount factor, r. Thus, the generational account captures the *average* present value over all net tax and transfer payments, as well as probability of survival.

Intertemporal fiscal gap

The intertemporal fiscal gap, based on a dynamic analysis of fiscal policy, is defined as the imbalance in the intertemporal budget constraint. This constraint simply states that in present value terms, the future net tax payments of current and future generations should cover the government's future purchases of goods and services and the initial net debt. Formally, the intertemporal budget constraint, is expressed as

$$\sum_{s=0}^{\infty} G_{t+s} (1+r)^{t-s} + D_t = \sum_{s=0}^{100} N_{t,t-s} P_{t,t-s} + \sum_{s=1}^{\infty} N_{t,t+s} P_{t,t+s} (1+r)^{t-s},$$

where G is the government's purchase of goods and services, D is the initial net debt, and $N_{t,k}$ is the generational account in year t of an individual born in year k. The first term on the right-hand side thus represents the net tax payments over the remaining lifetime of the currently living generation, while the second term is the present value of the net tax payments of future, yet unborn, generations. The intertemporal fiscal gap is calculated as the immediate and permanent adjustment in taxes or expenditures needed to ensure that the above constraint holds:

$$IBG = [\sum_{s=0}^{\infty} G_{t+s} (1+r)^{t-s} + D_t - \sum_{s=0}^{100} N_{t,t-s} P_{t,t-s} - \sum_{s=1}^{\infty} N_{t,t+s} P_{t,t+s} (1+r)^{t-s}] / GDP .$$

Intergenerational balance gap

The intergenerational balance gap is a hypothetical calculation of the intertemporal budget gap based on the assumption that net tax payments of the future generation are the same as that of the newborn in the currently living generation, adjusted for growth:

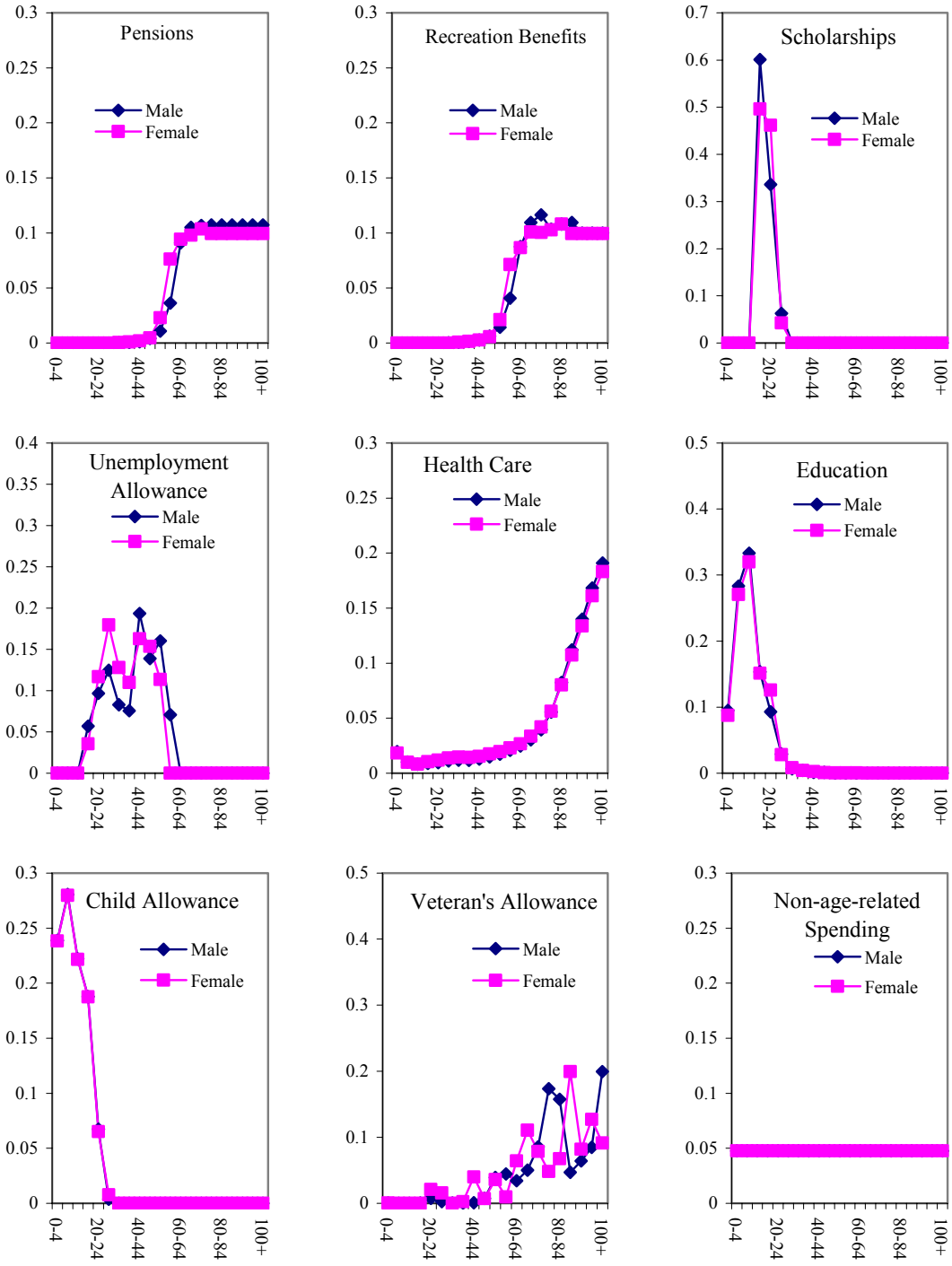
$$\sum_{s=1}^{\infty} N_{t,t+s} P_{t,t+s} (1+r)^{t-s} = \sum_{s=1}^{\infty} N_{t,t} (1+g) P_{t,t+s} (1+r)^{t-s} .$$

$$GBG = [\sum_{s=0}^{\infty} G_{t+s} (1+r)^{t-s} + D_t - \sum_{s=0}^{100} N_{t,t-s} P_{t,t-s} - \sum_{s=1}^{\infty} N_{t,t} (1+g) P_{t,t+s} (1+r)^{t-s}] / GDP .$$

Thus, *IBG* will be greater than *GBG* if $N_{t,t+s}$ is lower than $N_{t,t}(1+g)$. In other words, if the current policy is favorable to future generations such that the net taxes owed by a member of the future generation are lower than those of a currently newborn, the intertemporal budget gap will be wider than the intergenerational balance gap. For further details on these concepts, see Cardarelli, Sefton, and Kotlikoff (2000).

Appendix III

Slovenia: Age and Gender Profiles, 2003
(Ratio)



Source: Ministry of Finance of Slovenia.

Appendix IV
Pension Projections

The evolution of public pensions as a share of GDP depends on the pension system's level of generosity, the number of people receiving pension benefits, and the productivity and effort of the labor force. More specifically, the ratio of pension expenditure to GDP can be expressed as the following:

$$\frac{\text{Pension Expenditure}}{\text{GDP}} = \frac{\text{Average pension benefits}}{\text{Average productivity}} * \frac{\text{Number of pensioners}}{\text{Number of employed}}$$

$$= \frac{\text{Average pension benefits}}{\text{Average productivity}} * \frac{\text{Number of pensioners}}{(\text{Population} > 55)} * \frac{(\text{Population} > 55)}{(15 < \text{population} < 64)} * \frac{(15 < \text{population} < 64)}{\text{Number of employed}}$$

$$= \frac{\text{Average pension benefits}}{\text{Average productivity}} * \frac{\text{Number of pensioners}}{(\text{Population} > 55)} * \frac{(\text{Population} > 55)}{(15 < \text{population} < 64)} * \frac{1}{\text{empl rate} * \text{participation rate}}$$

= Benefit Effect (*BE*) * Eligibility Effect (*ELIGE*) * Aging Effect (*AE*) * 1/Employment Effect (*EMPE*),

where

Aging Effect = (Population > 55)/(15< population <64)
Eligibility Effect = (Number of pension recipients) / (Population > 55)
Benefit Effect = Average benefits / Average productivity
Employment Effect = Number of employed/(15< population <64)
= Employment rate * Labor participation rate.

The contribution of each of these factors can be derived by differencing the log-linearized version of the equation above:

$$\frac{d\,(\text{Pension Expenditure /GDP})}{d(t)} = \left[\frac{d\ln(BE)}{d(t)} * \frac{d\ln(ELIGE)}{d(t)} * \frac{d\ln(AE)}{d(t)} * \frac{d\ln(EMPE)}{d(t)}\right] * \frac{\text{Pension Exp}}{\text{GDP}\ (t=0)} + \text{err}$$

where Pension Exp/ GDP (t=0), measures the pension expenditure in the initial period. To minimize the residual, the difference is taken over the short period of a year and summed over the entire period (Eskesen, 2002).

The baseline scenario follows the assumptions in the Convergence Program of Slovenia. It is assumed that labor activation policies adopted by the Slovene government will help to lower the unemployment rate by 1 percentage point from the current 6.4 percent to 5.4 percent by 2020 and stabilize at this level thereafter. Similarly, the labor participation rate is assumed to increase from 68 to 73.6 percent by 2050 on account of these and other legislative measures to increase the full pensionable age. The demographic shift also affects the participation rate as the number of elderly with a lower participation rate increases. The number of pension recipients is also assumed to rise reflecting an increase in the average effective retirement age to 62 by 2023, in line with the approved pension reforms. It is also expected that average benefits will decline due to the reform measures introduced in 2000. The replacement rate is expected to decline from 70 percent to 62 percent by 2030 as per the estimates on the impact of the pension reform outlined in World Bank (2004). Average productivity growth is also

assumed to decline gradually from 3.5 percent to 1.7 percent by 2050 as the economy converges to higher income levels and growth slows down. Under these assumptions, pension expenditure is expected to rise rapidly after 2024 to almost 16 percent of GDP by 2050.

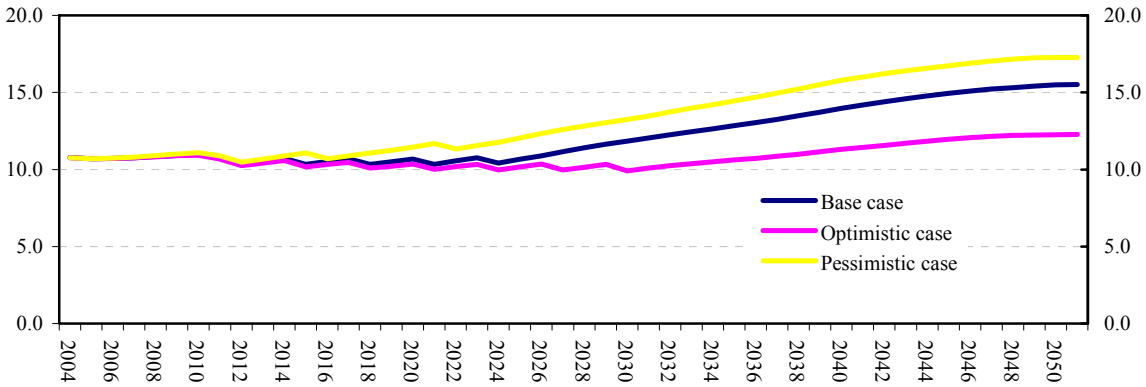
Pension projections are very sensitive to underlying assumptions (Appendix figures). An optimistic scenario is projected assuming stronger productivity growth, higher labor participation by the elderly, and further pension reform to lower the benefits level. Specifically, the labor participation rate is assumed to be higher by 1 percentage point, and the net replacement rate is assumed to decline further to 49 percent of wages over the long run. Labor productivity growth is expected to stay constant at 3.5 percent at current levels. Although the labor productivity growth rate is assumed to be higher, it does not reduce pension expenditure as a share of GDP because wages, to which pension benefits are indexed, also grow in line with productivity. In this scenario, pension benefits as a share of GDP rise to 12.3 percent. Under a more pessimistic scenario, when the average retirement age is assumed to increase only to 59 years, the eligibility effect will lead to higher pension expenditure than in the baseline case. Similarly, the labor participation rate is expected to rise to 71 percent by 2050. In this scenario, pension expenditure is expected to rise to 17.3 percent.

In each of the three cases, the demographic effect contributes the most to the rise in pension expenditure (Appendix figures). Despite the negative contribution of the eligibility effect, the benefits effect, and the employment effect, these do not offset the impact of population aging. Even under the optimistic scenario, when benefits are assumed to decline further and the number of retirees declines relative to the base case—as the elderly work longer—the demographic effect dominates.

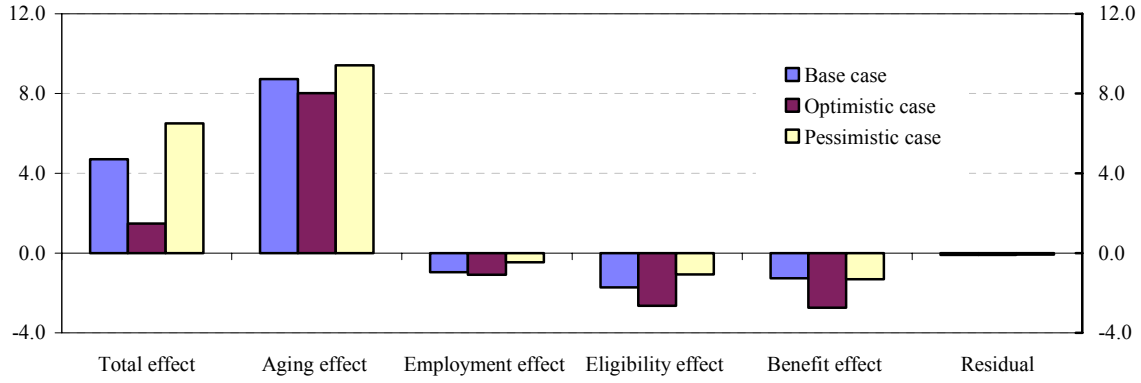
To analyze the impact of pension reform on debt sustainability, alternative scenarios showing the impact of pension reform on pension expenditure are also projected (Appendix figures). Four different scenarios are considered. First, we consider the impact of a gradual increase in the average effective retirement age from 61 years to 63 years—2 years beyond the baseline scenario assumption. The demographic pressure on pension expenditure is delayed, with a reduction of over 2 percent of GDP by 2050 relative to the baseline. Second, benefit reform—such as through an increase in the number of years used for calculating the pension base—that results in a further lowering of the entry net replacement rate to 52 percent is assumed. This estimate corresponds to the replacement rate under the reforms implemented in 2000 but before the indexation to wages introduced in 2005. In this case, the rate of increase of pension expenditure is lowered, although it still remains high at over 13.5 percent. Third, a more dramatic reform that indexes existing pensions to prices is estimated. This would substantially lower pension expenditure, to 8.0 percent of GDP through 2025, as the impact of pension reforms is also evident. Subsequently, demographic pressure increases spending to 11 percent of GDP. Last, a combined scenario that incorporates an increase in the retirement age and a decline in the entry net replacement rate is considered. In this case, pension expenditure is contained at around 11 percent of GDP over the next 50 years.

Slovenia: Pension Projections, 2004-50
(In percent of GDP)

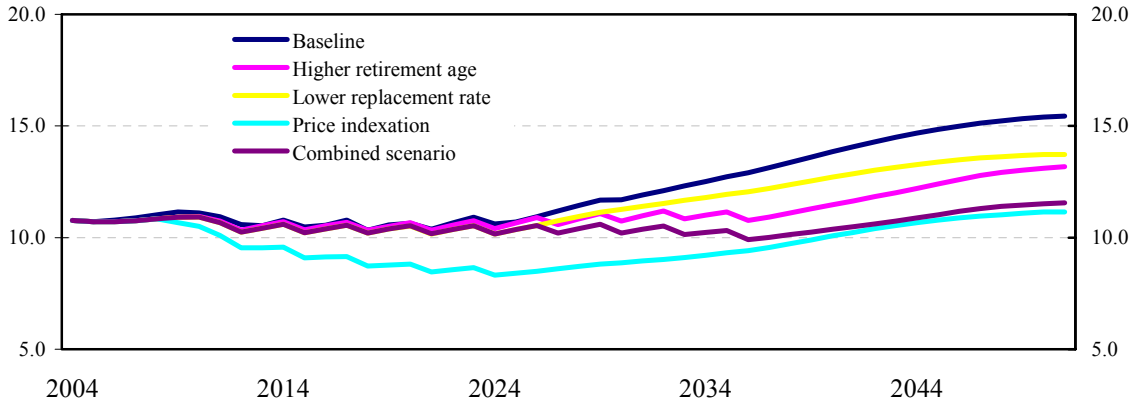
Pension Expenditure



Contribution to Pension Expenditure



Pension Reform Alternative Scenarios



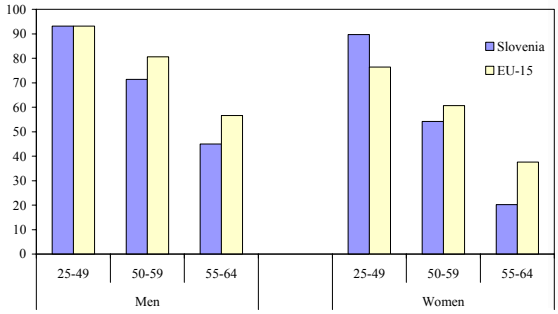
Source: Staff calculations.

IV. Retirement Incentives in the Pension System in Slovenia[31]

A. Introduction

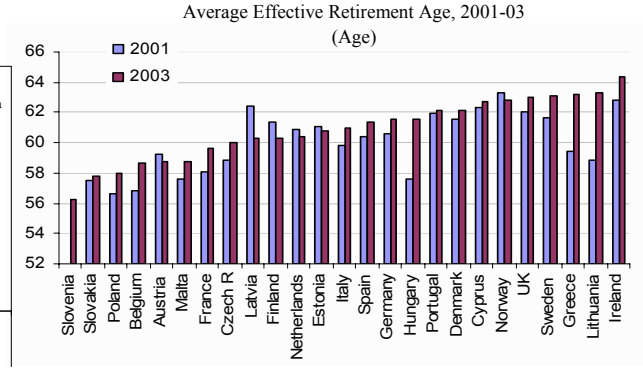
67. **The labor force participation rate among the elderly in Slovenia is very low, consistent with a trend of early retirement.** Compared with the EU-15 countries, labor participation rates are lower by nearly 10 percentage points for the population aged between 50 and 59. This is a sharp drop from the high activity levels—higher than that of the EU-15 among women—for the working-age population between the ages of 25 and 49. These early exits from the workforce have led to an average effective retirement age that is the lowest among the EU-25 countries (World Bank, 2005). For a society expected to age at one of the fastest paces in Europe, such a retirement problem will exacerbate the fiscal pressures arising from age-related spending over the coming years.

Labor Participation Rates in Slovenia and EU-15, 2005
(In percent)



Source: Eurostat.

Average Effective Retirement Age, 2001-03
(Age)



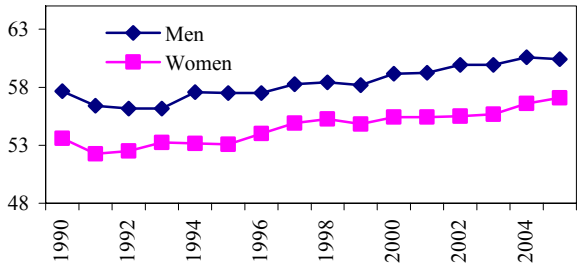
Source: World Bank (2005).

68. **Recognizing this problem, the Slovene government began implementing a pension reform in 2000 that sought to increase working years for the elderly.** The full pensionable age of retirement—for which a minimum number of years is required to qualify—was increased and gradually phased in. For men, the 2005 full pensionable age stood at 60 years and 6 months; this is expected to rise to 63 years by 2009 for 20 minimum years of work. Similarly, for women, the full pensionable age as of 2005 stood at 55 years and 4 months and is expected to reach 61 years by 2024. At the same time, incentives to continue working have been built in. Workers can retire earlier, with a penalty, provided a minimum qualifying period of 40 years has been achieved, and they can earn a bonus accrual for working beyond the full pensionable age.

[31] Prepared by Anita Tuladhar.

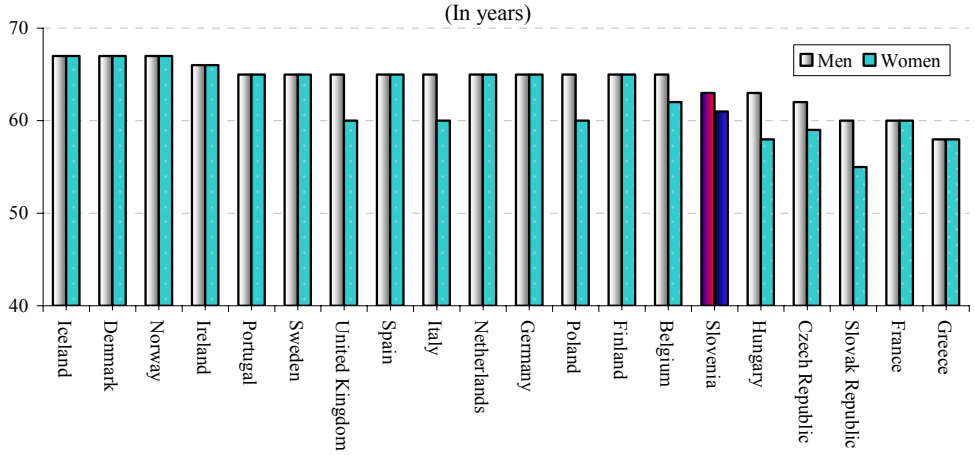
69. **While the average retirement age has been gradually rising (text figure) as a result of these rules changes, there still remains scope for further improvement.** The newly approved retirement age still remains low by current EU-15 standards (text figure), and the new rules also allow a reduction in the full pensionable age, depending upon the number of children. Furthermore, a large number of pensioners retire through alternative paths, such as the disability pensions, due to their generous benefits. In 2005, 12 percent of the population aged 55-59 years was on disability pensions. Nearly 4 percent of the new old-age pensioners retired early with a penalty. This situation raises concerns that the newly approved increase in the statutory retirement age may not be binding over the longer term.

Average Retirement Age, 1990-2005
(In years)



Source: Ministry of Labor, Family and Social Affairs.

Statutory Retirement Age
(In years)



Source: OECD (2004); and Slovene authorities.

70. **Using a simulation of retirement benefits to calculate the optimal retirement age, this chapter examines whether the new public pension system provides incentives for early withdrawal from the labor market**. Several studies have documented that the retirement incentives built into the pension system are one of the key factors for deciding the timing of the exits from the labor market and, thus, the effective retirement age (Coile and Gruber, 2000). The analysis finds that the currently approved system may still provide incentives to withdraw early from the labor market. Estimates of retirement incentives show that, for men, it could be beneficial to retire as early as age 61, two full years ahead of the already-low full pensionable age. A scenario analysis shows that these incentives exist even under alternative assumptions on valorization and indexation. The incentives are particularly strong for low-and-high income earners. This situation calls for a further review of the penalties and bonuses and other parameters in the pension system to ensure that the effective retirement age increases.

B. Literature

71. **In this chapter, the retirement incentive is being estimated using the social security wealth (SSW) accrual method, to provide an indicator of possible retirement behavior.** This accrual methodology is based on the incremental gains in retirement wealth from one additional year of work. Similar estimates have been used to test whether these retirement incentives indeed explain the retirement behavior in the population, after taking into account other social and institutional factors that affect retirement decisions (Hausman and Wise, 1985, and Yuan and Yun, 2005). Using a survey data set of workers' work and earnings histories, along with a projection of earnings, the incremental benefits of retirement at different ages and their distribution are simulated to derive the retirement incentives faced by the population and the optimal retirement age. After controlling for other factors that affect retirement behavior, such as marital status, health, education, and type of employment, they find that SSW and retirement incentives were significant factors in affecting retirement decisions of workers in China and Korea.

72. **This chapter will also take into account the literature focusing on more forward-looking measures of incentives.** The studies have also examined retirement incentives based on the evolution of future wealth with additional years of work, not limiting the analysis to an incremental benefit over one year alone. This is because accrual patterns are nonmonotonic, and multiyear accruals can have very different incentives than a single-year accrual. Working beyond the statutory retirement age is then equivalent to buying an option on the more-than-fair actuarial adjustments. Stock and Wise (1990) use an option value methodology to calculate the optimal retirement decision as a function of the difference between the utility from retirement today and the utility from an optimal date in the future. This methodology is based on the indirect utility function over work and leisure and calculates the optimal retirement date in the future. An alternative methodology is the peak value measure, which combines the accrual methodology with the option value methodology principles (Coile and Gruber, 2000). This chapter also uses a peak value measure to supplement the analysis.

C. Methodology

73. **As a first step for the simulation, the pension benefit for an individual is calculated based on pension rules approved under the 2000 reforms.** The pension benefits are earnings related, and eligibility depends upon a combination of the minimum qualifying period and age (text table). Workers can retire as early as age 58, provided the minimum-pension-qualifying period of 40 years (38 for women) is met. However, if the years of service—which can be lower than the pension-qualifying period, since the latter can be purchased under specific conditions—are still below 40 (38 for women), a

Full Pensionable Age (In years)

Men	Minimum Qualifying Period	Women	Minimum Qualifying Period
58	40	58	38
63	20	61	20
65	15	63	15

Source: Slovene authorities.

penalty will be imposed depending on the age of the retiree (see Appendix I).

74. **The amount of pension benefits depend upon a few key policy variables.** They are (i) the **valorization of wages,** which is the method used for assessing wages when calculating the pension base; and, (ii) **the service factor**, which is the rate at which pension benefits are accrued:

- The **valorization of wages** depends upon the *valorization rate* and the time *period used for assessing wages*. In Slovenia, the valorization rate is linked to the rate of pension indexation, which has been lagging wage growth. As a result, it has been a key factor in containing pension expenditure. However, with the reindexation of pensions to wages, the valorization rate is expected to gradually pick up from its current level. The assessment period for wages is expected to gradually increase from the 10 to the 18 best consecutive years as part of the 1999 pension reforms. This will have the effect of reducing the pension base as lower wage levels are included in the calculation. More specifically, the pension base is the average of the18 best consecutive years' annual wage assessments:

$$\text{Pension base} = \frac{\sum_{t=A-18}^{A} (\text{annual wage } (t) * \prod_{s=t}^{A} \text{valorization rate } (s)),}{18}$$

  where A is the age of retirement.

- The **service factor** is determined by the *accrual rates*, *years of service*, and *penalty and bonus rates* that provide actuarial adjustments for early and deferred retirement. More specifically, the accrual rate in the Slovene pension system is 35 percent for the first 15 years of service and 1.5 percent for every additional year of service. Depending upon the age of retirement, different penalty and bonus rates would apply as follows[32]:

$$\text{Service factor} = \begin{cases} (35+1.5*(\text{Service year } -15))*(100-\text{Penalty rate})/100 & \text{before FPA,} \\ (35+1.5*(\text{Service years } -15) & \text{at FPA,} \\ (35+1.5*(\text{Service year } -15))*(100+\text{Bonus rate})/100 & \text{after FPA,} \end{cases}$$

  where FPA denotes the date of full pensionable age. The pension benefit is thus obtained as

$$\text{Pension benefit} = \text{Pension base} * \text{Service factor}/100.$$

[32] See Appendix I for applicable penalty and bonus rates.

75. **Pension wealth is defined as the present discounted value of expected future pension benefits, conditional on probability of survival.** Thus, the estimate of pension wealth is sensitive to the assumptions on *remaining life expectancy*, *pension indexation,* and *the discount rate*. For a married worker, survivor benefits and joint survival probabilities of the worker and dependents would also need to be factored in. Pensions are also taxable in Slovenia. Since pensioners are allowed a higher income deduction, *personal income tax* becomes binding only for those workers earning above the average wage levels, starting at around 150 percent of the average wage. The effective tax schedule used in calculating the net pensions is provided in Appendix II.

76. **Pension accrual is the difference in pension wealth due to an additional year of work.** In other words, if the pension wealth from retiring next year is higher than the pension wealth from retiring today, then the positive pension accrual implies it is optimal to defer retirement. The extra year of work affects the pension benefits through two channels. First, the *accrual effect* implies that the pension wealth increases when working an additional year because the inclusion of a higher wage—for example, due to seniority—increases the pension base. In addition, a larger service factor due to an additional year of service and a larger bonus or a smaller penalty also increases the accrued pension benefit. Second, the *wealth effect* implies that pension wealth is less since benefits are lost for an extra year. We thus estimate the effective implicit tax on deferring retirement from time t to the following year:

$$\text{Effective implicit tax} = \frac{\text{Pension wealth } (t) - \text{Pension wealth } (t+1)}{\text{Wage } (t)}$$

$$= \frac{\text{- Pension accrual } (t)}{\text{Wage}(t)}$$

A negative value for the pension accrual and a positive effective tax rate thus indicate that the pension system likely provides a strong incentive to exit the labor force. A positive effective implicit tax means that the wealth effect dominates the accrual effect, and vice versa. As an alternative indicator that looks at a longer horizon, we also measure the *peak value*, which is derived as the difference between the pension wealth from retiring at the current date and the maximum value of pension wealth achieved by retiring in the future.

D. Simulation Assumptions

77. **For the baseline scenario, we consider a hypothetical male individual who joins the labor force at age 24 and is eligible for full pensions at the age of 63 years (currently being phased in)**. The following assumptions are used to characterize the earnings history of this worker and to calculate the pension base:

- Over the 40-year working period, wages are assumed to grow annually at the same rate as the economy-wide average wages—5 percent, with real wages growing annually at 2.5 percent and inflation at 2.5 percent—plus a seniority increment rate of 1 percent.

- The rate of valorization—which transforms the wages into the pension base—of past earnings is based on pension indexation and has been varying every year. For simplicity, we set the valorization rate equal to the average economy-wide wage growth in the baseline case, as per the rules effective since 2005. However, pension indexation is still expected to lag wages as the new pension rules on accrual factors and assessment period for calculating the pension base—which also affect existing pensioners under the indexation rule—are phased in; this implies an implicit valorization tax. Hence, an alternative valorization tax rate of 0.77 percent of wage growth is used under sensitivity tests in line with the data observed in 2005.

- Pensions are assessed on the 18 best consecutive years of earnings since 1970. Based on the assumption of a monotonic increase in wages, this corresponds to the last 18 years before retirement. Thus, as an example, the annual assessment of 1000 Slovenian Tolars (SIT) earned 18 years ago will be SIT 1000 * (1+.025+.025) ^18. Based on this assessment, the pension base will be calculated as the following:

$$W = \frac{\sum_{t=A-18}^{A} (\text{annual wage } (t) * \prod_{s=t} (\text{ avg wage } (s)/ \text{ avg wage } (s-1)),}{18}$$

  where A is the age of retirement.

- Under the current pension system, the wage levels used for calculating the pension base do not correspond to the actual net wage because net wage data are not recorded in the system. Instead, a synthetic net wage is used that corresponds to about 63 percent of the gross wage of the individual.

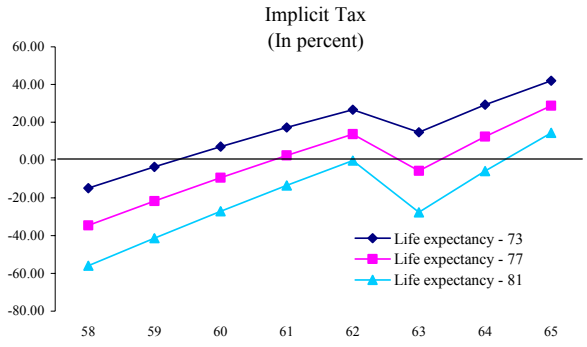
- In calculating the pension wealth, we consider a single worker who survives till age 77, which is the estimated remaining life expectancy for men in Slovenia, conditional on having survived till age 58. See Appendix III for details on life expectancy data.

- We also assume a discount rate of 3 percent and the indexation of pension benefits to nominal wage increases every year. Under alternative scenarios, these assumptions will vary to take into account the exiting trend of pension indexation lagging wage growth.

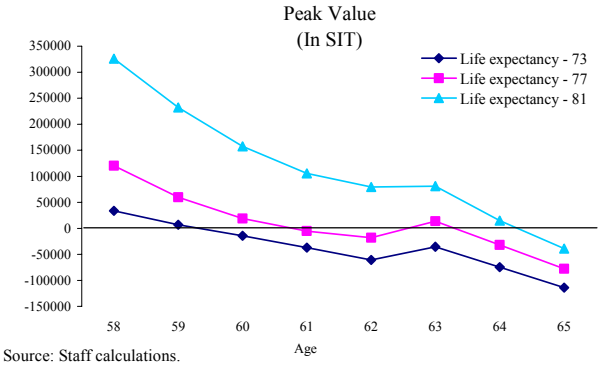
- Pensions are also taxable. The effective tax schedule used in calculating the net pensions is provided in Appendix II.

E. Simulation Results

78. **Estimates of pension accrual and the implicit tax show strong incentives for men to retire early.** For a man with an expected life expectancy of 77 years and earning an average wage, an additional year of work creates an implicit tax of 2 percent at age 61 and 13 percent at age 62 (text figure). Retiring one year later would increase the pensions for two reasons. First, since the final 18 years of earnings are used in calculating the assessment base, an additional year of work would mean that a higher income in the final year is added while a lower income from 8 years ago is deleted, thus increasing the assessment base. Second, an extra year of pension contribution would also increase the accrual factor by eliminating the applicable penalty. But retiring one year later would also have a negative wealth effect, as pension wealth would be reduced due to a loss of one year of benefit. The accrual numbers indicate that the increase in benefits is outweighed by the loss of the additional year of benefit at age 61. If the worker considers the benefits accrued between age 58 and any year up to the age of 66, the maximum pension wealth would be accrued at age 61, suggesting that this would be the optimal age to retire. One peculiarity is the kink in the implicit tax curve at the age 63 years. This arises from the nonlinearity of the applicable penalty and bonus rates. For example, under the bonus and penalty rate schedule, the service factor for retiring one year before the full pensionable age of 63 is reduced by 2.35 percent. On the other hand, retiring one year after the full pensionable age raises the service factor by 4.2 percent. Given this large bonus when deferring retirement from age 63 to 64, the implicit tax of deferring retirement drops sizably from the prior year.



Source: Staff calculations.



Source: Staff calculations.

79. **The incentive depends significantly on the individual's expected life expectancy.** It is estimated that life expectancy increases on average by a year for every decade. Thus, considering a horizon of 2050, and recalculating pension accrual with a longer life expectancy of 81, the analysis shows that the implicit tax would remain negative until age 64. Similarly, the peak value of pension wealth turns negative only at age 65, suggesting that this is the optimal age to retire. Increasing life expectancy by 4 years removes the motivation for early retirement; in fact, there is an incentive to defer retirement by a year.

80. **This finding is robust to alternative parametric assumptions** (text table). For example, a higher discount rate of 5 percent shows that the optimal retirement age could be

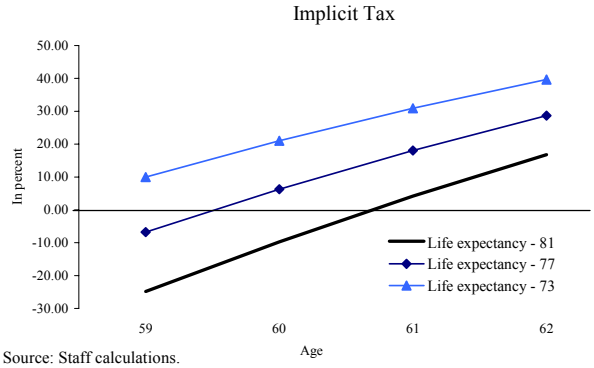
advanced by almost a year to age 60. With a lower discount rate of 1 percent, however, the implicit tax becomes positive at age 62. This could be explained by the fact that the larger pension amount accrued from deferring retirement is now worth less in present value terms. These calculations suggests that the incentive for early retirement exists irrespective of the discount rate assumed. Also, when no seniority wage growth is assumed in the earnings history, the optimal age for retirement moves forward to 60 years. Without the seniority increment, the increase in the pension assessment base from deferring retirement is now smaller than in the baseline case.

Implicit Tax (In percent)

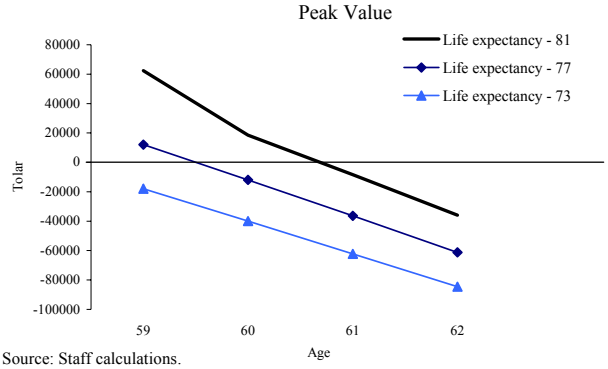
Retirement Age	58	59	60	61	62	63	64	65
Baseline	-34.62	-21.74	-9.33	**2.53**	13.72	-5.64	12.38	28.73
Higher discount rate	-19.99	-9.48	**0.77**	10.65	20.09	3.26	18.85	33.14
Lower discount rate	-53.97	-37.74	-22.32	-7.79	**5.74**	-16.65	4.50	23.44
No seniority increment	-25.56	-11.73	**1.47**	13.95	25.61	4.40	23.49	40.61

Source: Staff calculations.

81. **In the case of a male worker who becomes eligible for retirement by fulfilling the minimum years of service, there is little incentive to defer retirement.** We consider a male worker who at age 59 has fulfilled 40 years of service. He is thus faced with the decision to retire with a full pension or defer retirement for a year and accrue a permanent bonus. Other assumptions are as discussed in the baseline scenario above. Given the bonus system he faces, it is optimal to retire at age 60, a year more than the age at which he is eligible, as demonstrated by the positive implicit tax and negative peak value.



Source: Staff calculations.

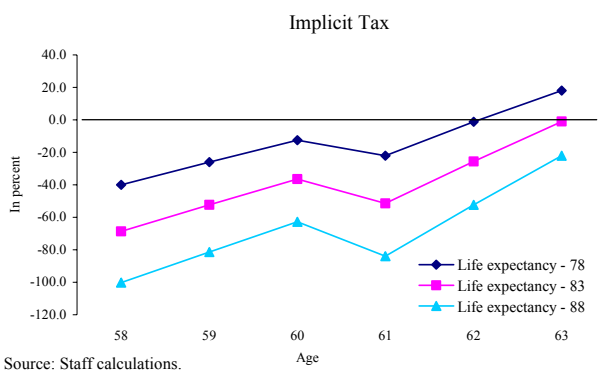


Source: Staff calculations.

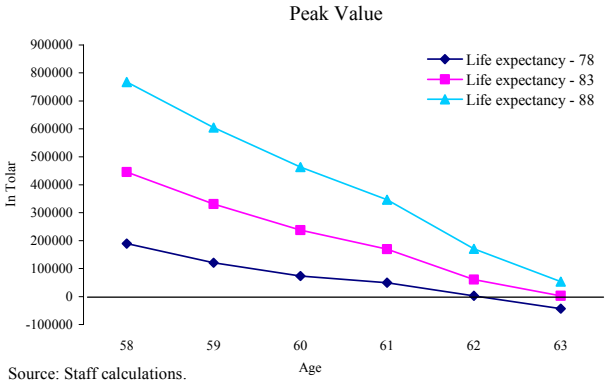
82. **For a women, however, the new system does not appear to provide incentives to retire early.** We consider a woman earning average wages who at age 58 is eligible to retire, having achieved 35 years of service and purchased 3 further years of service. As in the baseline case, she can retire with a reduced pension or defer retirement to obtain a permanently higher pension. The key differences with the baseline case are the (i) expected remaining life expectancy of 83 years (approximating the average retirement age of 56 years and remaining life expectancy of 26 years as per current data) and (ii) penalty rates. Alternate life expectancies of 78 years (current life expectancy at birth) and 88 years (expected remaining life expectancy in 2050) are also used. In this case, simulations show that the

implicit tax of deferring retirement remains negative up to the age of 63, two years beyond the full pensionable age. This is because the higher life expectancy of women creates a stronger accrual effect on pension wealth, rather than the effect of losing one additional year of benefits.

83. **The incentives to retire early are particularly strong for both low- and high-wage earners (text figures).** A comparison across the wage scale indicates that the incentive to retire increases for workers earning half the average economy wage and those earning more than twice the average wage. The disincentives to work among lower-wage earners can be attributed to the rules ensuring a minimum pension base, which stood at close to 60 percent of the average net wage in 2005. To the extent that the minimum pension base is



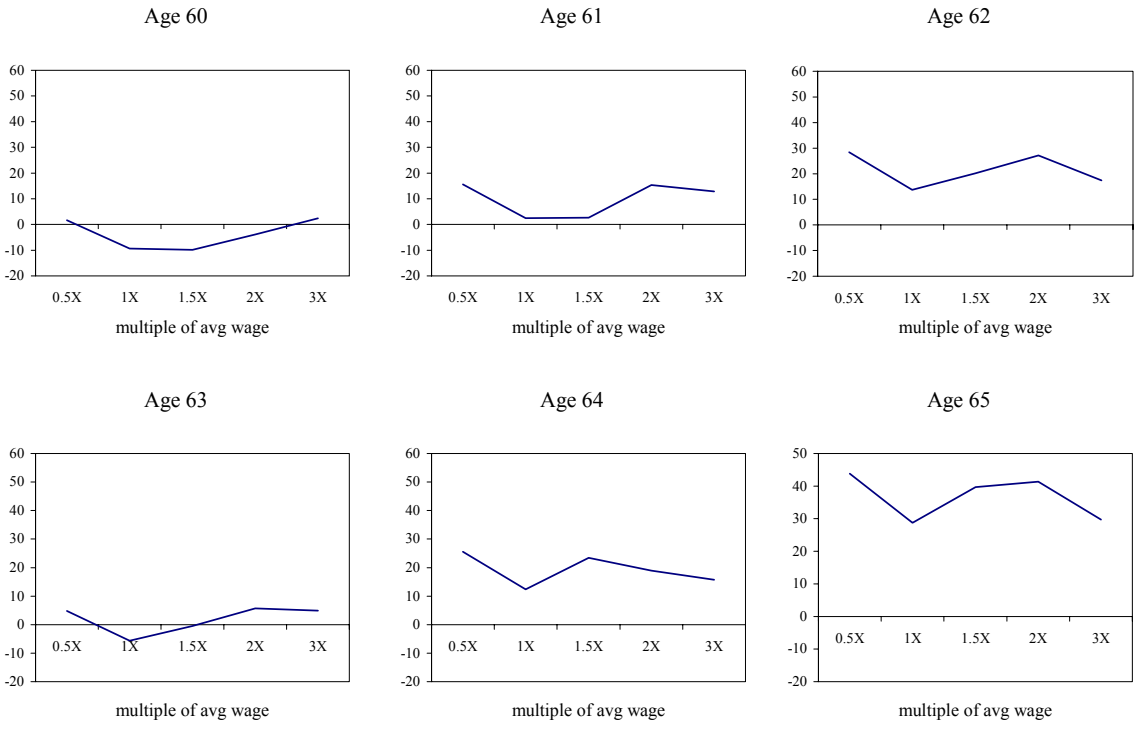
Source: Staff calculations.



Source: Staff calculations.

binding, an additional year of work and the associated increase in wages do not affect the pension base, weakening the accrual effect. As the wealth effect dominates, the incentive to retire early strengthens. Similarly, at the higher end of the wage spectrum, the larger pensions accrued pushes the income into a higher tax bracket. The increase in the effective tax rate (see appendix) thus negates the impact of higher wages accrued so that the accrual effect is weakened. The implicit tax of retirement deferment rises when the effective tax rate on the pension becomes binding.

Slovenia: Implicit Tax of Deferring Retiring by One Year
(In percent)



Source: Staff estimates.

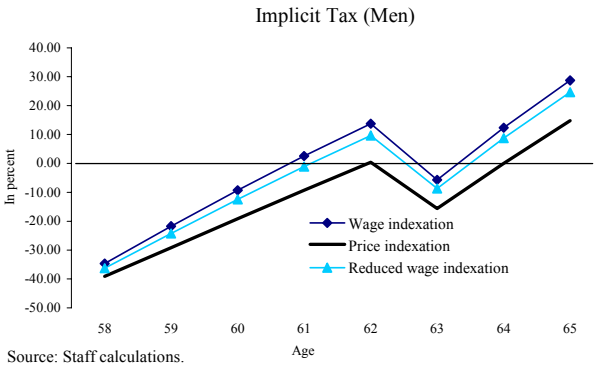
F. Alternative Scenarios

84. **Retirement incentives depend crucially on the policy parameters in the pension system.** The simulations above are based on the parameters approved under the 1999 pension reform. Because these parameters are time varying since they are still being phased in, alternative scenarios are also considered to analyze the sensitivity to the these policies. Furthermore, additional pension reform would still be needed to restore pension viability and improve incentives to remain in the workforce. Some of these policy reform scenarios are also simulated to examine their impact on retirement incentives.

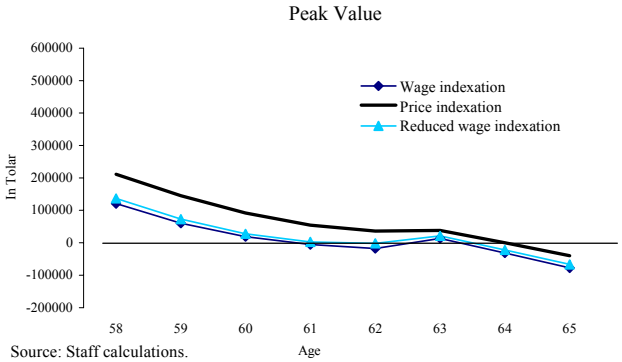
Pension indexation

85. **A simulation of alternative indexation mechanisms for pension benefits shows that incentives to retire early are strongest under wage indexation and weakest under price indexation** (text figure). This is because, under the price indexation, the wealth effect is smaller than the accrual effect, as the additional year's pension benefits that are foregone are smaller. Similarly, an alternative indexation rule is simulated in line with the current rule

that pension growth will effectively lag wage growth.[33] As in the case of price indexation, the accrual effect dominates. The incentives to retire early weaken, and it becomes optimal to retire at age 62.

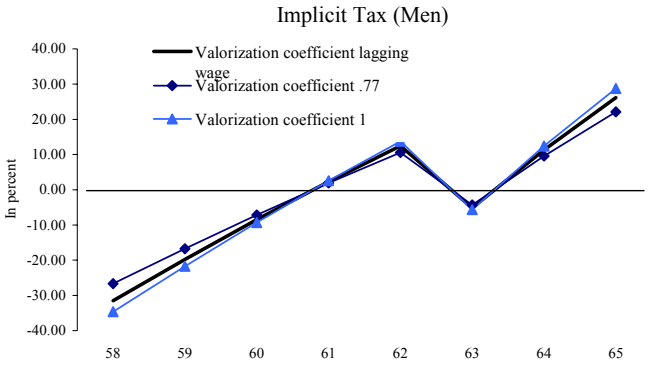


Source: Staff calculations.

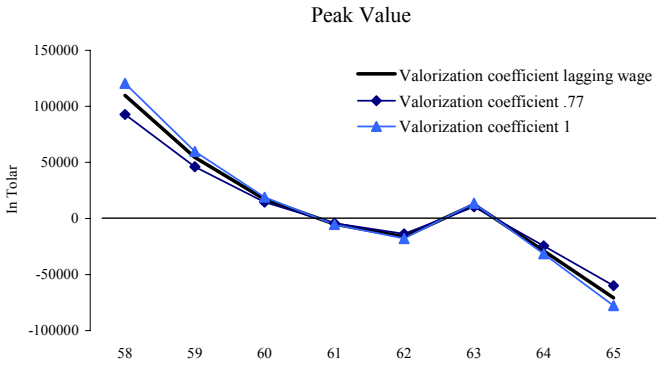


Source: Staff calculations.

Valorization of wage earnings



Source: Staff calculations.



Source: Staff calculations.

86. **The rate at which wages are valorized in calculating the pension base does not appear to affect the incentives substantially** (text figure). Since this rate depends upon pension indexation—which, in turn has lagged wage growth—there is an implicit valorization tax on wages in calculating the pension base. In 2005, this amounted to 77 percent of wages. While the magnitude of the implicit tax changes under the different rates of valorization, the sign of the implicit tax does not change, and the optimal retirement

[33] Existing pensioners' benefits are adjusted downward to ensure consistency with the 1999 pension reform measures that lowers benefits for new pensioners due to the higher number of years used for assessing wages in calculating the pension base and the lower accrual rate. This is expected to increase pensions for existing pensioners at a rate that lags wage growth by .065 percent through 2024.

date remains at 61 years—the age at which the implicit tax turns positive and the peak value turns negative.

Assessment period for pension base calculation

87. **As in the case above, changing the assessment period for calculating the pension base does not have a significant impact**. Raising the assessment period from the 18 years assumed in the baseline to 25 years does not change the date of the optimal retirement age (text table). Even though this affects the level of the benefit considerably more than the baseline scenario, the effect on the pension base of working an additional year is very small.

Implicit Tax (In percent)

Retirement Age	58	59	60	61	62	63	64	65	66	67
Baseline	-34.6	-21.7	-9.3	**2.5**	13.7	-5.6	12.4	28.7		
Longer assessment period	-33.5	-21.1	-9.0	**2.4**	13.3	-5.5	12.0	27.8		
Accrual rate (30 + 1.7)	-38.0	-25.2	-12.7	-0.7	**10.7**	-8.4	9.9	26.6		
Accrual rate (25 + 1.9)	-41.4	-28.6	-16.1	-4.0	**7.7**	-11.2	7.3	24.4		
Accrual rate (22.5 + 2)	-43.1	-30.4	-17.8	-5.6	**6.2**	-12.6	6.1	23.3		
Higher full pension age (64)		-31.4	-17.9	-5.0	**7.3**	18.9	0.0	18.5	35.0	
Higher full pension age (65)			-27.7	-13.6	**0.0**	12.7	24.7	6.4	25.3	41.7

Source: Staff calculations.

Accrual rate

88. **Changing the accrual rate that determines the service factor can have a significant impact on retirement incentives**. Under the current system, the accrual rate is highly front-loaded, with 35 percent for the first 15 years and 1.5 percent for every additional year of service. If this is changed so that the accrual rate is 30 percent for the first 15 years and 1.7 percent for every year of additional service—which, as in the baseline, maintains the same service factor of 72.5 percent for a man with 40 years of service retiring at age 63—the optimal retirement age rises to 62 years (text table). This suggests that back-loading the accrual rate over time could be useful in increasing the effective retirement age. Changing the penalty and bonus rates would also have a direct impact on the accrual rate. However, these changes would have a more significant trade-off in terms of the amount of pension benefit and cost of pension expenditure.

Increase in full pensionable age

89. **Raising the statutory full pensionable age does not ensure a higher effective retirement age**. It is assumed that the full pensionable age increases from 63 years to 64 years, with a corresponding increase in the minimum pension-qualifying period. In this case, the optimal retirement age, at 62, is still two years ahead of the new full pensionable age. A further increase in the full pensionable age, however, does not change the optimal retirement age. As in the case of a shorter life expectancy, increasing the statutory retirement age for a given life expectancy would strengthen the wealth effect, as benefits can be enjoyed for fewer years. This suggests the need for a careful review of other policies that can affect the incentives to retire even as the statutory retirement age is raised.

G. Conclusions and Policy Implications

90. **The labor force participation rate is considerably lower among the elderly population in Slovenia than in the EU-15 countries**. This situation reflects the low full pensionable age under the Slovene pension system. Recognizing the impending challenges of aging and early retirement, the authorities introduced reforms in 2000 to increase the pensionable age and incentives to defer retirement through pension bonuses and penalties. These reforms and benefits are being phased in through a transition period. Despite these changes, there is a possibility that the effective retirement age may not rise significantly, due to provisions allowing retirement earlier than the full pensionable age and the implicit incentives to retire early given the parameters in the public pension system.

91. **This paper simulates the retirement incentives built into the public pension system based on the accrual methodology**. Calculations of the implicit tax based on this methodology suggest that the pension system parameters will likely encourage workers to leave employment early; this applies particularly to men, who can expect a shorter life span. The redistributive nature of the pension system—through its minimum pension base and progressive effective tax rate—also means that these incentives are stronger for workers earning at the low and high ends of the wage spectrum. These incentives appear robust to differing assumptions on discount and seniority wage growth rates.

92. **The pension parameters need to be reformed to raise the effective retirement age**. With a large demographic shift expected over the coming decades, the role of the pension system in inducing an early exit from the labor market needs to be reviewed to prevent an exacerbation of aging-related spending pressures on the economy. **In addition to changing t**he bonus and penalty rates that have a directly impact on the incentives, more back-loading of the accrual rates would also help to defer retirement decisions. Retirement incentives also weaken more under price indexation than under wage indexation. The simulations also suggest that increasing the assessment period for calculation of the pension base can lower pension expenditure significantly without weakening retirement incentives. These changes need to be considered even if the statutory retirement age is raised, as these early-retirement incentives could make it difficult to raise the effective retirement age.

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Appendix I
Penalty and Bonus Rates

Penalty and Bonus Rates Under Slovenia's Pension System

Penalties for insufficient years of service

Men	Age	Women	Age
12 percent	58	9 percent	58
8.4 percent	59	5.4 percent	59
5.4 percent	60	2.4 percent	60
3.0 percent	61		
1.2 percent	62		

Bonus for extended years of service

Men	Age
3.6 percent	64
6.0 percent	65
7.2 percent	66

Bonus for extended years of service after qualification for full pensions (40 years)

3.0 percent	1st year
2.6 percent	2nd year
2.2 percent	3rd year
1.8 percent	4th year

Sources: Slovene authorities; and World Bank (2004).

Appendix II
Tax Rates

Effective Tax Rate on Pensions

Net Pension From Benefit Formula/ Average Net Wage	Effective Tax Rate	Net Pension After Explicit Taxation/ Average Net Wage
50 percent	0.0 percent	50 percent
100 percent	0.0 percent	100 percent
110 percent	1.0 percent	110 percent
120 percent	2.5 percent	120 percent
130 percent	3.8 percent	130 percent
140 percent	5.0 percent	140 percent
150 percent	6.0 percent	150 percent
160 percent	7.0 percent	160 percent
170 percent	7.9 percent	170 percent
180 percent	8.8 percent	180 percent
190 percent	9.4 percent	190 percent
200 percent	10.1 percent	200 percent

Sources: Slovene authorities; and World Bank (2004).

Appendix III
Life Expectancy

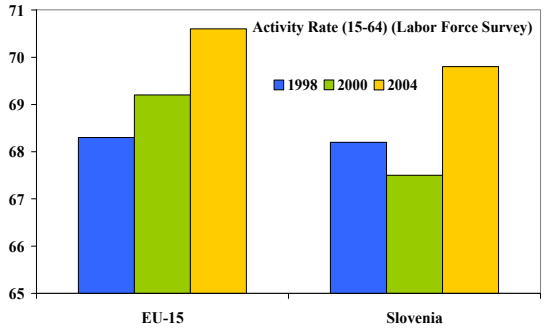
Estimated Remaining Life Expectancy as a Function of Age								
Estimated Remaining Life Expectancy (Years)								
Age	**Men**	**Women**	**Age**	**Men**	**Women**	**Age**	**Men**	**Women**
0	72.2	80.1	30	43.6	50.7	60	17.8	22.9
1	71.5	79.4	31	42.6	49.7	61	17.1	22.0
2	70.5	78.4	32	41.7	48.8	62	16.4	21.2
3	69.5	77.4	33	40.7	47.8	63	15.7	20.4
4	68.6	76.4	34	39.8	46.8	64	15.0	19.5
5	67.6	75.4	35	38.9	45.8	65	14.4	18.7
6	66.6	74.4	36	38.0	44.9	66	13.7	17.8
7	65.6	73.5	37	37.0	43.9	67	13.1	17.1
8	64.6	72.5	38	36.1	42.9	68	12.5	16.3
9	63.6	71.5	39	35.2	42.0	69	11.9	15.5
10	62.6	70.5	40	34.3	41.0	70	11.3	14.7
11	61.6	69.5	41	33.4	40.0	71	10.8	14.0
12	60.6	68.5	42	32.4	39.1	72	10.3	13.3
13	59.7	67.5	43	31.5	38.1	73	9.7	12.5
14	58.7	66.5	44	30.7	37.2	74	9.1	11.8
15	57.7	65.5	45	29.8	36.2	75	8.6	11.2
16	56.7	64.5	46	28.9	35.3	76	8.1	10.5
17	55.8	63.5	47	28.1	34.4	77	7.6	9.9
18	54.8	62.5	48	27.2	33.4	78	7.2	9.2
19	53.9	61.6	49	26.4	32.5	79	6.7	8.5
20	53.0	60.6	50	25.5	31.6	80	6.2	8.0
21	52.0	59.6	51	24.7	30.7	81	5.8	7.4
22	51.1	58.6	52	23.9	29.8	82	5.4	6.8
23	50.2	57.6	53	23.1	28.9	83	4.8	6.2
24	49.2	56.6	54	22.3	28.0	84	4.3	5.6
25	48.3	55.6	55	21.5	27.2	85	3.8	5.1
26	47.4	54.7	56	20.6	26.3	86	3.4	4.7
27	46.4	53.7	57	19.9	25.4	87	3.7	4.8
28	45.5	52.7	58	19.2	24.6	88	3.5	4.4
29	44.5	51.7	59	18.5	23.8	89	3.4	4.1
Source: World Bank (2004).								

V. Slovenia: The Tax and Benefit Systems and Incentives to Work[34]

A. Introduction

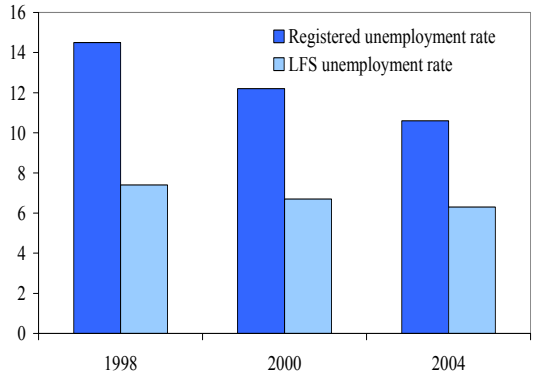
93. **The labor participation rate in Slovenia is among the lowest in Europe**. Over the last decade, Slovenia's growth averaged 4 percent, and unemployment declined to around 6 percent (Labor Force Survey), surpassing performance in most EU countries. However, the labor participation rate remained lower than the average in the EU-15. The large positive gap between registered and survey unemployment rates partly reflects this problem since registration is a condition for receiving benefits. A large number of registered unemployed are likely not searching for work and therefore would not be counted as unemployed by the survey. Low labor participation has constrained potential output growth, leading to a virtually closed output gap and raising concerns about inflation in the period ahead. Low participation has kept welfare spending high, contributing to one of the highest ratios of nondiscretionary to total expenditures among the EU-8 and considerable fiscal rigidity.[35] As Slovenia prepares to introduce the euro, its continuing strong growth in a stable macroeconomic environment will hinge in part on a higher labor participation rate. In addition, this would help to address the looming fiscal sustainability problem associated with Slovenia's pensions.[36]

Labor participation is relatively low...



Source: Eurostat.

..., which is reflected in the gap between registered and survey unemployment rates.



Source: Statistical Office of the Republic of Slovenia

94. **High taxes and generous benefits are likely to be key factors explaining the lackluster labor participation**. Labor taxation in Slovenia is among the highest in Europe. In most cases, the tax wedge dwarfs the averages in the EU-15 and OECD. Taxes include the progressive personal income tax and payroll tax—the latter paid by employers— and social

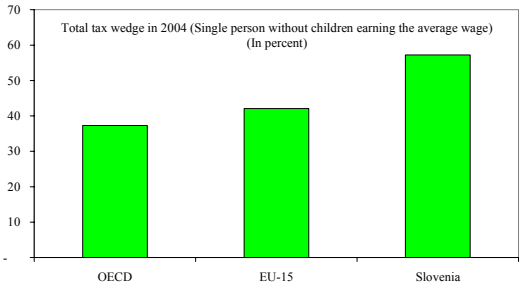
[34] Prepared by Philippe Egoume-Bossogo. The author thanks Mr. Gonzalo Caprirolo of the Ministry of Finance of Slovenia for providing the data and for useful discussions.

[35] See Chapter II, "Budget Rigidity and Expenditure Efficiency in Slovenia."

[36] See Chapter III, "Impact of Aging on Fiscal Sustainability in Slovenia."

security contributions. The welfare system is generous. In particular, the replacement rate for unemployed individuals with poor income prospects is relatively high. As will be discussed below, the combination of high taxes and generous benefits creates disincentives to seek jobs actively.

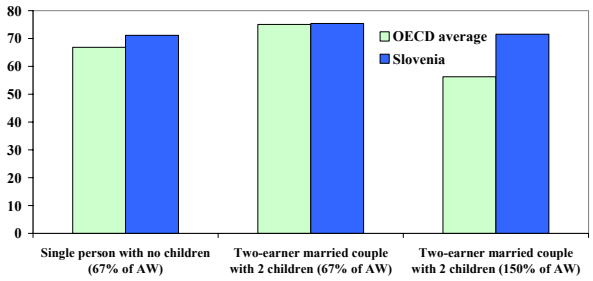
Taxes are high and...



Sources: OECD and author's calculations.

... Benefits generous.

Net Replacement Rates: Initial Phase of Unemployment at Different Earning Levels, 2004 (OECD), and 2005 (Slovenia) /1



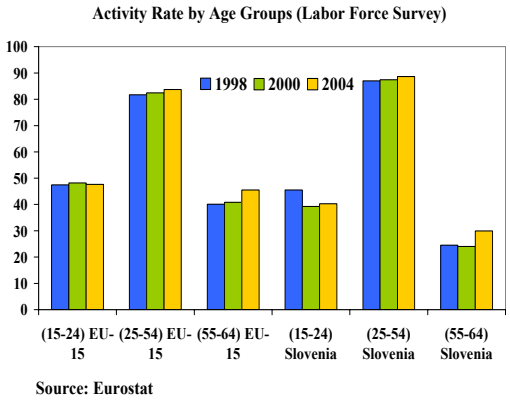
Sources: OECD and staff calculations.
1/ For married couples the percentage of average wage (AW) relates to one spouse only; the second spouse is assumed to have full-time earnings equal to 67% of AW.

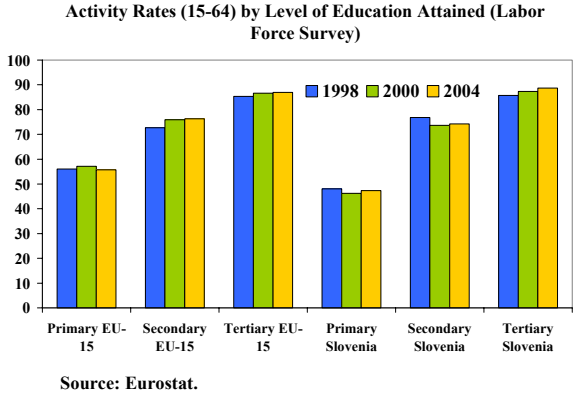
95. **This chapter assesses work incentives and reforms that could increase them.** The Slovene authorities are planning a tax reform whose aims are broader than increasing labor participation. Their main objective is to decrease tax pressure, particularly for workers at the high end of the income distribution, in order to spur both labor supply and demand. This would be achieved by reducing tax rates and flattening the tax schedule. However, it is not clear that this reform would increase labor supply among low-wage earners as well. Such outcome would depend on how the reform affects the eligibility and amount of benefits, thereby highlighting the importance of reforming the tax and benefit systems simultaneously to create proper work incentives and boost labor participation. This paper, in turn, reviews labor participation and the tax and benefit systems in Slovenia; analyzes incentives to work under the current system based on marginal effective tax rates (METRs); and, finally, examines possible alternative reforms.

B. Labor Participation and Tax and Benefit Systems in Slovenia

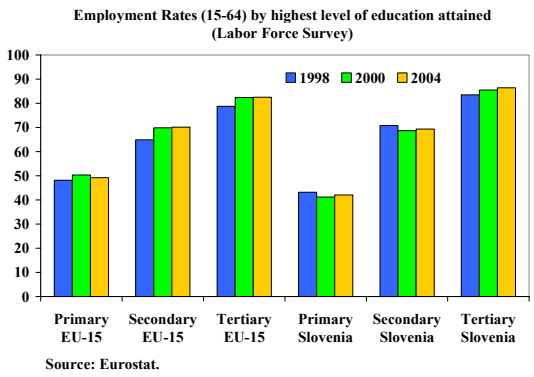
96. **Low labor participation rates are prevalent among specific groups of individuals, particularly those with poor income prospects**. Relative to the EU-15, participation is weak for younger and older individuals, which suggests that these categories either encounter difficulties in finding jobs or do not have appropriate incentives to look for them. As participation is also weak among individuals with low education attainment (a proxy for income prospects in the labor market), the lack of sufficient incentives appears to be a strong candidate for explaining this outcome—although labor demand considerations could also play a role. This situation implies that low-income individuals have high reservation wages due to generous benefits. In this paper, we will focus on labor participation

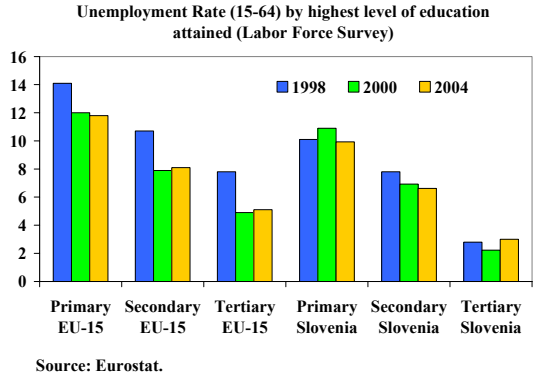
among low-income individuals, a large share of which may be represented of young workers.[37]





97. **Performance in employment and unemployment has also been uneven among low-income groups**. In particular, employment and unemployment rates have been lower and higher, respectively, than among the rest of the Slovene population. Employment rates have also been lower than those of peers in the EU-15. Thus, not only do low-income individuals participate less, but also a larger share of those who are active are unemployed. This outcome could be due to a lack of qualifications, high labor costs, and other factors, such as lack of job mobility and fungibility that would limit labor demand. It could also result from generous benefits that dampen efforts to seek work aggressively. All of these factors are likely to have some relevance, but we will investigate specifically the role the tax and benefit policies play in discouraging labor supply among low-income individuals.





[37] Low labor participation among individuals aged 15-24 may also be due to the "student status". As it exempts employers from payroll taxes and social security contributions, it may have led to abuses and under-reporting. However, data to measure the phenomenon are not available. For a discussion about low labor participation among older individuals and incentives to retire earlier, see Chapter IV, "Retirement Incentives in the Pension System in Slovenia."

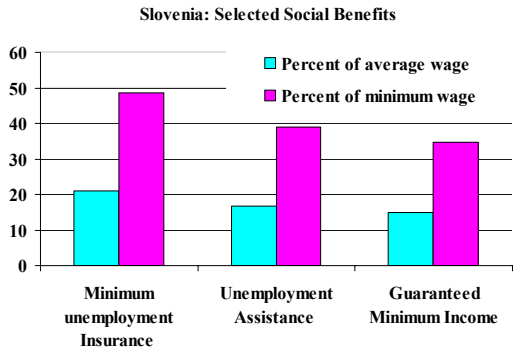
98. **The income tax in Slovenia is among the most progressive in Central Europe and tax rates are high**. The Slovene personal income tax system is very progressive, with the top rate, at 50 percent, among the highest in Central Europe. As indicated above, the tax wedge in Slovenia is also quite wide, in some cases exceeding the EU-15 average (see para. 2). High tax rates have been associated with poor labor market performance, but taxes alone would not determine an individual's decision to seek additional income through a job. The availability of social benefits should also be factored in.

Top Rates of Personal Income Tax in Selected Countries
(In percent)

	Top rates	Ratio of Top Income Threshold to Average Wage
Croatia	45	387
Czech Republic	32	145
Estonia 1/	23	25
Hungary	38	...
Latvia 1/	25	11
Lithuania 1/	33	61
Poland	40	261
Slovakia 1/	19	44
Slovenia	50	306

1/ Flat tax and threshold under which income is tax-exempt.

99. **Social benefits, particularly those pertaining to labor income replacement, are also among the most generous.** The Slovene welfare system provides a wide array of benefits which are more generous than EU standards.[38] Support to jobless individuals takes several forms. Unemployed workers who have contributed initially receive the unemployment insurance benefit (UB) and subsequently receive unemployment assistance (UA) when the UB runs out. Individuals who do not qualify for these benefits are entitled to a top up in earnings to the guaranteed minimum income (GMI). In terms of work incentives, the main problem for low-income workers is that the difference between the minimum UB and the other two benefits is not large. In addition, while the UB is taxable and subject to social security contribution, the UA is free of both deductions (see Box 1). Thus, individuals who qualify for UA after receiving the minimum UB derive a financial windfall. This will become more apparent in the next section in the calculation of marginal effective tax rates (METRs).



Source: Slovenia's Ministry of Labor and Social Affairs

[38] See IMF Country Report No. 05/253, Table 8, which provides a comparison of selected benefits (amount and duration) in Slovenia and several EU-25 countries.

Box 1. Slovenia: Taxation and Benefits Related to Job Status

Labor income taxation. Labor income in Slovenia is subject to personal income and payroll taxes, as described in the tables below. In addition to the general tax allowance that each individual is entitled to, families with children can deduct a child allowance amounting to roughly 14 percent of the average wage for the first child; this allowance declines at a decreasing rate for subsequent children. The payroll tax is paid entirely by the employer. In 2005, the government decided to gradually phase it out (totally by 2009), beginning with a 20 percent reduction in the rates effective January 1, 2006. Social security contributions apply to gross wages at the rate of 22.1 percent for employees and 16.1 percent for employers.

Personal Income Taxes (in percent of average wage) and Tax Rates (In percent)

(In percent of average wage)			(In percent)	
Taxable income brackets		Minimum taxes	Additional income taxed at	
0	< 16.7	0.0	0	General tax exemption.
16.7	< 38.5	0.0	16	
38.5	< 75.2	6.2	33	over income equal to 38.5 percent of AW
75.2	< 152.2	18.3	38	over income equal to 75.2 percent of AW
152.2	< 305.8	47.5	42	over income equal to 152.2 percent of AW
305.8	+	112.1	50	over income equal to 308.5 percent of AW

Payroll Tax

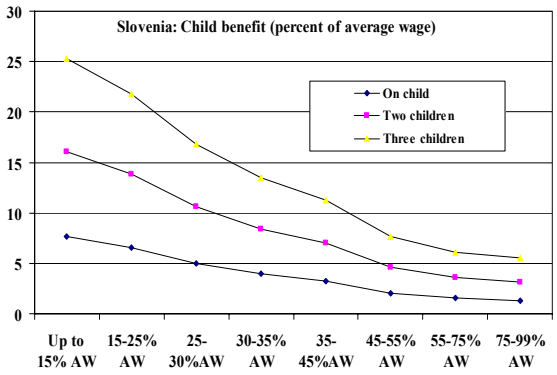
Wage brackets (Percent of AW)		Tax Rates 1/
0	59	0.0
59	142	3.0
142	266	6.2
266	+	11.8

1/ Reduced by 20 percent from January 2006

Benefits related to job status. The three main benefits related to income replacement when jobless, as certified by registration in the Employment Service, are outlined in the table below. In addition, individual or families with children are eligible to receive child benefits, which vary as illustrated below. The child benefit is inversely related to income levels, as one would expect, but also increase more than proportionally with the number of children. This last feature has not paid off since Slovenia's fertility rate is the lowest in Europe. The benefits outlined in this chapter do not cover the whole set available in Slovenia. For instance maternity leave and childcare assistance also play an important role. However, the benefits the chapter focuses on are the ones that affect work decisions directly and are easily tractable for calculating METRs.

	Unemployment Insurance Benefit (UB)	Unemployment Assistance (UA)	Guaranteed Minimum Income (GMI)
Conditions	Minimum 12-month contribution period; registration with Employment Service	Registration with Employment Service	Registration with Employment Service
Eligibility	Unemployed	Unemployed. After rights to UB have expired	Income below the GMI topped up.
Amount	70 percent average monthly earning for first 3 months, 60 percent thereafter.	80 percent of minimum UB	71 percent of minimum UB
Duration	3 to 24 months. For most people, 6 months	Most people up to 15 months. Up to 3 years if old-age pension conditions fullfilled during period	No limit
Tax status	Subject to PIT	Not subject to PIT	Not subject to PIT
Social security status	Subject to SSC	Not subject to SSC	Not subject to SSC
Type	Insurance based	Pure welfare	Pure welfare

Source: Ministry of Labor and Social Affairs.



Source: Ministry of Labor and Social Affairs

C. Marginal Effective Tax Rates and Incentives to Work

100. **From a theoretical viewpoint, high marginal effective tax rates (METRs) provide a measure of work incentives**. The METR is the change in the combination of taxes paid and benefits received at different levels of income. At the margin, one compares the effective tax rate from one income level (1) to the next (2), therefore obtaining the METR as follows (Carone and others, 2004):

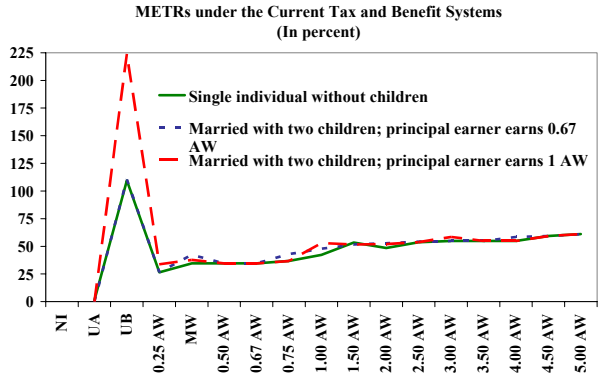
$$METR = 1 - \frac{\Delta y_{net}}{\Delta y_{gross}} = 1 - \frac{\left[(y_2(1 - t_y - r_{ssc}) + b_2(1 - t_{b)})) - (y_1(1 - t_y - r_{ssc}) + b_1(1 - t_{b)}))\right]}{y_2 - y_1}$$

where y_1 is one gross income level and y_2 is the next gross income level; t_y is the rate of income tax; r_{ssc} is the rate of social security contribution; and b_1 and b_2 are total benefits at income levels 1 and 2. As the METR measures the percentage of an additional dollar earned that is lost through the interplay of taxes and benefit, it is a key factor in determining the decision to seek work and that dollar. Using this formula, we calculate METRs in Slovenia to evaluate work incentives under the current system.

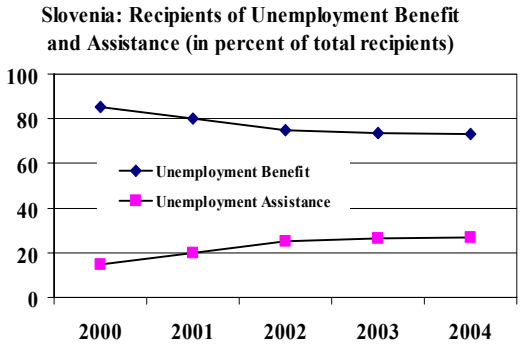
101. **The current tax and benefit systems produce high METRs, particularly at the lower end of the income distribution**. As discussed above, low-income individuals who have exhausted their UB receive a windfall when they become eligible for UA because the amount lost in terms of reduced benefits is more than offset by the gain associated with the exemption from income taxes and social security contributions. As a result, METRs between the minimum UB and UA exceed 100 percent (and top 200 percent in some cases, as illustrated in the figure below).[39] In addition, while the duration of the UB for most people is limited to 6 months, the duration of UA is 15 months across the board. [40] In fact, over the years, while the number of UB recipients has declined, the number of UA recipients has increased, stabilizing recently.

[39] Most low-income earners who become unemployed would be eligible for the minimum UB or an amount close, and thus would receive a financial windfall when they exhaust the UB and qualify for UA. In this case, the METR between the minimum UB should be regarded as a marginal effective subsidy that accrue to recipients of UA.

[40] The duration of the UB could reach 24 months for workers over 55 with insurance periods over 25 years. The UA duration could rise to 3 years if conditions for old-age pension were fulfilled during this period.

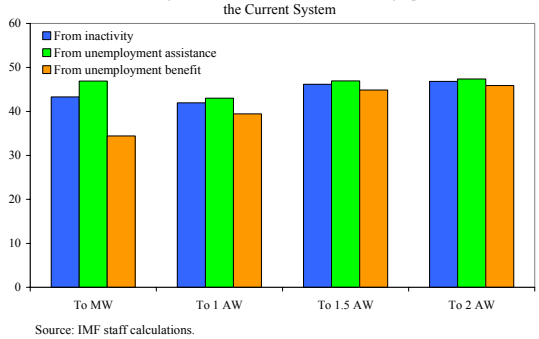


Source: IMF staff calculations.

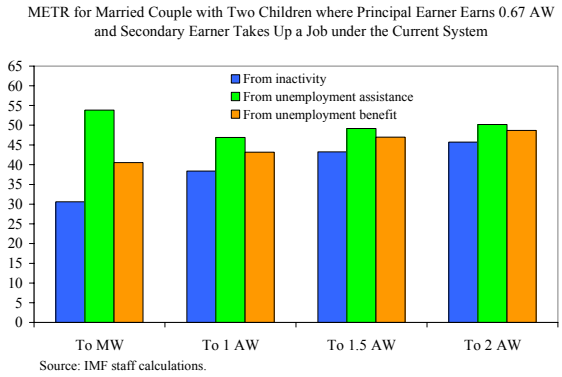


Source: Slovenia Ministry of Labor and Social Affairs

102. **Moreover, the current system makes it rather costly to exit from joblessness**. As discussed earlier, joblessness, whether from inactivity or unemployment, affects mostly low-income individuals. Therefore, an important social objective is to find jobs for this segment of the population. However, the combination of progressive tax rates and generous benefits would produce for most people high and increasing METRs when exiting joblessness, depending on the type of benefit they are currently receiving, the salary paid by the job they take up, and their family status. As illustrated in the charts below, most people would face METRs in the range of 30-55 percent, which are quite high and may discourage not only low-income workers but also spouses in families where there is a principal breadwinner. This could explain why female participation is lower than that of males.



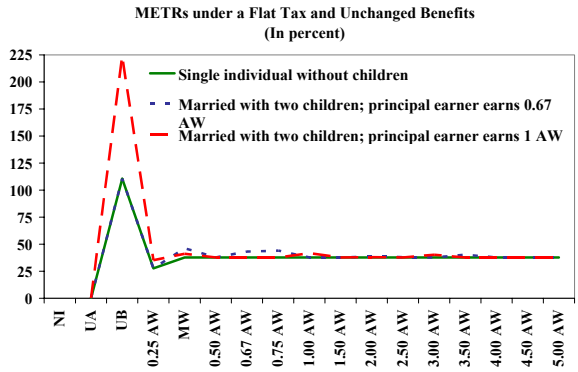
Source: IMF staff calculations.



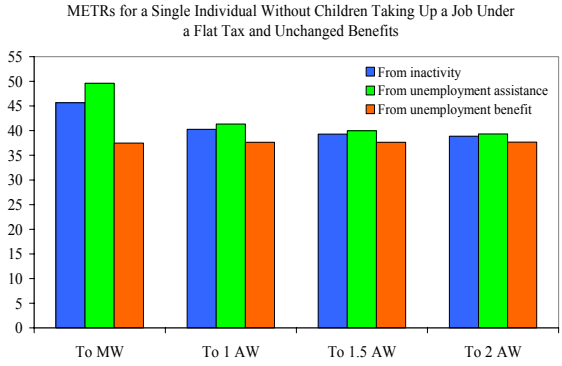
Source: IMF staff calculations.

103. **The introduction of a flat tax alone would not improve work incentives for low-income workers**. A flat tax of 20 percent has been one of the tax reform proposal considered. Such a reform would significantly improve work incentives for high-income workers by reducing dramatically their METRs to around 35 percent (see figure below) from current levels of over 60 percent (for income levels above roughly four times the average wage). However, as participation for these workers is already above EU-15 averages, it is therefore unlikely that this would significantly boost their activity rate (although in terms of hours worked, it might make a difference). In contrast, a flat tax, if not accompanied by other changes, could worsen incentives for low-income individuals because their tax rate would likely increase. METRs for those taking a job would continue to be high, reaching 50 percent

for a single individual moving from UA to a job paying the minimum wage. This is precisely the type of individual whose participation is currently low. In addition, the flat tax would raise average effective tax rates for low-income individuals while reducing those of high-income ones (see Figure 3). Aside from the authorities' objective to make changes in the tax system revenue-neutral, a fair and incentive-rich reform should aim to deliver simultaneously lower average and METRs for most people. We take up this question next.



Source: IMF staff calculations.



Source: IMF staff calculations.

D. Reforms to Increase Labor Participation

104. **Based on the literature and practical experience, work incentives could be improved through reforms that affect both the tax and benefit systems**. The earned income tax credit (EITC) is one such reform. It provides a payment to low-income individuals who take low-wage jobs. This scheme reduces their METRs, thus providing a stronger work incentive. In the United States, the introduction of the EITC was instrumental in reducing welfare rolls during the 1990s (Hotz and Scholz, 2000). However, the same authors argued that the scheme succeeded due to the relatively low minimum wage, social benefits and tax rates in the United States. Although these preconditions are not necessarily present in Slovenia, the EITC should not be ruled out completely, especially as past reforms in Slovenia have achieved a measure of success.

105. **In Slovenia, past benefit reforms to improve work incentives have increased job search efforts.** Using legislative changes in 1998 pertaining to the duration of the unemployment benefit, Van Ours and Vodopivec (2006) found that exits from registered unemployment rose among those individuals whose UB duration had been curtailed. The tightening of duration exempted those recipients who had been unemployed for less than 18 months, thus providing a natural experiment to assess whether job search efforts had changed following the reform. The duration of unemployment for those whose UB eligibility duration had been cut dropped significantly and quickly. In contrast, the duration of

Median Duration of Unemployment in Months, Simulation Results 1/

	Median Duration (Months)		
	Before 1998 reform	After 1998 reform	Difference
Median worker	5.3	4.1	-1.1
If age = 40	8.5	5.4	-3.1
If female	8.9	5.4	-3.5

Source: Van Ours and Vodopivec (2006).
1/ Median worker is a 30-year-old male, with vocational education, 10-15 years of work experience, and no dependent family members. With the change in the law, this person's unemployment benefit duration was lowered from 12 to 6 months.

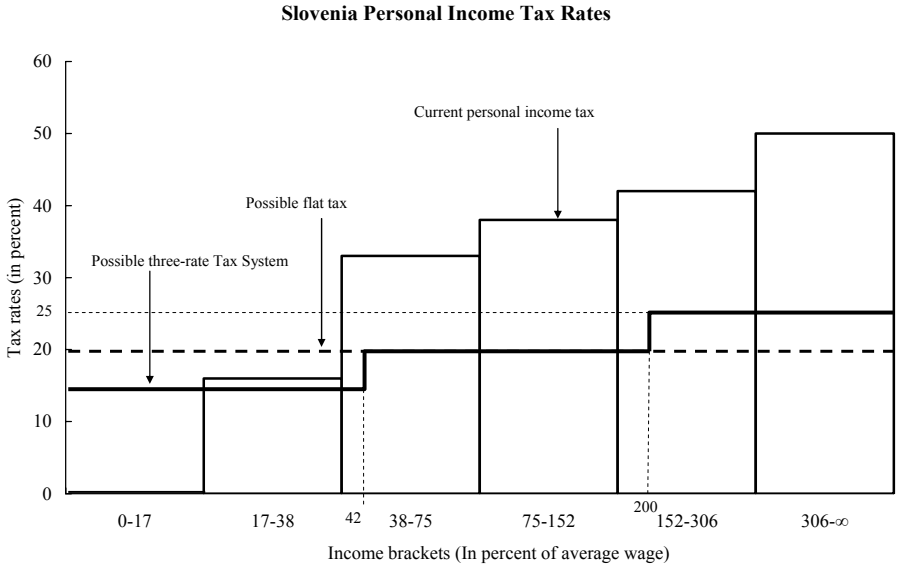
unemployment among younger unemployed workers did not decline. Since they accounted for the bulk of those with unemployment spells shorter than 18 months, this provided evidence that the shortening of the unemployment duration among the rest was due to increased job search efforts rather than better labor demand conditions. Although working through shorter duration as opposed to smaller benefits (a trade-off that is beyond the scope of this paper), the results show that expectations could be successfully changed, thus sparking more intensive job search and achieving higher participation rates.

106. **One possible option to reduce marginal tax rates for low-income individuals would be to change the benefits associated with joblessness**. The main source of the high METRs among low-income workers is the lack of sufficiently large differences between the minimum UB, the UA, and the GMI. This option would be based on the following elements:

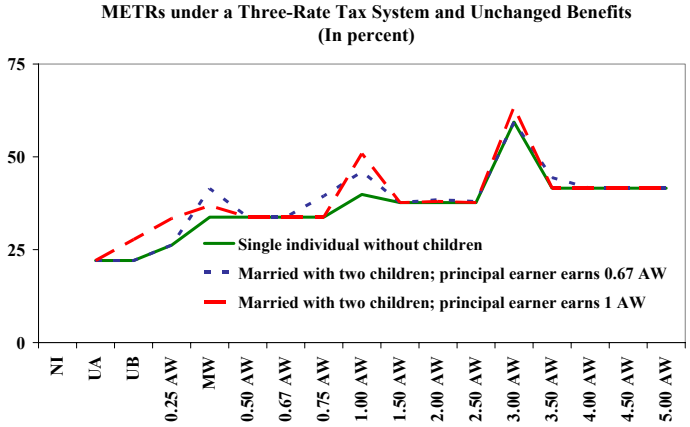
- With regard to benefits, the GMI (currently amounting to 71 percent of the minimum UB) would be left unchanged, as it is linked to the poverty line. The UA would be reduced to half the minimum UB from the current ratio of 80 percent. Since the UA would be smaller than the GMI, it would be regarded as a temporary support that the unemployed could not count on to live a decent life, leading to more intensive job search. An individual who had exhausted his UB would qualify to receive UA and would not be able to opt for the higher GMI during the statutory duration of the UA, which also could be shortened. We assume an unchanged child benefit.

- As an alternative to the flat tax, the Slovene authorities have been considering a tax schedule with two or three tax brackets. The paper considers a possible three-rate system, as described in the table and chart below. A tax rate of 15 percent would target individuals with taxable income up to the minimum wage, representing a slight reduction from the 16 percent most of them face at the moment and cover slightly more people (the current upper income bracket represents 38½ percent of the average wage). The bulk of the working population would face a rate of 20 percent (the figure that is cited most frequently as a possible flat tax rate). Finally, individuals whose taxable income is at least twice the average wage would be taxed at a rate of 25 percent. The general tax exemption, as well as the child tax exemption, would remain unchanged. However, it is assumed that all labor incomes whether subject to the personal income tax or not, would be subject to social security contributions at the current rate of 22.1 percent.

Taxable income brackets	**Rates**
0-minimum wage (42 percent of the average wage)	15 percent
Minimum wage – 2 average wages	20 percent
Above 2 average wages	25 percent



107. **The hypothetical alternative reform of the tax and benefit systems outlined above would strengthen job search incentives for low-income individuals**. From the benefit point of view, the reduction of UA and the signal that it is no longer sufficient to depend for an extended period on social support would intensify the search for work. On the one hand, this reform would lead to a decline in the number of UA recipients, which has increased in the face of a decline in overall unemployment. On the other hand, the reduction of the METR (rather than increase under the flat tax) would raise take-home income. As illustrated in the figure, together these reforms could reduce METRs for most people relative to the current system and for most low-income individuals relative to the flat tax proposal. In particular, they would eliminate the spike between the UA and the UB. METRs could be made smoother by adjusting the other benefits (such as the child benefit) and/or various tax exemptions, particularly at the points where tax rates increase.



Source: IMF staff calculations.

108. **With the caveat that this is a partial equilibrium analysis, one can draw some lessons by comparing the three systems—the current system, the flat tax system, and the proposed three-rate system—focusing not only on incentives to work but also on fairness of taxation**:

- Figure 1 shows marginal effective tax rates for a single individual without children and for a married couple with two children at various income levels of both spouses under the current system, the flat tax system (a 20-percent flat tax with unchanged benefits) and the three rate system (15-20-25 percent). The latter delivers lower METRs than the former two in the income range up to the average wage. Beyond that point, the flat tax produces lower METRs as one would expect, since no other changes are made to tax allowances and benefits.

- The alternative three-rate tax system would increase incentives to seek work for low-income individuals. Figure 2 depicts METRs when taking a job under the three systems. The cases of a single individual without children and of a married couple where the principal earner earns 67 percent of the average wage are shown here because they are good representatives of individuals with the lowest income levels. Whether taking a job from complete inactivity, from the UA, or from the minimum UB, these individuals or families in most cases, face METRs that are lower under the three-rate system than currently or under the flat tax. This remains the case whether the job found pays the minimum wage, the full average wage, or an income that is up to twice the average wage. Nevertheless, METRs would continue to be somewhat high (up to 40 percent in some cases). Therefore, a careful calibration of other benefits and tax allowance could create a system with lower METRs.

- Figure 3 contains charts of the average effective tax rates (i.e., what percentage of the overall income from labor and the welfare system is paid to the government) faced by various families. As the flat tax system would raise the tax rate of low-income workers, it would—under unchanged benefits and up to a point—generate higher average effective tax rates than both the current and three-rate tax systems. The three-rate system produces consistently lower average effective tax rates than the other systems, with two notable exceptions. First, individuals receiving the UA would face higher effective tax rates. This is consistent with the change designed to give them incentives to seek work. Second, the average effective tax rates would outstrip those of the flat tax at some point owing to the higher tax rate of 25 percent. However, the intersection in most cases happens well beyond income levels equal to twice the average wage, where the tax rate increases. Therefore, higher (around 35 percent) effective tax rates would apply only to individuals who are well off.

E. Conclusion and Policy Recommendations

109. **The Slovene tax and benefit systems create disincentives to work, and these disincentives explain in part why labor participation in Slovenia is weaker than the EU-15 average among several groups of workers and particularly those with poor-income prospects.** Under the current tax and benefit systems, marginal effective tax rates are high, discouraging labor participation at the lower end of the income distribution. In particular, those taking a job from being jobless face METRs that would discourage intensive job search.

110. **This situation suggests that reforms to improve work incentives should focus on both the tax and benefit systems**. Evaluation of marginal effective tax rates generated by a hypothetical 20 percent flat tax with unchanged benefits shows that work incentives for individuals with poor-income prospects would worsen. This would defeat the important objective of raising labor participation rates, which is crucial for lifting potential growth. However, an alternative that is also being considered by the Slovene authorities could solve these problems; adopting three fairly low rates of personal income tax and widening the gap between the minimum UB and the UA would lower marginal effective tax rates for most individuals. Work incentives would increase, and average effective tax rates for most people would decline.

111. **Further work taking account of aspects of the welfare system not directly related to job status, as well as other effects of tax and benefit reforms, would be a natural extension of this analysis**. Keeping in mind that results in this paper reflect a partial equilibrium perspective, the analysis could be widened to look into the whole spectrum of benefits available in Slovenia and labor demand considerations. Assessing the budgetary impact of the reform would also be crucial before implementation.

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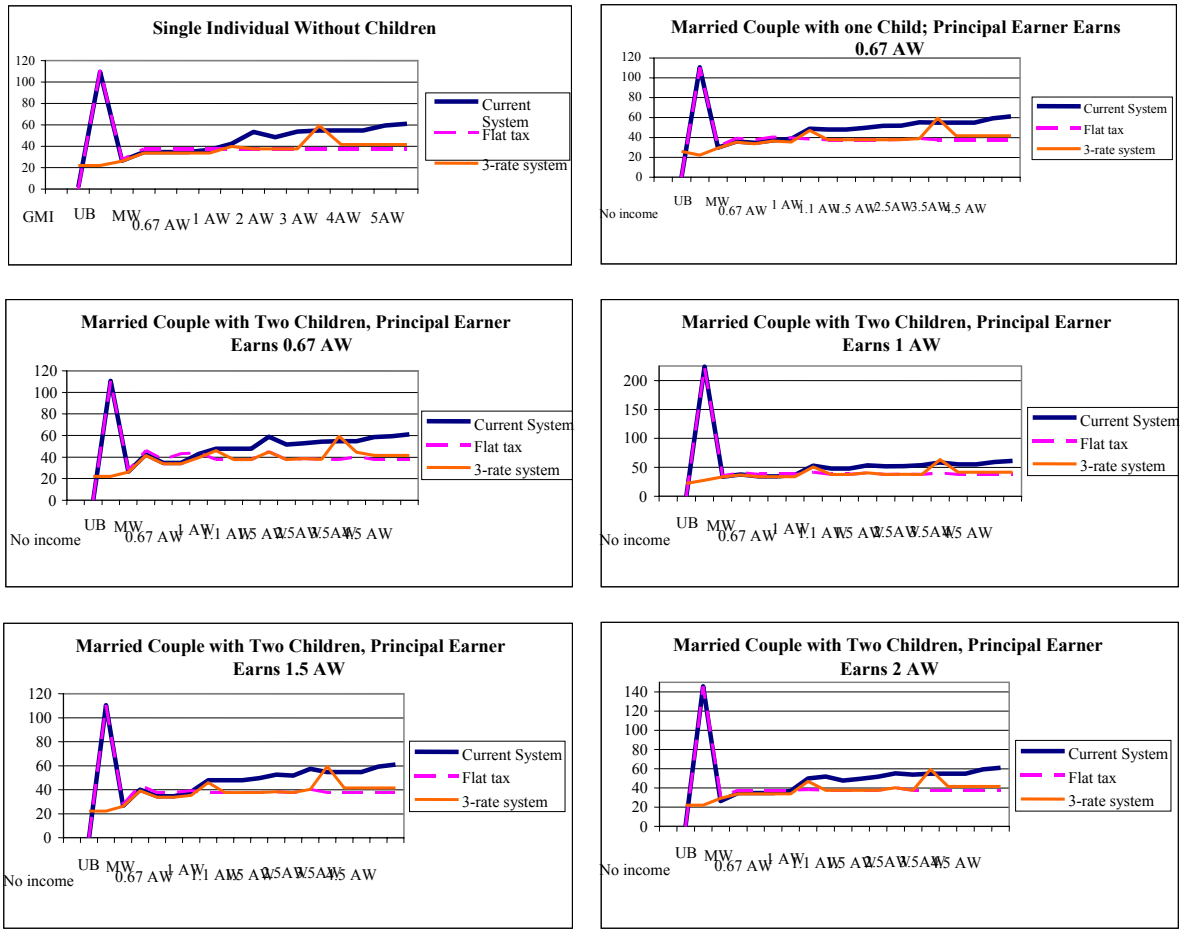
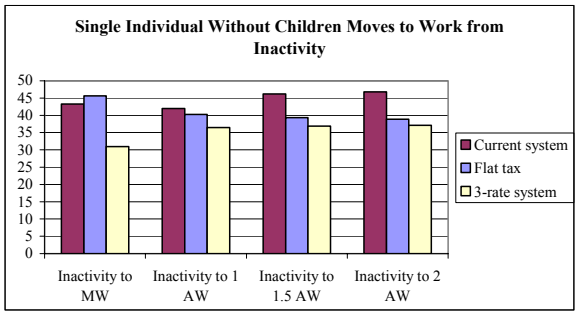
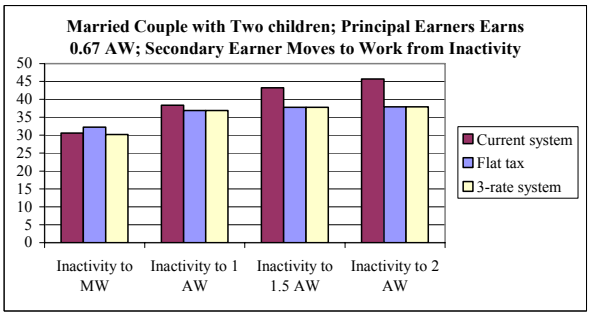
Figure 1. Slovenia: Marginal Effective Tax Rates for Selected Individuals 1/
(In Percent)

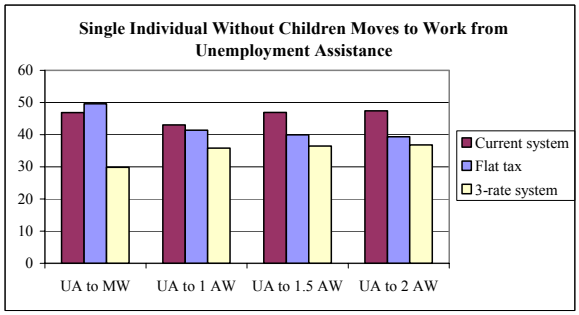


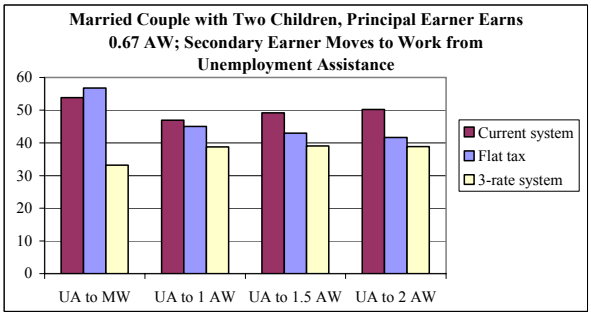
1/ For simplicity of calculations, it is assumed that (i) single individuals who are not eligible for UA receive the full GMI; and (ii) spouses in families where there is a principal earner do not receive the GMI. In couples, the x-axis shows the income of the secondary earner.

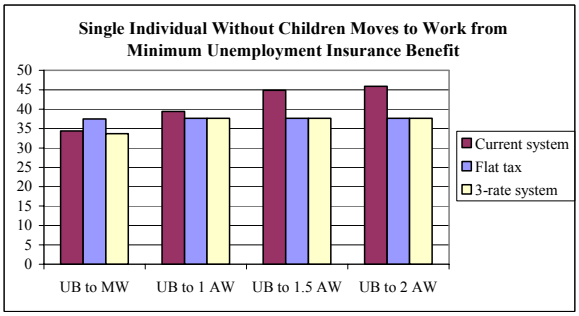
Figure 2. Slovenia: Marginal Effective Tax Rates Faced when Taking Up a Job from Joblessness 1/
(In percent)

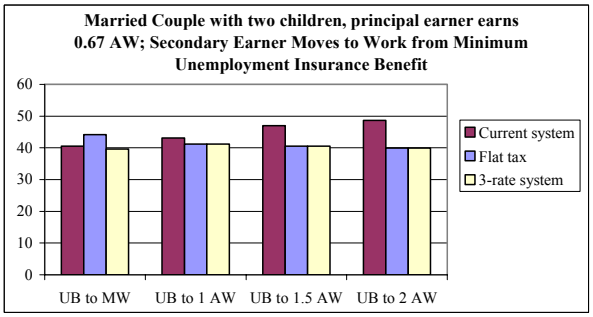






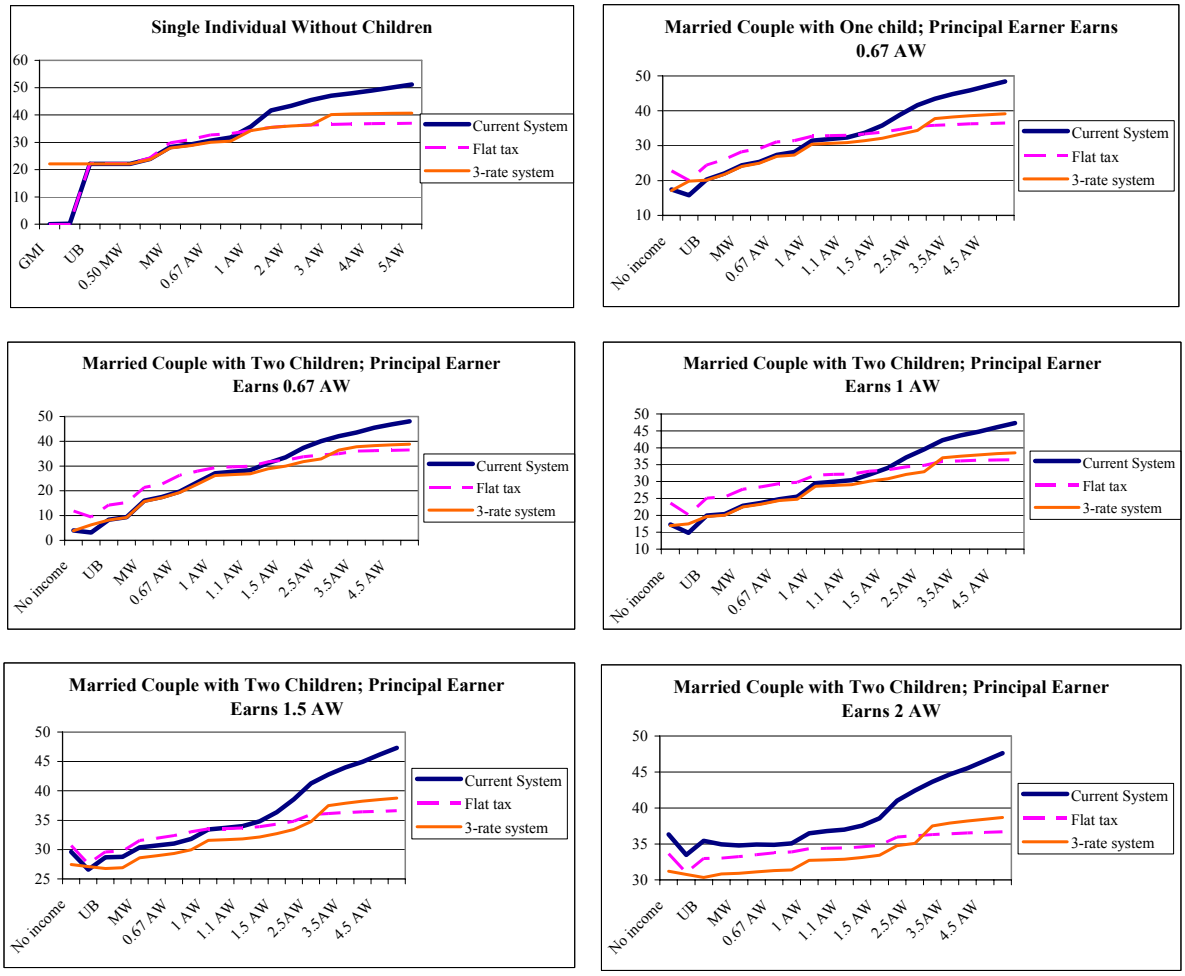






1/ For simplicity of calculations, it is assumed that (i) single individuals who are not eligible for UA receive the full GMI; and (ii) spouses in families where there is a principal earner do not receive the GMI. In couples, the x-axis shows the income of the secondary earner.

Figure 3. Slovenia: Average Effective Tax Rates for Selected Individuals 1/
(In percent)



1/ For simplicity of calculations, it is assumed that (i) single individuals who are not eligible for UA receive the full GMI; and (ii) spouses in families where there is a principal earner do not receive the GMI. In couples, the x-axis shows the income of the secondary earner.

VI. Trends in Technological and Quality Upgrading and Implications for Export Competitiveness in Slovenia[41]

A. Introduction

112. **In the coming years, Slovenia will face increasing challenges in maintaining its export competitiveness.** Slovenia's high income level relative to the other new EU member states and emerging markets puts it at a disadvantage in terms of cost competitiveness. The loss of the exchange rate instrument will pose a further challenge to its competitive position. For a high-wage economy such as Slovenia, quality upgrading and specializing in higher-value-added niche markets will become an increasingly important strategy to withstand competition from low-cost economies and sustain its export market shares. In this regard, its ability to improve the quality and technological content of exports will be a key determinant of its long-run growth prospects and living standards.

113. **Although most competitiveness indicators seem adequate for now, Slovenia's trade performance appears to have been lagging behind its regional peers.** Most indicators of cost competitiveness are favorable, and exports have been growing at a robust pace. Export market shares have also held stable. But the increase in export market share has been more limited than in the other new member states, where market shares have grown much more rapidly. This trend raises questions as to whether Slovenia is gradually falling behind in its export competitiveness.

114. **In this context, this chapter aims to assess Slovenia's competitive position by examining its trade patterns and analyzing whether its exports show evidence of technological and quality upgrading.** In particular, it asks the following two questions:

- Is there evidence of technological and quality upgrading of Slovene exports?
- To what extent does the technological and quality upgrading help explain Slovenia's export market performance?

115. **The analysis finds that, although Slovenia has been increasing the share of high-technology goods in its exports, including to the more developed markets of the EU-15, this increase is smaller than in most other emerging markets.** While this trend is partly explained by Slovenia's favorable initial position, its slower pace of quality upgrading also appears to have played a role. This slow growth, in turn, appears to be related to a catching-up process, as well as to limited opportunities for market linkages and technological spillover.

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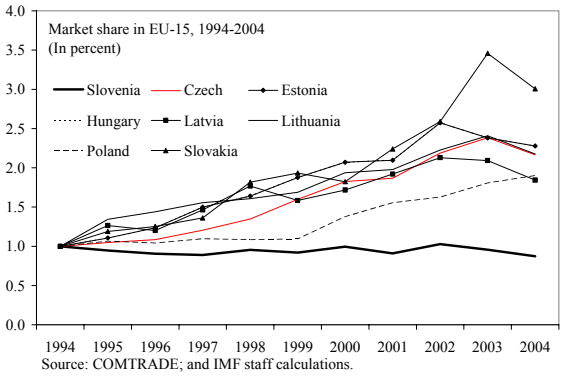
[41] Prepared by Anita Tuladhar and Mercy Mathibe. The cross-country results of the paper are drawn from ongoing research project on trade and techonological upgrading in the new EU member states by S. Fabrizio, D. Igan, and A. Tuladhar.

116. **The chapter is organized as follows**. Section B presents the background on overall competitive indicators; Section C discusses the literature on technological and quality upgrading on export competitiveness; Section D examines specialization trends in Slovenia's exports and provides indicators of competitiveness of high-technology goods; Section E presents evidence on the quality content of exports; and Section F analyses the factors that could explain the market competitiveness trends and the determinants of quality upgrading.

B. Background

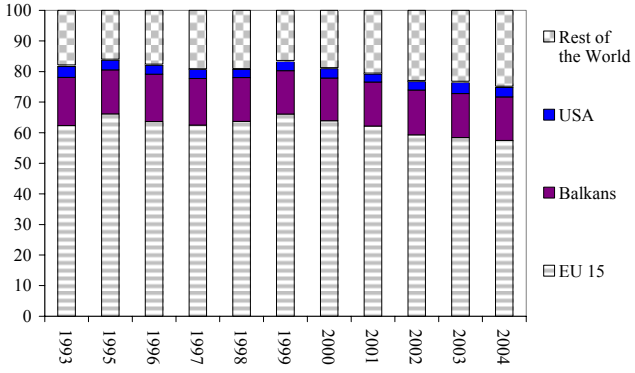
117. **Most indicators suggest that the competitiveness of the Slovene economy is adequate.** CPI-based and cost-based real effective exchange rates have been broadly stable over the past five years (text figure). Studies on equilibrium exchange rates (Bulir and Smidkova, 2004; and Egert and Lommatzsch, 2003) also do not suggest an overvaluation. Declining wage growth has slowed unit labor cost growth, although productivity-adjusted gross manufacturing wages, on average, are still high by regional standards. Export growth, as well as export profitability, remains robust. The variety of export products are on the rise. Slovenia also ranks favorably in competitiveness rankings (Lopez-Claros, Porter, and Schwab, 2006).

118. **Despite these positive trends, Slovenia's export performance is still lagging behind that of other new member states, and remains heavily dependent on a few export markets.** While Slovenia has been maintaining its market share, other new member states (EU-8) have been making more significant gains in the EU-15 and world markets. Whereas the EU-8 market share in the EU-15 more than doubled from 2.2 percent to 4.7 percent between 1993 to 2004, Slovenia's market share has remained relatively constant throughout this period, at about 0.25 percent. Exports to the markets outside of the EU-15, Balkans, and the USA have been steadily increasing at the expense of the EU-15 exports. But diversification within the EU-15 market appears to be relatively limited. The four biggest trading partners—which comprise in order Germany, Italy, Austria, and France—accounted for 83 percent of total goods exports to the EU-15 and 49 percent of total exports to the world, respectively. The sluggish growth in market



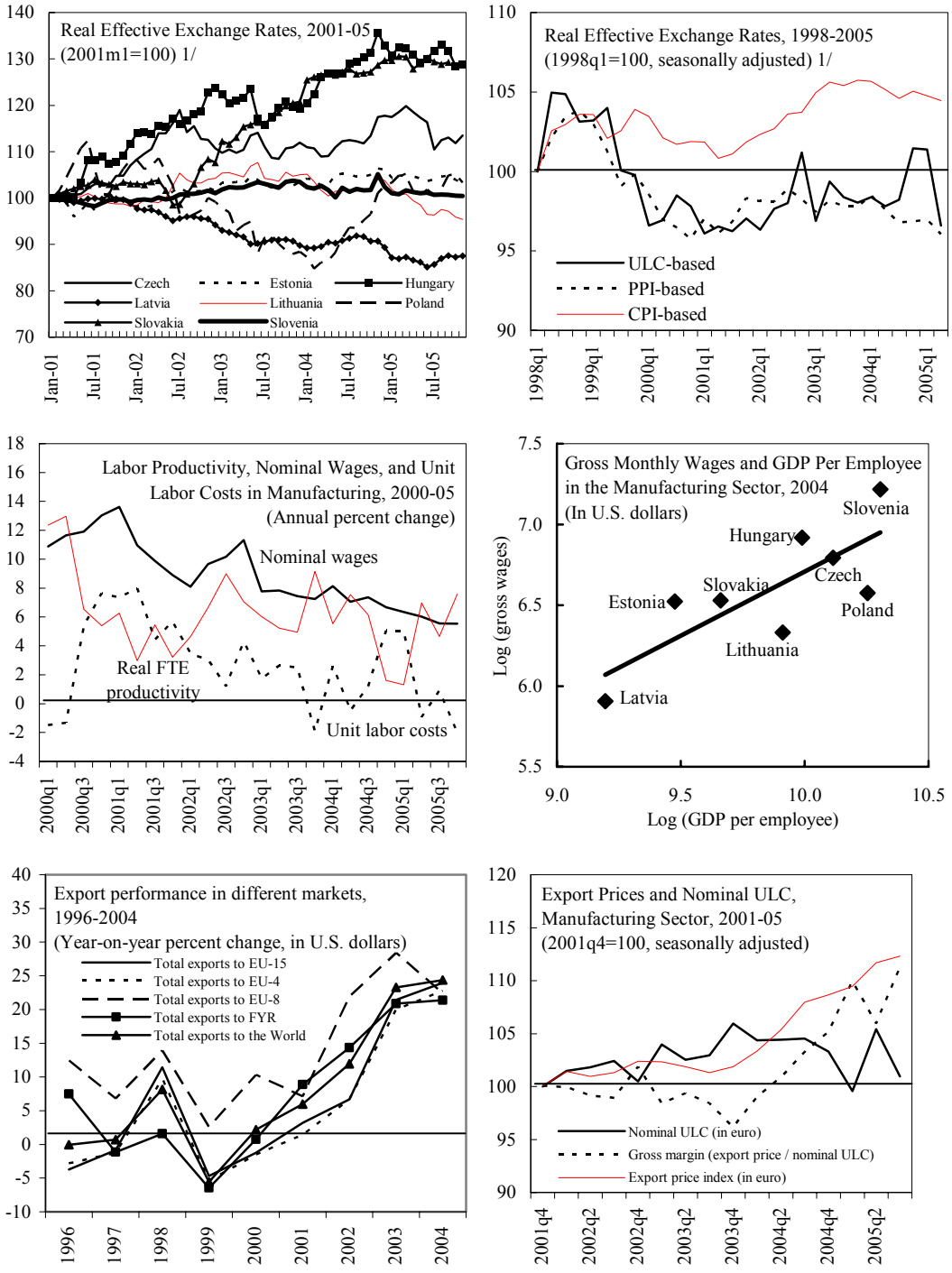
Source: COMTRADE; and IMF staff calculations.

The Structure of Slovenia's Export Markets
(In percent)



Source: COMTRADE; and IMF staff calculations.

Slovenia: Competitiveness Indicators, 1996-2005



Sources: International Financial Statistics, IMF; COMTRADE; Country authorities; Statistical Office of the Republic of Slovenia; and IMF staff calculations.
1/ An increase indicates appreciation.

share has been partly attributed to the slowdown in these key export markets— in particular, Germany and France—in the early half of this decade (IMAD, 2005). Nevertheless, these trends raise concerns about whether Slovenia is gradually losing ground to its regional peers and emerging market countries due to a loss of competitiveness.

C. Literature

119. **The trade literature has highlighted the role played by quality and technological upgrading in export competitiveness**. Theoretical models have discussed the importance of differentiation, through the production of greater varieties of goods or goods of higher quality, for maintaining export markets, especially for larger and richer countries (Krugman, 1980; Flam and Helpman, 1987; and Grossman and Helpman, 1991). One way to achieve this differentiation is through product innovation. When innovation leads to creation of a new product, the economy will have a competitive advantage in this product. In line with the theories of technological gaps and product life cycle (Posner, 1961; and Vernon, 1966), this product will be traded internationally to exploit innovation-driven monopoly profits, until imitation and standardized mass production reduce the competitive advantage. Thus, more advanced economies with higher wages and a more skilled labor force will specialize in new and rising industries that are driven by product innovation, such as high-technology industries, where they can have a competitive advantage. Alternatively, by exporting high-quality goods, countries are also able to differentiate their products and obtain a higher price. Empirical evidence also shows that richer countries export goods with high-quality (Brooks, 2003, Schott, 2004), and that quality differences account for a substantial share of country differences in real income per worker (Hummels and Klenow, 2005). While the early literature focused on the role of preference-driven demand for high-quality goods, recent studies have also highlighted the need to upgrade the quality of exports to meet minimum quality requirements and to minimize transaction costs, given the incomplete contracts in international transactions (Hallak and Sivadasan, 2006). Against this background, we examine next the trends in the technological and quality content of Slovene exports as a key measure of the country's ability to sustain export competitiveness.

D. Is There Increasing Specialization in High-Technology Products?

120. In this chapter, the specialization pattern of Slovenia's exports is analyzed by examining the structure of exports and indicators of revealed comparative advantage (RCA). Developed by Balassa (1965), the RCA is defined as the ratio of the share of "product B" in the country's total exports to the share of the "product B" in world exports.[42] For products in

[42] More specifically, the formula used in the study is as follows:

$$RCA^{s}{}_{b} = \frac{X^{s}{}_{b}}{X^{s}{}_{t}} \div \frac{M^{EU-15}{}_{b}}{M^{EU-15}{}_{t}},$$

(continued)

which the index is unity or greater, the country is deemed to have a comparative advantage. The main advantage of the RCA index is that it allows a more disaggregated analysis of the competitiveness of export products than the more standard measures of competitiveness discussed above (see Pitigala, (2005); Mahmood, (2000); Fertö and Hubbard, (2003); and World Bank, (1998)). In this chapter, the RCA is calculated based on the factor-intensity content of Slovenia's exports and the imports in EU-15 markets, which have close trade links with Slovenia. The SITC three-digit (Rev. 3) export data between 1994 and 2004 from the United Nations COMTRADE database are used. Following Krause (1984) and Hinloopen and Van Marrewijk (2005), these data are classified into five different groups based on the factor intensity: (i) human capital (skilled) labor-intensive products; (ii) technology-intensive products; (iii) unskilled labor-intensive products; (iv) natural resource-intensive products; and (v) primary products.[43]

121. **The structure of Slovenia's exports to the EU-15 shows specialization in technology-intensive and skilled-labor-intensive goods (text tables).** Together, they account for around two-thirds of total exports. This specialization is in line with Slovenia's high level of technological advancement and stock of skilled human capital. Slovenia's ratio of number of students in tertiary education to the total population was around 5 percent in 2003, which is higher than the EU-25 average of 3.7 percent (Eurostat, 2005). Furthermore, Slovenia is ranked among the top four countries in the EU-25 in terms of youth education attainment level in 2004. The RCA indicators also show that over the past decade the competitiveness of technological-intensive exports has been gradually increasing, while that of unskilled labor-intensive exports has been declining (text table). Furthermore, since 2003, the RCA for technology-intensive exports has been greater than 1 suggesting that Slovenia's exports to the EU-15 have been more competitive than the rest of the world's.

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where, RCA^{s}_{b} = revealed comparative advantage/ disadvantage index of Slovenia in product (*b*),

X^{s}_{b} = total value of Slovenia's exports of product (*b*),

X^{s}_{t} = total value of Slovenia's overall goods exports,

$M^{EU\text{-}15}_{b}$ = total value of the EU-15 imports of product (*b*), and

$M^{EU\text{-}15}_{t}$ = total value of the EU-15 overall goods imports.

A value for this index of below 1 indicates that a country has a "revealed" comparative disadvantage in that product, whereas a value equal to or greater than 1 indicates that the country is considered to have a "revealed" comparative advantage in that product.

[43] See Appendix I for the detailed classification of products.

Structure of Slovenia's Exports to the EU-15 by Factor Content
(In percent)

	Primary Products	Skilled Labor Intensive	Technology Intensive	Natural Resource Intensive	Unskilled Labor Intensive
1996	4	33	27	10	27
1997	4	33	28	10	25
1998	4	35	28	9	24
1999	4	33	30	9	24
2000	4	33	32	9	22
2001	4	32	32	9	22
2002	4	34	33	9	20
2003	4	33	35	9	20
2004	5	33	34	9	19

Source: COMTRADE; and IMF staff calculations.

Revealed Comparative Advantage Indices of Slovenia's Exports to the EU-15
(Ratio)

	Primary Products	Skilled Labor Intensive	Technology Intensive	Natural Resource Intensive	Unskilled Labor Intensive
1996	0.40	1.28	0.87	1.80	2.07
1997	0.44	1.27	0.87	1.82	1.91
1998	0.44	1.26	0.83	1.76	1.91
1999	0.45	1.20	0.84	1.84	1.98
2000	0.45	1.32	0.86	1.85	1.95
2001	0.45	1.26	0.89	1.86	1.91
2002	0.45	1.25	0.93	1.81	1.76
2003	0.45	1.22	1.01	1.92	1.69
2004	0.42	1.26	1.01	2.22	1.69

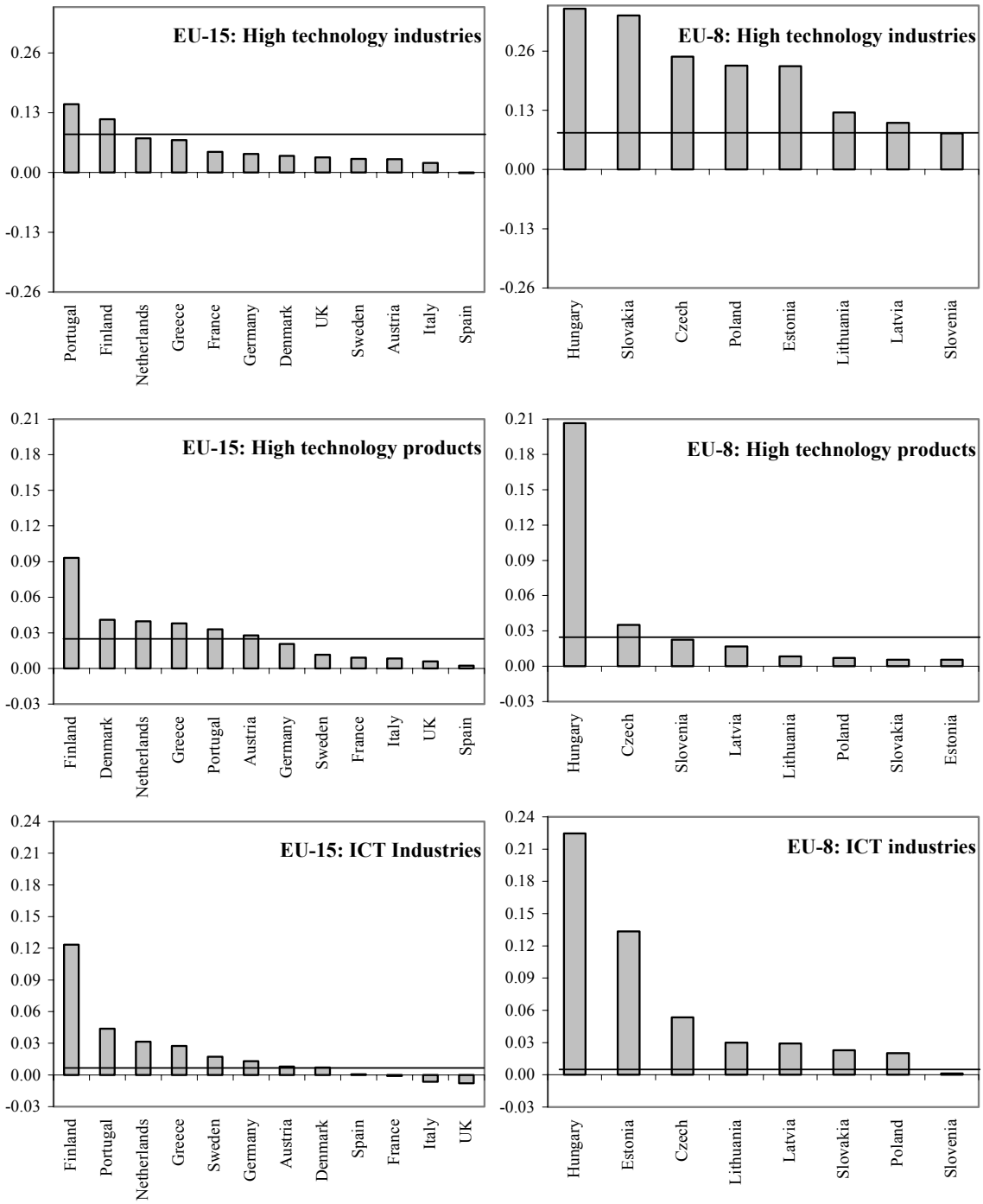
Source: COMTRADE; and IMF staff calculations.

122. **Under alternative classifications of high-technology export products, it is also evident that Slovenia's exports of goods with high technological content are increasing as a share of total exports to the world.** A total of six different classifications of high-tech and high-skill exports are examined. Following the taxonomies in Peneder (2001), export products are classified under two different criteria by: (i) by factor intensity; and (ii) labor skill intensity. In line with Hatzichronoglou (1997), manufacturing industries are also classified under various levels of technology intensity. Another taxonomy, following Dulleck and others (2005), classifies industries under different levels of technological content. Under this classification, industries under machinery, equipment, and transport are included as high-technology industries. In addition, the shares of exports of information and communication technology (ICT) goods and high-technology product goods are also calculated.[44] Under each of these categories, the share of the high-technology segments has increased between the years 1994 and 2004 (text figures). For example, the shares of exports with high-technology intensity and of high skill intensity each increased by around 5 percent. Exports of high-technology industries goods, have also increased by around 8 percent as a share of total exports. The share of ICT industries, however, has remained at the same level over this time period.

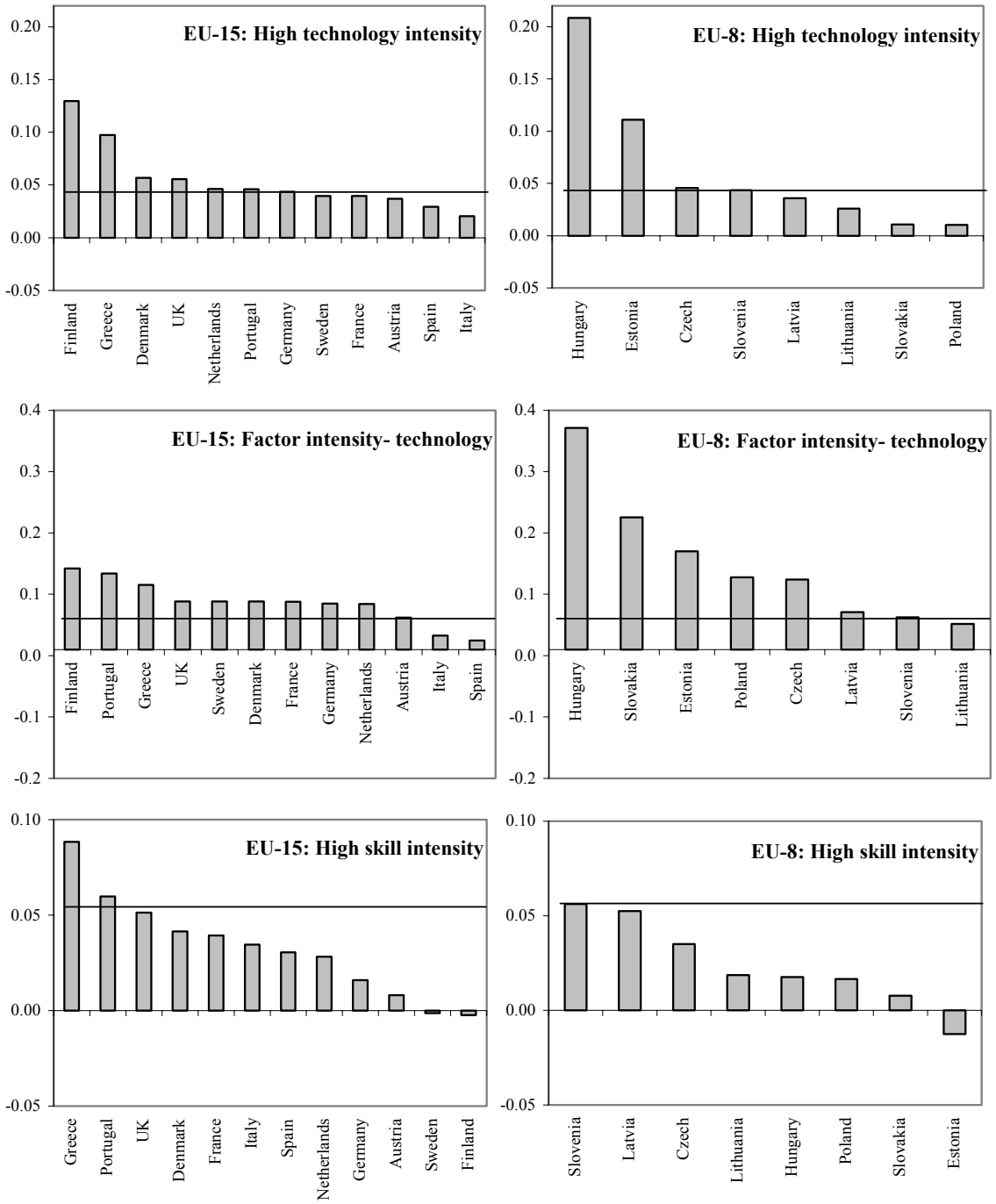
123. **While this specialization is in keeping with the trend in other European countries, Slovenia seems to be shifting to high-technology exports more slowly than the other EU-8 countries.** Aside from the high-tech-product exports and the high-skill-intensive exports, where Slovenia has advanced the most, the rate at which Slovenia is shifting into high- technology goods is generally slower than that of other EU-8 members, particularly the Central European countries (CECs) of Hungary and the Czech and Slovak Republics. These

[44] Under the factor-intensity taxonomy, manufacturing exports are classified under mainstream, labor-intensive, capital-intensive, marketing-driven and technology-driven categories. Under the labor-skill-intensity taxonomy, these exports are divided into low-skill, medium-skill/blue collar, medium-skill/white collar, and high-skill categories. Under technological intensity, exports are classified as high-tech, medium-high tech, medium-low tech and low-tech industries. Detailed information on product coverage under these classifications is available at http://ec.europa.eu/economy_finance/publications/economic_papers/economicpapers181_en.html and at http://www.olis.oecd.org/olis/1997doc.nsf/43bb6130e5e86e5fc12569fa005d004c/94da9f9c463dd85cc125656a004b77b0/$FILE/12E77471.DOC.

Europe: Increase in Share of High-Technology Exports to World, 1994-2004 1/
(In percent)



Europe: Increase in Share of High-Technology Exports to World, 1994-2004 1/ (continued)
(In percent)



Sources: COMTRADE database; and staff calculations.
1/ EU-15 data excludes Belgium, Ireland, and Luxembourg.

findings are consistent with the studies on technological upgrading (Dulleck and others 2005; and Landesmann, 2003), which also show a structural shift toward high-technology industries of the EU-8 in its exports to the EU, with the CECs leading the group.

124. **An examination of the RCA indicators also suggests that Slovenia's competitive gains vis-à-vis the rest of the world are not as strong as the CECs'.** A look at the RCA indicators between 1994 and 2004 shows some regularities (text figures):

- **Slovenia held a more favorable initial competitive position than the other EU-8 countries**. In 1994, Slovenia's RCA was among the highest in the EU-8, with the RCA furthest to the right. This is the case under all technological classifications, except for the ICT industries.

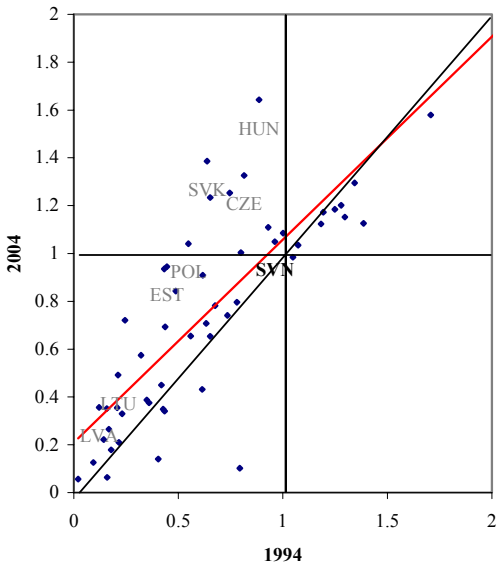
- **Over the past decade, Slovenia's position has been relatively stable,** as demonstrated by its position near the 45-degree line. The CECs, in particular, are placed above the 45-degree line, suggesting their competitive position is advancing more rapidly.

- **During this decade, other new member states have been rapidly catching up**. Indeed, by 2004, many of these countries have RCAs above 1, indicating a stronger competitive position in these products. The CECs tend to be positioned more upper left than to Slovenia. However, in the high-technology product and high skill intensity products (not shown), Slovenia's position has improved and is close to that of the EU-8.

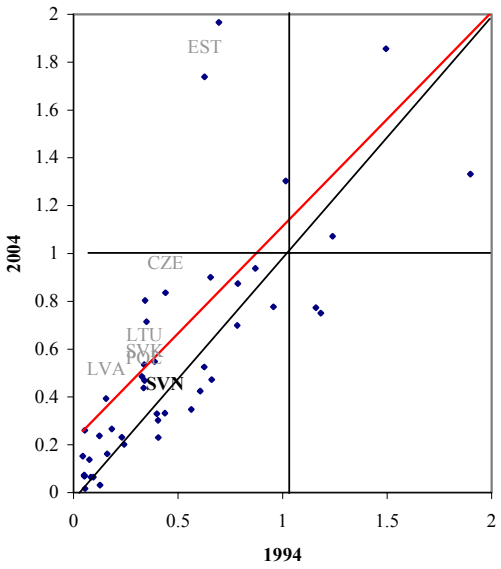
- **A partial explanation for the relatively slow gain in the RCA of Slovene exports could be its initial position**. A simple regression line on the RCA levels for the high technology exports for 56 developed and emerging markets in the sample has a slope less than the 45-degree line. This suggests that the catch-up effect may play a significant role in the growth rate of market share. This also indicates that specialization has not increased in products that did not hold an initial competitive advantage existed. These factors are tested more formally in Section F.

Cross-Country Comparison: Revealed Comparative Advantage, 1994 vs. 2004
(Ratio)

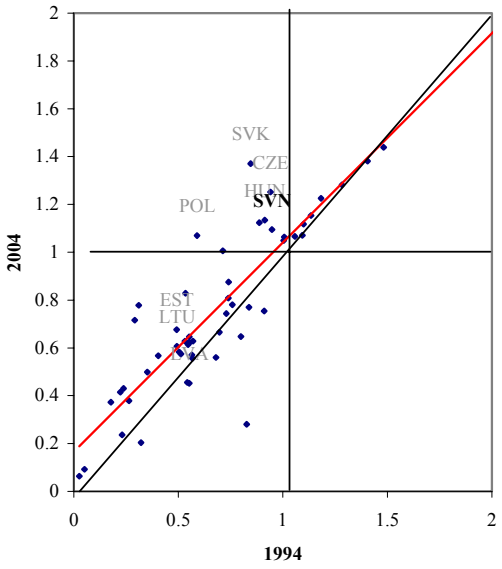
High-Tech Industries



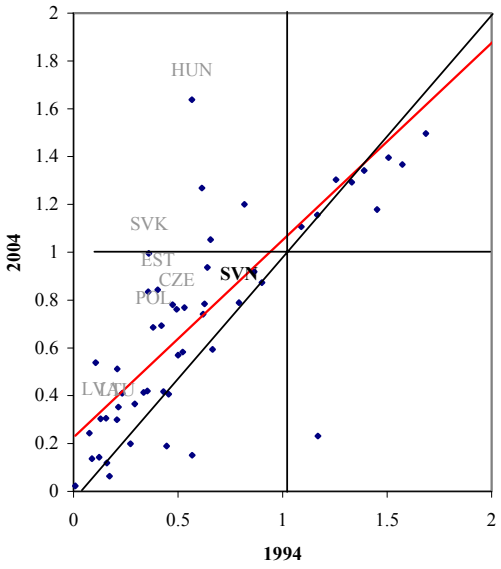
ICT Industries



Medium-High-Tech Intensity



Tech-Driven Factor Intensity



Sources: COMTRADE database; and staff calculations.

E. Is There Evidence of Quality Upgrading?

125. **In this study, quality is proxied using unit value ratios (UVRs) of manufacturing export goods**. Following studies on quality upgrading by Dulleck and others (2005), Hallak and others (2005), and Landesmann (2003), this ratio tries to capture the quality content of the export product that is implicit in its price. This approach is based on the assumption that, for the same product, a higher price is paid for greater quality. The UVR is calculated as the ratio of unit value for a Slovene export product to that of the world export of the same product.[45, 46] To achieve homogeneity of goods to the maximum extent possible, the unit values are calculated at the six-digit level of the Harmonized System Classification from the COMTRADE database. The product level UVRs are then aggregated using current-year shares as weights. To ensure comparability, the methodology also ensures a common basket of goods for both the country and the benchmark of total world exports.

126. **Since 1994, Slovenia appears to have improved the quality content of its exports, as measured by an increase in UVRs, but the pace of improvement is lagging behind the EU-8, especially in high-technology exports.** The change in the country-level UVR between 1994 and 2004 shows a positive improvement (text figures). This is in keeping with the trend in most developed and emerging market countries and ranks about average, compared with the rest of the EU-8 countries. A closer look at the high technology exports reveals, however, that Slovenia's pace of quality improvement is lagging behind many of the EU-25 countries. This trend is observed under all the technological classifications.

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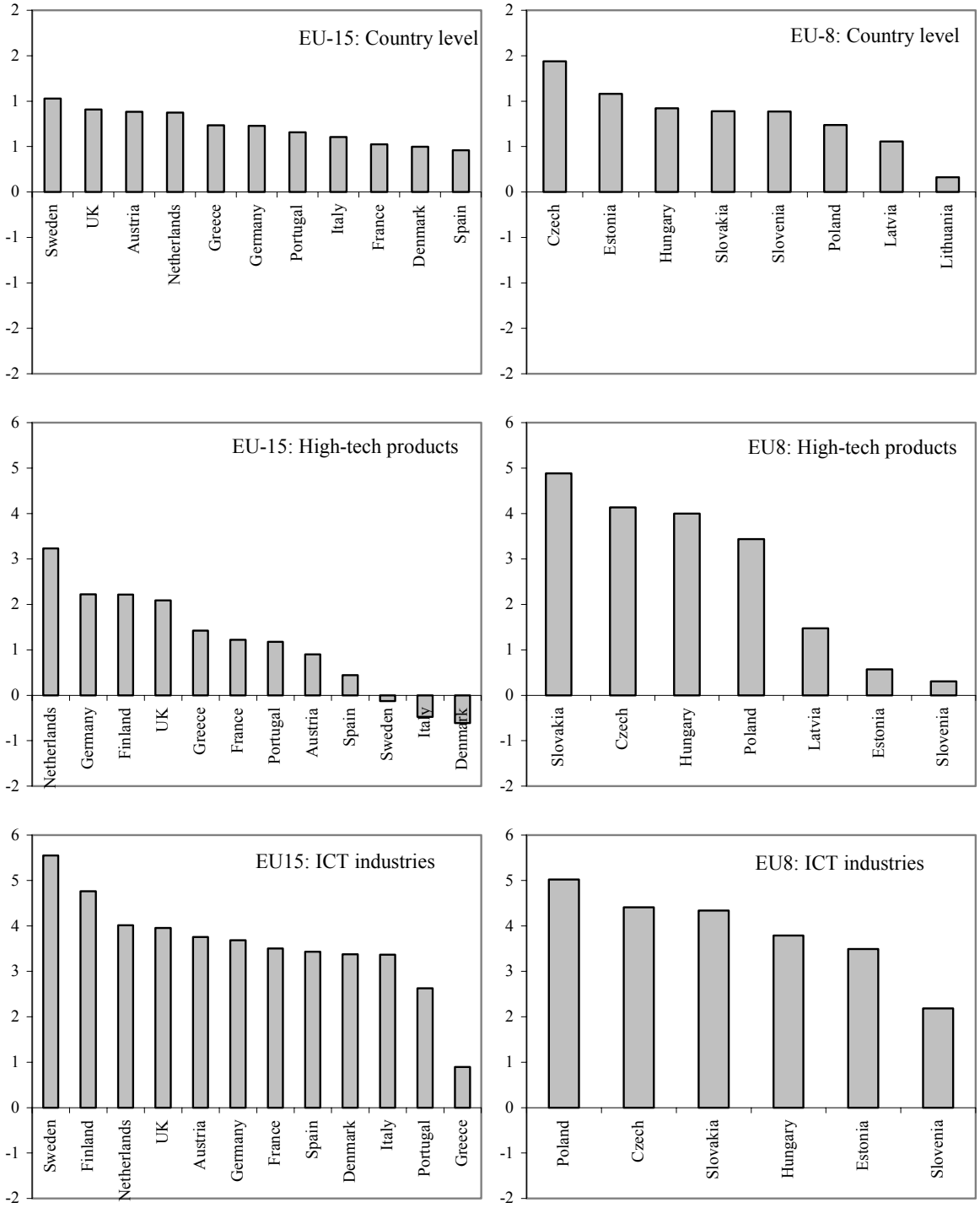
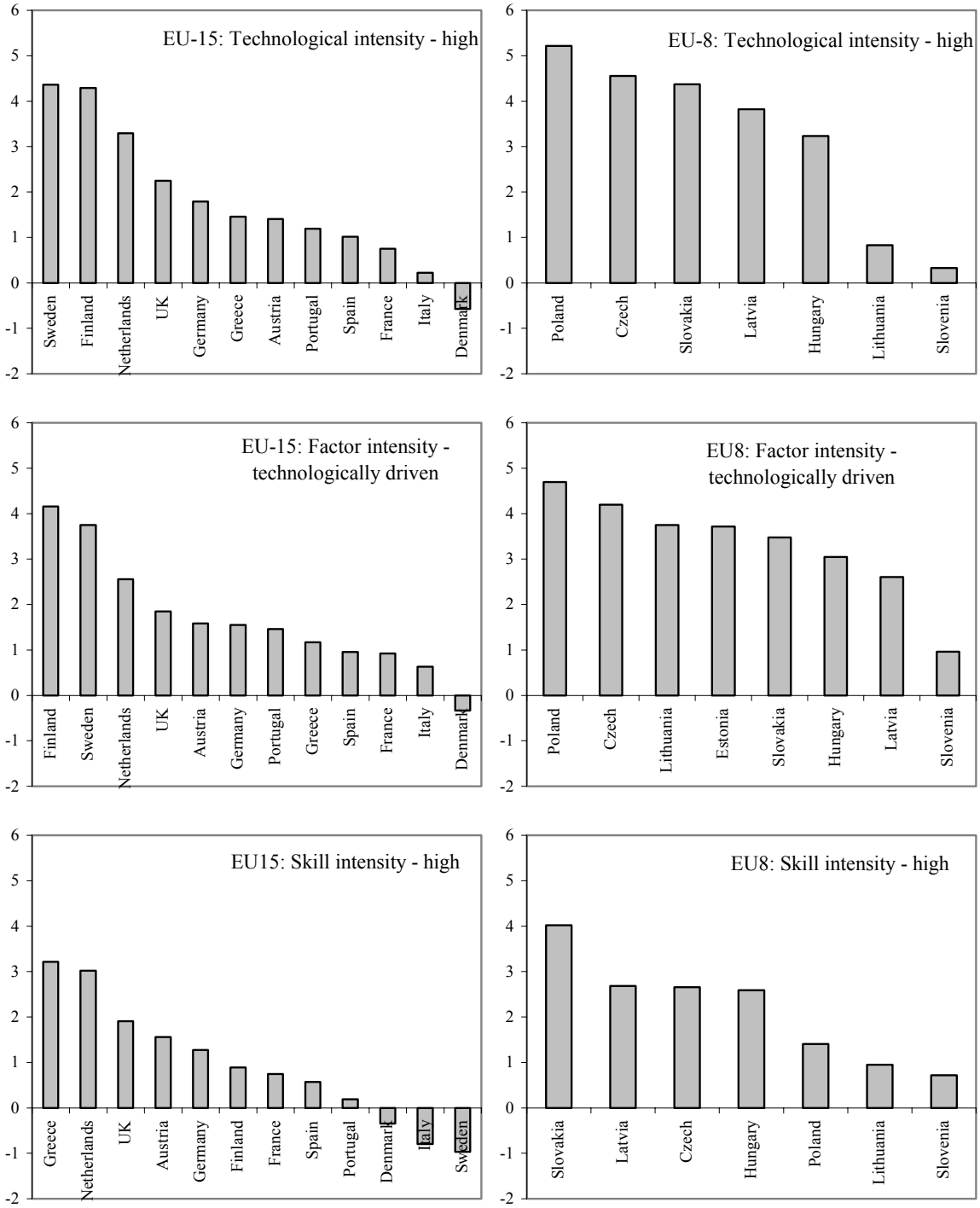
[45] More specifically, the unit value ratio of an export product *i* of country *j* compared with the world is calculated as $UV_{i,j}/UV_{i,world}$, where the unit value, $UV_{i,j}$ is the value of exports of product *i* to the world by country *j*, divided by its volume. For the measurement of volume, common units have been used, not limited just to kilograms, to ensure consistency and minimize loss of data. $UV_{i,world}$ is the unit value of total world imports from the world. These product-level UVRs are then aggregated to higher-level UVRs using a stepwise weighting procedure. Two aggregate UVRs can be constructed, one using country *j*'s export structure weights, and the second using world's total import structure weights. In this paper, country *j*'s weights have been used. In another dimension, UVRs based on current-year weights can be compared to UVRs constructed using a base year for the weights. In this chapter, however, the UVR calculations are based only on current-year weights.

[46] A potential disadvantage of this measure is the difficulty in distinguishing between quality upgrading and price inflation. Studies on quality have tried to deal with this by calculating export shares based on volume rather than value terms. Other studies have tried to isolate the effect of quality from price information contained in the UVR indicators by examining interactions with other factors that could increase quantities exported, such as product variety.

Europe: Increase in UVR of Manufacturing and High Technology Exports, 1994-2004 1/
(Ratio)



Europe: Increase in UVR of High Technology Exports, 1994-2004 1/ (continued)
(Ratio)



Sources: COMTRADE and staff calculations.

1/ Several EU-8 countries whose data are missing are excluded. EU-15 excludes Belgium, Ireland, and Luxembourg.

127. **The increase in UVRs over time could be driven by a quantitative shift toward high- quality products or by higher prices for the same exports.** Under the assumption of scale economies in the production of high-quality goods, an exogenous increase in demand—for example, through trade openness—of a relatively high-quality good would generate larger output. Thus, even though prices have remained unchanged, the increasing share of the high quality good in the export composition would lead to an increase in UVRs. UVRs would also increase if improving cost competitiveness enabled new entrants to focus on producing higher-quality goods. One method to determine whether the increase in the UVR is being driven by a price increase or by a shift into products with a higher-quality content is by calculating the UVRs using the base-year shares as constant weights. In Slovenia's case, the increase in the UVR of high-tech products under current weights is higher than under constant weights, using 2000 as the base year. This indicates a shift in the composition of exports, with an increasing share of products with higher UVRs. This trend is observed under most of the technological classifications. In the CECs, this trend is less evident, suggesting that the increase in UVRs could be driven more by price effects in these countries. The price increase, in turn, could reflect higher quality content, owing to technical improvements or even externalities from market perception or preference for quality (such as labeling or brand image). This may be particularly relevant for countries that exhibit a faster catch-up effect. The following section tests more formally the different factors driving the increase in UVRs and the improvement in market competitiveness.

F. Empirical Analysis

128. **To better understand the factors behind market share performance and to test whether quality upgrading explains export market performance, we estimate the change in market share under the following specification:**

$$\Delta Share_{j,t} = \alpha + \beta_1 \Delta Share_{j,t-1} + \beta_2 Share_{j,0} + \beta_3 \Delta UVR_{j,t} + \beta_4 \Delta REER_{j,t} + \beta_5 Trade\ openness_{j,t} + \beta_6 FDI_{j,t} + \varepsilon_{i,j,}$$

where *j* represents an individual country in time-series panel data. The equation is estimated using a fixed-effects methodology across country observations. A negative coefficient β_2 on the initial share indicates a catch-up effect, as countries with a small initial shares grow faster. The coefficient β_3 estimates the effect of improved quality, contained in the UVR indicator, in gaining market share. We also introduce control variables such as the real effective exchange rate to capture the impact of price competitiveness. Similarly, to proxy for the impact of market linkages and trade policies, we include FDI and trade openness, both as a percent of GDP. The equation is also estimated using changes over different time windows. The data in the full sample cover 129 countries over the period 1994-2004.

Table 1. Dependent Variable: Change in World Market Share

	All countries, 1 yr	All countries, 3 yr	Emerging, 1 yr	Developed, 1 yr	Developing, 1 yr
Lagged dependent variable	**-0.133**	-0.034	**-0.195**	0.01	-0.136
	(1.73)	(0.56)	(3.14)**	(0.11)	(1.62)
Lagged level market share	**-0.835**	**-0.924**	**-0.546**	**-0.867**	**-0.849**
	(9.97)**	(10.53)**	(4.21)**	(5.52)**	(8.82)**
Change in country UVR	-0.122	-0.148	**0.241**	**-0.132**	-0.2
	(1.32)	(1.61)	(4.29)**	(2.03)	(1.37)
Change in REER	**0.44**	0.14	**0.548**	-0.219	**0.44**
	(3.13)**	(1.04)	(1.85)	(0.70)	(2.58)*
FDI	-0.021	0.011	-0.028	0.02	-0.038
	(0.75)	(0.34)	(1.18)	(1.07)	(0.75)
Trade openness	**0.224**	-0.062	**0.56**	**-0.428**	0.165
	(1.78)	(0.21)	(4.16)**	(1.76)	(0.98)
Constant	**-5.666**	**-4.957**	**-5.08**	**-1.602**	**-6.274**
	(7.83)**	(3.77)**	(7.99)**	(1.91)	(6.41)**
Observations	997	763	270	186	540
R-squared	0.51	0.45	0.48	0.52	0.51
Number of Countries	118	119	31	22	65

Robust t statistics in parentheses

* significant at 5%; ** significant at 1%; significance above 10 % threshold marked in bold.

129. **The empirical estimation for market performance points to several findings:**

- **Catch-up plays a significant role in gaining market share (text table)**. This relationship is robust to alternative specifications of time windows and country samples. The speed of convergence, implicit in the coefficient for the initial lagged-level market share, is faster for the sample of developing economies compared than for emerging markets, in line with the catch-up hypothesis. However, the coefficient is quite large for the developed economies. Among these countries, the market share—as a relative concept—is being lost as other countries catch up. This relationship holds even after controlling for factors such as trade openness and price competitiveness. In the case of Slovenia, this could partly explain the export performance of its high-tech industries, where Slovenia held a comparative advantage in the mid-1990s. However, this still does not explain the total export performance because even though Slovenia's initial aggregate export market share was smaller than the CECs, the growth in its market share was still smaller.

- **The strong relation of trade openness to market share gain among the emerging markets could suggest a positive impact of growing linkages through trade integration**. However, this relationship is not very robust and is sensitive to the choice of country groups.

- **A positive relationship between REER appreciation and market share improvements is particularly strong for emerging markets and developing economies**. Interestingly, one would have anticipated that a REER appreciation would have led to a loss of competitiveness and market share. But the opposite sign could be a reflection of reverse causality, as a growing trade share is linked to productivity improvement and Balassa-Samuelson effects.

- **For emerging markets, quality upgrading is also important for improving export performance**. In this group of countries, the increase in UVR shows a strong positive relationship with gains in market share. This result supports the role of quality upgrading as a key determinant among emerging markets since export market shares are increasing even as unit prices are going up. Among the developed economies, however, this relationship is negative and significant. For these countries, market share has been declining on average despite an improvement in UVRs. This development may reflect more difficulty in retaining market share for a given level of UVR growth, as other developing and emerging market countries catch up faster. Indeed, an interaction term between initial share and UVR growth enters the regression positively for the sample of developed economies (not shown), suggesting that enhancing quality, for a given level of initial share, helps to retain market share. Among the developing economies, the negative relationship despite the catching-up effect could suggest either underlying structural problems or a capturing of the price effect in the UVR indicators. Below, we test for the factors driving the UVR growth in the data.

130. **Given the differential impact of UVR growth on market share, we examine in more detail some of the factors that determine growth in the UVR index. We test the following specification, again using a fixed-effects model:**

$$\Delta UVR_{i,t} = \alpha + \beta_1 \Delta UVR_{i,t} + \beta_2 UVR_{i,0} + \beta_3 \Delta REER_{i,t} + \beta_4 Trade\ Openness_{i,t} + \beta_5 FDI_{i,t} + \varepsilon_{i,t.}$$

UVR growth is regressed on the initial UVR to examine the catch-up effect. In the presence of scale economies in producing high quality goods, one would expect a positive value of the coefficient $\beta_{2.}$ But if factors other than technological intensity, such as improved image and consumer preferences are driving higher demand and prices, the scope for catch-up could be greater. Real exchange rate appreciation is also included to examine whether a rise in prices is driving UVRs. Finally, to test whether cross-border technological spillovers and learning through market integration play a role, we include FDI and trade openness, measured as the total exports and imports as a percent of GDP. Trade openness can also be an important indicator of quality upgrading as production of higher-quality goods would require more imports of intermediate goods. All variables are expressed in logs.

131. **The results indicate several empirical regularities, as follows:**

- **The catch-up effect is again significant, as countries with a lower initial UVR experience faster UVR growth**. The coefficient on initial UVR is negative and highly significant across the different time windows and country groups (Text Tables 2a and 2b). In keeping with the growth literature, the speed of convergence is found to decline faster among the emerging market and developed economies than among the developing economies. This negative relationship is also observed when using a subsample for the various technological segments.

Table 2a. Dependent Variable: Change in Country UVR, (1, 3 and 5 year windows)

	All, 1yr	All, 1 yr	All, 3 yr	All, 3 yr	All, 5 yr	All, 5 yr
Lagged Dependent Variable	**-0.305**	**-0.361**	0.141	0.151	-0.038	-0.019
	(2.09)*	(2.16)*	(1.57)	(1.42)	(0.87)	(0.35)
Lag level (initial UVR)	**-0.391**	**-0.295**	**-0.886**	**-0.847**	**-0.847**	**-0.519**
	(4.11)**	(3.45)**	(9.64)**	(8.72)**	(3.75)**	-1.34
Change in REER	0.09	0.054	-0.044	0.042	0.092	0.127
	(1.37)	(0.84)	(1.18)	(1.00)	(1.13)	(1.33)
FDI		**0.027**		**0.051**		-0.031
		(1.78)		(2.57)*		(0.68)
Trade Openness	**0.213**		**0.396**		-0.099	
	(2.90)**		(2.08)*		(0.64)	
Constant	**-0.791**	**0.076**	**-1.448**	**0.172**	0.735	**0.127**
	(2.57)*	(4.14)**	(1.84)	(8.90)**	(1.12)	(1.33)
Observations	1127	999	873	765	620	541
Number of Country	127	118	127	119	125	115
R-squared	0.29	0.28	0.32	0.31	0.11	0.04

Robust t statistics in parentheses

* significant at 5%; ** significant at 1%; significance above 10 % threshold marked in bold.

Table 2b. Dependent Variable: Change in Country UVR (one year window)

	All	All	Developing	Developing	Emerging	Emerging	Developed	Developed
Lagged Dependent Variable	**-0.361**	**-0.305**	**-0.392**	-0.274	-0.129	-0.09	**-0.158**	**-0.21**
	(2.16)*	(2.09)*	(1.75)	(1.30)	(0.90)	(0.62)	(1.77)	(2.92)**
Lag level (initial UVR)	**-0.295**	**-0.391**	**-0.407**	**-0.578**	**-0.2**	**-0.249**	**-0.274**	**-0.276**
	(3.45)**	(4.11)**	(2.11)*	(2.76)**	(3.57)**	(5.77)**	(2.57)*	(2.34)*
Change in REER	0.054	0.09	0.023	0.014	0.082	**0.231**	0.155	0.267
	(0.84)	(1.37)	(0.27)	(0.17)	(0.66)	(1.89)	(0.55)	(1.30)
FDI	**0.027**		0.016		**0.056**		0.029	
	(1.78)		(0.79)		(1.93)		(1.18)	
Trade Openness		**0.213**		**0.128**		**0.397**		**0.963**
		(2.90)**		(1.72)		(2.53)*		(3.11)**
Constant	**0.076**	**-0.791**	**0.065**	-0.436	0.043	**-1.646**	**0.125**	**-3.837**
	(4.14)**	(2.57)*	(2.22)*	(1.44)	(1.50)	(2.39)*	(4.03)**	(3.05)**
Observations	999	1127	542	655	270	279	186	193
Number of Country	118	127	65	74	31	31	22	22
R-squared	0.28	0.29	0.36	0.37	0.12	0.14	0.17	0.22

Robust t statistics in parentheses

* significant at 5%; ** significant at 1%; significance above 10 % threshold marked in bold.

- **Market spillover effects are important for quality upgrading**. Trade openness enters the regression positively and is significant across most samples and time periods. FDI is also positively related to UVR growth and is significant, in particular, for the emerging markets group. This outcome indicates that knowledge spillover and market linkages have played an important role in enhancing quality in this group of countries.

Table 3: Indicators of Investment and Technological Progress, 2000-04

	FDI, 2000-04, (Percent of GDP)	R&D, 2000-02, (Percent of GDP)	US Patents, 2000-04, (Total)	School enrollment, tertiary, 2000-02 (In percent of Gross)	Labor force with tertiary education, 2000-01, (In percent of total)	Manufacturing Productivity Growth, 2000-04 (In percent)
Slovenia	2.3	1.5	18	65	17	6.3
EU-8 average	5.0	0.8	16	54	23	7.8
Czech	7.3	1.2	28	33	11	7.7
Hungary	4.9	0.9	53	45	16	5.3
Poland	3.5	0.6	15	58	14	8.1
Slovakia	7.5	0.6	5	32	29	7.0
Estonia	7.9	0.6	3	64	36	10.0
Latvia	3.4	0.4	2	68	20	9.1
Lithuania	3.3	0.6	2	65	45	9.3
EU-15 average	4.6	2.0	1,951	60	21	0.0
Austria	2.4	2.1	551	51	12	4.8
Denmark	5.7	2.5	457	63	25	1.1
Finland	3.6	3.4	788	86	32	6.7
France	2.8	2.2	3,829	54	26	0.3
Germany	2.8	2.5	11,000	50	19	3.6
Greece	0.7	0.6	20	68	24	-2.2
Ireland	16.1	1.1	148	50	26	na
Italy	1.2	1.1	1,696	53	12	-0.1
Netherlands	8.0	1.9	1,312	57	12	3.1
Portugal	3.9	0.9	13	53	9	2.4
Spain	4.3	1.0	283	59	27	0.4
Sweden	5.0	4.3	1,561	77	27	4.9
UK	3.8	1.9	3,712	62	26	na

Sources: Eurostat; World Economic Outlook, IMF; World Development Indicators, World Bank; OECD; US Patent and Trademark Office.
1/ EU-15 data excludes Belgium, and Luxembourg.
2/ Data reflects average over the sample period. The time periods for individual country data may vary within this range depending upon data availability.

132. **These results suggest that, despite its comparative advantage with a high-skill workforce, weak market linkages may have contributed to the slower quality upgrading in Slovenia.** Given that Slovenia's FDI has been much lower than in all other EU-8 and some EU-15 countries (Text Table 3), this could have played a role in the slower quality upgrading. The role of relatively weak market linkages in Slovenia is also suggested by the fact that, despite spending substantially higher amounts on research and development than the CECs, Slovenia has produced a much smaller number of commercial applications in the form of patents. Furthermore, despite a very high tertiary school enrollment rate, the number of Slovenes with a tertiary education who are in the labor force is much smaller than the average in both the EU-8 and EU-15 countries.

133. **The analysis can be expanded in several dimensions.** First, in understanding trade patterns, gravity models have played a significant role. Thus, the impact of trade distance and its interaction with measures of technological and quality gaps with trading partners can be used. Second, in order to disentangle the effect of prices from that of quality improvement, export data based on volume (tons) can be used. Third, since the link between quantities exported and prices, as represented by the UVRs, may be distorted by the presence of a greater variety of products (Hallak and Schott, 2005), the effect of variety in isolating the role of quality can also be examined. Fourth, empirical analysis can also be done at a more disaggregated level to examine more directly whether catching up, market spillover, and investment lead to higher quality and market performance. Answering this question would be

particularly important since the literature has noted the differential impact across different industries and quality segments. Finally, with many emerging market countries, particularly the EU members, focusing on increased research spending in order to achieve faster technological progress, the impact of this greater spending on quality, as well as market performance, can also be analyzed.

G. Conclusions and Policy Implications

134. **This paper focuses on two key questions, the answers to which provide important indicators of Slovenia's future prospects for export competitiveness and growth enhancement.** First, it examines whether there is evidence of technological and quality upgrading of Slovene exports. Second, it tries to analyze to what extent the technological and quality upgrading helps explain Slovenia's export market performance. This is particularly interesting, given that Slovenia is gaining export market shares more slowly than the other new EU member states. The paper also takes a comparative look at Slovenia's technological upgrading process vis-à-vis other European countries.

135. **The paper finds increasing specialization trends in high-technology products, as well as quality upgrading, in Slovenia's exports to the world.** This is observed from the data on Slovenia's export composition, revealed comparative advantage, and unit value ratio indicators, all of which show improvements in high-technology and high-skilled export products over the past decade. This trend is also consistent across a number of different types of classification of high-technology products.

136. **Nevertheless, the pace of technological and quality upgrading is slower than that of the EU-8 countries**. The Central European countries, in particular, are making much faster gains in terms of shifting their export composition to high technology exports, as well as upgrading the quality content of these exports. The empirical analysis suggests that this could be related to their faster catching-up process, as well as to stronger market spillover and learning effects. These findings suggest that, in order to enhance its export market performance, Slovenia will need to improve its market linkages by creating a more conducive environment for investment, which will, in turn, enable technological upgrading and productivity improvements.

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Appendix 1: Classification of Export Categories According to Factor Intensity

Primary Products	Skilled Labor-Intensive	Technology- Intensive	Natural Resource - Intensive	Unskilled Labor-Intensive
Fuel wood/wood charcoal	Pigments/paints/varnish	Meters and counters nes	Leather manufactures	Prefabricated buildings
Beverage non-alcohol nes	Trailers/caravans/etc	Domestic equipment	Wood manufactures n.e.s.	Furniture/stuff furnishing
Meat/offal presvd n.e.s	Rubber tyres/treads	Rotating electr plant	Mineral manufactures nes	Glassware
Electric current	Dyeing/tanning extracts	Metalworking machine nes	Aluminium	Cotton fabrics, woven
Flour/meal wheat/meslin	Flat rolled alloy steel	Explosives/pyrotechnics	Veneer/plywood/etc	Textile yarn
Sugar confectionery	Iron/stl/alum structures	Medicaments include vet	Zinc	Special yarns/fabrics
Wood simply worked	Base metal manufac nes	Metal salts of inorg acd	Leather	Lighting fixtures etc
Hide/skin (ex fur) raw	Cut paper/board/articles	Other inorganic chemical	Lead	Office/stationery supply
Edible products n.e.s.	Base metal h"hold equipms	Fans/filters/gas pumps	Lime/cement/constr mat"l	Man-made woven fabrics
Milk pr exc buttr/cheese	Iron/steel bars/rods/etc	Civil engineering plant	Furskins tanned/dressed	Clothing accessories
Jute/bast fibre raw/retd	Paper/paperboard	Taps/cocks/valves	Nickel	Sanitary/plumb/heat fixt
Meat/offal preserved	Materials of rubber	Metal machine tool parts	Clay/refractory material	Women/girl clothing wven
Cereal meal/flour n.e.s	Hand/machine tools	Electrical equipment nes	Misc non-ferr base metal	Mens/boys wear, woven
Eggs, albumin	Perfume/toilet/cosmetics	Mtl m-tools w/o mtl-rmvl	Copper	Baby carr/toy/game/sport
Wood chips/waste	Passenger cars etc	Mech transmission equmnt	Cork manufactures	Made-up textile articles
Wood in rough/squared	Metal store/transpt cont	Articles nes of plastics	Tin	Glass
Uranium/thorium ore/conc	Television receivers	Non-elec parts/acc machn	Silver/platinum etc	Woven textile fabric nes
Tobacco, manufactured	Printed matter	Photographic equipment	Radio-active etc matrial	Tulle/lace/embr/trim etc
Nf base metal waste nes	Articles of rubber nes	Electric circuit equipmt	Pearls/precious stones	Ships/boats/etc
Alcoholic beverages	Essent.oil/perfume/flavr	Optical fibres		Footwear
Animal/veg oils proces"d	Iron/steel pipe/tube/etc	Steam/vapour turbines		Knit/crochet fabrics
Fruit/veg juices	Wire prod exc ins electr	Elect power transm equip		Women/girl wear knit/cro
Pulp and waste paper	Nails/screws/nuts/bolts	Mechanical handling equi		Articles of apparel nes
Aluminium ores/concs/etc	Iron/steel wire	Food processing machines		Headgear/non-text clothg
Meat nes,fresh/chld/froz	Soaps/cleansers/polishes	Plastic waste/scrap		Trunks and cases
Cereal etc flour/starch	Watches and clocks	Elements/oxides/hal salt		Pottery
Spices	Motor veh parts/access	Paper industry machinery		Men/boy wear knit/croch
Man-made fibres nes/wast	Railway vehicles/equipmt	Plastic tube/pipe/hose		Floor coverings etc.
Animal oil/fat	Telecomms equipment nes	Indust heat/cool equipmt		
Vegetables,frsh/chld/frz	Road motor vehicles nes	Special indust machn nes		
Animal feed ex unml cer.	Motorcycles/cycles/etc	Agric machine ex tractr		
Beef, fresh/chilld/frozn	Primary/prods iron/steel	Plastic nes-primary form		
Stone/sand/gravel	Misc manuf articles nes	Plastic sheets/film/etc		
Ferrous waste/scrap	Jewellery	Steam generating boilers		
Fish/shellfish,prep/pres	Iron/steel railway matl	Electrical distrib equip		
Chocolate/cocoa preps	Flat rolled iron/st prod	Polyacetals/polyesters..		
Veg root/tuber prep/pres	Goods/service vehicles	Non-electr machines nes		
Fixed veg oil/fat, soft	Rolled plated m-steel	Textile/leather machinry		
Fruit presvd/fruit preps	Cutlery	Power generating equ nes		
Heavy petrol/bitum oils	Musical instrums/records	Measure/control app nes		
Crude veg materials nes	Synth org colour agents	Starches/glues/etc.		

Appendix1 : Classification of Export Categories According to Factor Intensity (Continued)

Primary Products	Skilled Labor-Intensive	Technology-Intensive	Natural Resource-Intensive	Unskilled Labor-Intensive
Sulphur/unroastd pyrites	Art/collections/antiques	Pumps for liquids		
Oil seeds-not soft oil	Sound/tv recorders etc	Monofilament rods/sticks		
Sugar/mollasses/honey	Radio broadcast receiver	Alcohols/phenols/derivs		
Briquettes/lignite/peat		Medical/etc instruments		
Butter and cheese		Telecomms equipment nes		
Rice		Household/garden chemcal		
Fruit/nuts, fresh/dried		Mach-tools remove mtrial		
Other crude minerals		Tractors		
Margarine/shortening		Carboxylic acid compound		
Cheese and curd		Internal combust engines		
Live animals except fish		Pharmaceut exc medicamnt		
Fixed veg oils not soft		Optical instruments nes		
Coffee/coffee substitute		Cine fild developed		
Residual petrol. prods		Organo-inorganic compnds		
Crude animal mterial nes		Photographic supplies		
Worn clothing etc		Oil etc additives/fluids		
Wool/animal hair		Misc chemical prods nes		
Cotton		Printing industry machny		
Tea and mate		Aircraft/spacecraft/etc		
Cereal grains nes		Ball/roller bearings		
Maize except sweet corn.		Valves/transistors/etc		
Precious metal ore/conc.		Medical etc el diag equi		
Veg text fibre ex cot/ju		Other organic compounds		
Fertilizers crude		Styrene primary polymers		
Fish,live/frsh/chld/froz		Office equip parts/accs.		
Wheat/meslin		Nitrogen function compds		
Natural rubber/latex/etc		Arms and ammunition		
Rubber synth/waste/etc		Manufactured fertilizers		
Synthetic spinning fibre		Office machines		
Tobacco, raw and wastes		Engines non-electric nes		
Crustaceans molluscs etc		Computer equipment		
Liquid propane/butane		Vinyl chloride etc polym		
Coke/semi-coke/retort c		Hydrocarbons/derivatives		
Fish,dried/salted/smoked		Primary ethylene polymer		
Cork natural/raw/waste				
Petrol./hydrocarbon gas				
Natural abrasives n.e.s.				
Oil seeds etc - soft oil				
Base metal ore/conc nes				
Barley grain				
Furskins/pieces, raw				
Iron ore/concentrates				
Coal non-agglomerated				
Cocoa				