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BOSNIA AND HERZEGOVINA

Selected Issues

Prepared by Mali Chivakul, Milan Cuc, Graham Slack (all EUR), Samir Jahjah (PDR), and Wojciech Maliszewski (FAD)

Approved by the European Department

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I. Overview

1. **On the basis of the strong performance of recent years, staff macroeconomic projections show that Bosnia & Herzegovina's medium-term baseline outlook is stable** (see accompanying staff report). The momentum of robust growth in 2006 is expected to continue in the coming years. Fiscal and external positions are projected to be in a comfortable zone in the medium term, even with recent spending pressures.

2. **This baseline projection is reassuring, but two important questions arise: With current policies in place, will Bosnia & Herzegovina be able to keep this growth momentum in the longer term? And what are the risks to this outlook?** Despite the recent good performance, Bosnia & Herzegovina still suffers from a number of structural weaknesses. Although weak policy coordination, the absence of a comprehensive fiscal strategy, and structural reform drift may not matter much in good times, they may become a drag to the economy in the longer run and gradually leave the country increasingly vulnerable to changes in the external environment. The Chapters in this Selected Issues volume examine the risks and structural weaknesses in Bosnia & Herzegovina.

3. **Extending the analysis beyond the medium term, Chapters II and III explore risks to longer-term external and fiscal sustainability.** On the external side, what would be the consequences of maintaining persistently high current account deficits? With no change in policies, the current account deficits would remain wide in the coming years and Bosnia & Herzegovina's net foreign liabilities (NFL) will keep growing from today's' level, which is below the regional average. To keep the external position sustainable, the country's NFL will have to stabilize at some point. Chapter II provides an estimate of the current account adjustment required to stabilize NFL. It uses the external sustainability approach of the Consultative Group on Exchange Rate Issues (CGER) methodology for exchange rate assessment, which is a debt dynamics accounting framework that takes into account all forms of foreign liabilities (both debt and equity). The adjustment is estimated in the order of 8 percentage points of GDP. The Chapter finds that if the adjustment were to start now and span the next 10 years, NFL would stabilize at a level below 60 percent of GDP. This seems feasible if the recent export trends were to persist. In contrast, if the adjustment is delayed, the paper shows that the level of NFL would reach about 90 percent of GDP before it stabilizes. The Chapter points to the need for an early start of the adjustment; postponing the reforms that would ensure recent export trends continue would leave the economy with very high NFL and thus vulnerable to changes in external environment.

4. **On the fiscal front, could the newly-introduced borrowing rules help reverse explosive debt dynamics and ensure fiscal sustainability?** Previous staff analysis indicated that growing primary deficits combined with the increasing share of non-concessional borrowing may lead to an explosive debt dynamics over the longer term. Debt laws recently adopted by the State and Entities introduce borrowing rules limiting future debt service as a percentage of last year's revenue. Chapter III uses a stochastic method, which takes into

account uncertainty about macroeconomic conditions, to assess the impact of these new borrowing rules on debt dynamics. The results show that the rules would indeed help maintain debt sustainability in the long term. However, implementing the borrowing rules without a comprehensive policy framework and a long planning horizon may result in inefficient expenditure compression and ultimately undermine the credibility of the borrowing limits.

5. **Beyond external and fiscal sustainability concerns, rigidities in the labor market could make it difficult for the economy to adjust to a changing environment.** Despite several years of robust growth, unemployment—a sign of inefficient use of resources—remains stubbornly high. What are the causes of high unemployment in Bosnia & Herzegovina? Although the lack of high quality statistics makes it difficult to answer the question in a definite way, Chapter IV explores the available data and possible hypotheses. It finds several signs pointing to the problems on the supply side and to structural rigidities. These include wage policies, heavy taxation of labor, and the limited portability of pension and health insurance systems, which may hinder labor mobility and discourage employment creation.

6. **The lack of internal economic integration is another rigidity with potentially important political repercussions.** Different policies and rules in the Entities make capital and labor mobility difficult and distort market incentives. After many years of actively promoting economic cohesion, have the authorities and the international community succeeded in doing so? Chapter V examines the degree of economic cohesion in Bosnia & Herzegovina. It finds strong evidence of economic convergence between the Entities, with the Republika Srpska (RS) catching up with the Federation. However, there is little evidence of increased economic integration between the two, or within the Federation. Promoting internal economic cohesion in Bosnia & Herzegovina will require accelerating structural reforms in the Federation and eliminating the remaining barriers to capital and labor mobility within and between the Entities.

7. **In the context of rapid credit growth, which has accompanied economic growth in recent years, risks to financial stability cannot be ignored.** These risks are explored in Chapter VI. Specifically, the Chapter empirically examines the relationship between credit growth, bank soundness, and banks' foreign liabilities, and tests the effects of past policy measures to curb credit growth. The Chapter shows that the financial deepening process in Bosnia & Herzegovina has been in line with regional trends. It finds that policy measures to curb credit growth have not been effective, which points to the important role of prudential supervision to minimize the risks to financial stability. The Chapter also finds that foreign-owned banks appear to run a higher risk of insolvency. This finding highlights the importance of cooperation with home-country supervisors to closely monitor local subsidiaries or branches of foreign banks.

II. External Balance Sheet and the Current Account Adjustment Required to Stabilize Net Foreign Liabilities[1]

At about 50 percent of GDP, Bosnia & Herzegovina's net foreign liabilities today are close to the average of Eastern European countries. Gross official reserves are at a comfortable level, external public debt is low and largely at concessional terms, and foreign direct investment has recently been increasing. However, in the staff baseline macroeconomic framework (no policy change), the current account deficit remains high, and is projected to stay at a level that would imply a steady rise in net foreign liabilities over the medium term.

At some point, the country's external balance sheet will have to stabilize if Bosnia & Herzegovina's external position is to be sustainable. The only way to achieve this is a substantial adjustment in the current account. Although the current account has improved significantly over the last couple of years, a lot more will be needed to stabilize net external liabilities. In addition, although foreign direct investment inflows do not create debt, they do raise the foreign liabilities of the private sector and will generate an increasing outflow of income payments in the form of profit repatriation. This future outflow has to be taken into account when estimating the required current account adjustment that would stabilize the country's external balance sheet.

This paper provides an estimate of the current account adjustment required to stabilize net foreign liabilities. It uses the external sustainability approach of the Consultative Group on Exchange Rate Issues (CGER) methodology for exchange rate assessment, which is a debt dynamics accounting framework that takes into account all forms of foreign liabilities (both debt and equity). This adjustment is estimated around 8 percentage points of GDP.

An adjustment of this magnitude can only happen gradually over time. Two key questions are: when will it start? and how long will it take? This paper assumes that the adjustment will take place over a 10-year horizon. Two scenarios are considered. The first scenario, "an early adjustment," is based on the assumption that the adjustment would start in 2007. The second scenario, "a delayed adjustment," is based on the assumption that the adjustment would start only in the next decade.

The results show that, in the early adjustment scenario, the NFL would stabilize at around 56 percent of GDP by 2017. This is still a relatively low level by international standards. In contrast, in the delayed adjustment scenario, the level of NFL would reach about 90 percent of GDP before it stabilizes. The two scenarios illustrate the importance of early adjustment, which is feasible if the recent export trends persist. Although a slower adjustment through a more gradual pace of reforms might be politically easier, the end result of a very high level of NFL would leave the economy vulnerable to changes in the external environment.

[1] Prepared by Samir Jahjah.

A. Introduction

8. **Bosnia & Herzegovina's net foreign liabilities (NFL) have been growing in recent years and reached about 50 percent of GDP at end-2006, close to the average of Eastern European countries.** Similar to the experience of many Central and Eastern European (CEE) countries, Bosnia & Herzegovina has been running large current account deficits and accumulating external liabilities in recent years. Commercial bank borrowing and foreign direct investment (FDI) have been the main contributors to growth in NFL.

9. **NFL relative to the size of the economy will have to stabilize at some point to ensure the sustainability of the country's external position; this will require a much reduced current account deficit.** Despite a recent decline, Bosnia & Herzegovina's current account deficit remains high, and is projected to stay around the same level in the medium term. This implies increasing net external liabilities and income payments, both in the form of interest payment and profit repatriation. Taking this future outflow into account, the required adjustment in current account to stabilize NFL can be substantial.

10. **This Chapter provides an estimate of the current account adjustment required to stabilize net foreign liabilities**. It uses the external sustainability approach of the Consultative Group on Exchange Rate Issues (CGER) methodology for exchange rate assessment, which is a debt dynamics accounting framework that takes into account all forms of foreign liabilities (both debt and equity) to calculate the adjustment. The calculated adjustment depends on the outstanding stock of accumulated liabilities, output growth, and the expected returns on external assets and liabilities.

11. **The methodology used in this Chapter involves three main steps**. First, the composition of the external balance sheet of the country at end-2006 is estimated. Second, the external balance sheet at end-2012 is projected in line with the staff medium-term baseline macroeconomic scenario. Third, using simple debt dynamics accounting, the current account adjustment required to stabilize NFL is estimated.

12. **Two scenarios are then considered.** The level at which NFL stabilize depends on when Bosnia & Herzegovina will start adjusting and how long it will take. First, a scenario that assumes an early adjustment is estimated. This scenario assumes that the adjustment would start immediately and span a 10-year horizon. A "delayed adjustment" scenario is then considered. It assumes that the adjustment would only start at the end of the decade, and also span a 10-year horizon. A delayed and long adjustment period would imply continued build-up of liabilities before they stabilize.

13. **The results illustrate the importance of an early start of the adjustment.** Although a gradual adjustment would allow more time and might be easier politically, a high level of NFL could leave the economy vulnerable to changes in the external environment and could

undermine the viability of the currency board. The case for an early start is even stronger if Bosnia & Herzegovina is to undertake ambitious infrastructure investments in the coming years, that would imply additional foreign liabilities to those assumed in the baseline.

B. The External Balance Sheet of Bosnia & Herzegovina

Current situation

14. **At end-2006, the gross external liabilities of Bosnia & Herzegovina are about 90 percent of GDP (Table 1).** Liabilities are equally spread between debt and equities (portfolio and FDI-related liabilities). The government external debt is small and mainly on concessional terms.

Table 1 : BiH : External balance sheet (at end 2006)
(in percent of GDP)

	Assets	Liabilities
Monetary authority	30.6	
Commercial banks	13.1	22.6
Government		23.4
of which London Club		1.4
Private Equity		
Portfolio		18.4
FDI		27.9
Total	43.7	92.4

Source : CBBH

15. **Debt assets are below the average of other countries and are concentrated in the monetary authority and the commercial banks**. Debt assets are about 44 percent of GDP, two-third of which belong to the monetary authority. The average in the region is 3 percentage points higher. Compared to other currency boards, Bosnia & Herzegovina's level of international reserves is relatively low (Table 2).

16. **While equity liabilities are already above the average of other countries in the region, they are expected to increase further.** Equity liabilities are estimated at 46 percent of GDP, 4 percentage points higher than the region's average, but well below Estonia, Hungary, and Czech Republic. As the authorities pursue their privatization efforts and

structural reforms, FDI is likely to increase in the medium term. In the next two years, large FDI is expected in the telecom, refinery, and electricity sector.

17. **The level of net foreign liabilities is close to the average in Eastern European countries**. NFL stands at 48.6 percent of GDP, just above the average of 48.2 in other Eastern European countries. Debt liabilities are below the average. This low level of indebtedness reflects low fiscal deficits in the past, but also a weak implementation of donor-financed projects.

Table 2. Composition of Net External Position (in percent of GDP)

	Debt Assets	Equity Assets	Debt Liabilities	Equity Liabilities	NFL
Estonia	59.6	16.3	70.7	104.9	99.7
Hungary	35.4	6.7	64.9	74.0	96.8
BiH 1/	***43.7***	***0.0***	***46.0***	***46.3***	***48.6***
Croatia	54.2	7.5	84.8	41.4	64.5
Latvia	65.4	2.2	88.0	34.6	55.0
Poland	30.1	1.5	44.2	40.7	53.3
Bulgaria	62.9	-0.1	70.0	40.5	47.7
Lithuania	31.0	2.1	42.4	29.6	38.9
Slovak Republic	54.2	5.3	50.6	46.5	37.6
Romania	30.0	0.4	37.4	27.9	34.9
Czech Republic	58.0	5.9	37.2	61.4	34.7
Slovenia	55.1	11.3	58.9	25.5	18.0
Average (excl. BiH)	47.3	3.9	56.8	42.6	48.2

1/ As of end 2006, Staff Estimates; 2004 for the other countries
Source: Lane and Milesi-Ferretti, 2006

Medium-term projection

18. **The medium term outlook (2007-12), based on the baseline (unchanged policies) scenario in the accompanying staff report, is stable, supported by a relatively benign external environment.** Exports will continue to grow, although the growth will slow down starting from 2008. Falling metal prices will partly offset growing export volumes. GDP growth will decline slowly, averaging 5.2 percent, and the current account deficit is expected to remain around 13 percent of GDP. Significant FDI inflows are expected over the next two years, but they will abate in subsequent years, reflecting a slowdown in structural reforms. The fiscal position will deteriorate, but would be offset by GDP growth. After an initial jump due to the issuance of bonds to cover domestic claims, the public debt-to-GDP ratio will decline over the projection period.

19. **At the end of the medium term period in 2012, NFL are projected to reach about 61 percent of GDP**. This increase is mainly driven by FDI flows, a continued increase in banks' borrowing and declining foreign assets of the central bank (Table 3). The increase in FDI is related to the privatization of RS Telecom as well as other projected FDIs in refineries and other industries. During the medium term, new government borrowings are assumed to be on market terms. The structure of external public debt, which was almost entirely concessional at end-2006, will therefore become increasingly non-concessional.

Table 3 : BiH : Projected external balance sheet (at end 2012)
(in percent of GDP)

	Assets	Liabilities
Monetary authority	28.7	
Commercial banks	13.6	25.6
Government		15.8
of which London Club		0.2
of which non concessional		3.0
Private Equity		
Portfolio		18.0
FDI		44.2
Total	42.3	103.6

Source : Staff Estimates

C. Methodology and Assumptions

20. **To determine the current account that would stabilize net foreign liabilities, a simple accounting framework that takes into account all components of the external balance sheet is developed**. The method differs from a standard debt sustainability analysis (DSA) in that the class of assets and liabilities and their respective rate of returns are explicitly distinguished. The analysis is also carried on beyond the medium term projection covered in the standard DSA.

21. **The methodology, which is used in CGER assessments of exchange rate, provides the analytical foundation to estimate the current account balance that would stabilize the NFL**. The approach, developed by Lane and Milesi-Ferretti (2006), links the net external position, the current account, the trade balance, and the rates of return on the external portfolio. The methodology allows, for a given structure of the external portfolio, to estimate the steady-state current account balance required to stabilize NFL. A country's net external liabilities cannot continually increase relative to the size of the economy. The required adjustment depends on the accumulated stock of external liabilities, the cost of servicing them, and the GDP growth. The cost of servicing liabilities depends on the structure of the

portfolio. Servicing will be low if liabilities are mainly at concessional terms. It will be higher if equity liabilities represent a higher share of the portfolio.

The accounting framework[2]

22. **In this section an accounting framework that links the dynamics of external liabilities to the current account and economic growth is presented.**

23. **The change in the net foreign asset position B is given by**

$$B_t - B_{t-1} = CA_t + KG_t + E_t \qquad (1)$$

where *CA* is the current account balance, *KG* is the capital gain or loss on net foreign assets and *E* includes capital account transfers and error and omissions.

24. **By expressing (1) in ratio to GDP (represented with lower-case letters), and assuming zero capital gain[3], equation (1) becomes**

$$b_t - b_{t-1} \equiv ca_t - \frac{g_t + \pi_t}{(1+g_t)(1+\pi_t)} b_{t-1} + \varepsilon_t \qquad (2)$$

where *g* is the growth rate of real GDP, π is the inflation rate, and ε the ratio of capital transfers and errors and omissions to GDP. Ignoring the latter term, the equation relates the current account balance needed to stabilize the next external position and the nominal GDP growth.

25. **The current account balance that would stabilize *b* is derived by setting $b_t = b_{t-1}$ in equation (2).** This yields $ca^{ss} \approx -(g+\pi)b^{ss}$. For example, in a country running a 7 percent current account deficit and growing at 8 percent in nominal terms, NFL would stabilize at about 90 percent of GDP. A growing country can sustain a permanent current account deficit, and this deficit can be larger the larger the growth rate and the larger the stock of external liabilities. However, larger external liabilities require a stronger balance of goods and services to offset the higher income payments associated to the liabilities.

26. **Equation (2) can be further expanded by decomposing the external portfolio into its assets A and liabilities L.** Doing so yields

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[2] This section is based on Lane and Milesi-Ferretti (2006) "Capital Flows to Central and Eastern Europe", *IMF Working Paper 06/188.*

[3] Given the currency board arrangement of the KM with the euro, and given that most assets and liabilities are in euro, we can ignore capital gains without affecting the conclusion of the analysis.

$$b_t - b_{t-1} \equiv bgst_t + \frac{i_t^A A_{t-1} - i_t^L L_{t-1}}{Y_t} - \frac{g_t + \pi_t}{(1+g_t)(1+\pi_t)} b_{t-1} + \varepsilon_t \quad (3)$$

where *bgst* is the balance of goods, services, and transfers, *A* and *L* are external assets and liabilities, and i^A and i^B their respective nominal yields.

27. **Equation (3) can be expressed in function of real rate of return on foreign assets and liabilities**:

$$b_t - b_{t-1} \equiv bgst_t + \frac{r_t^A - g_t}{1+g_t} a_{t-1} - \frac{r_t^L - g_t}{1+g_t} l_{t-1} + \varepsilon_t \quad (4)$$

where *r* represents the real rate of return, defined as $r_t^A = \frac{1+i_t^A}{1+\pi_t} - 1$ and $r_t^B = \frac{1+i_t^B}{1+\pi_t} - 1$.

28. **If returns on assets and liabilities are identical, equation (4) becomes the standard debt accumulation equation** $b_t - b_{t-1} = bgst_t + (r_t - g_t) b_{t-1}$. To prevent the ratio of external liabilities to GDP to grow indefinitely, a net debtor (b<0) must achieve a trade surplus if the rate of return exceeds GDP growth (r>g). If returns on assets and liabilities are different, as it is most often the case, the structure of the balance sheet will affect the estimation of the trade balance required to stabilize net external liabilities. For example, if the stock of assets and liabilities is about 100 percent of GDP and a country pays a rate of return on its liabilities which exceeds the return on its assets by 100 basis point, the trade surplus necessary to stabilize the net external position will be 1 percentage point of GDP higher than in the absence of return differential.

29. **A further refinement is to decompose assets and liabilities into their "debt" and "equity" components.** Expected returns on debt and equity are likely to differ substantially as external financing in Bosnia & Herzegovina is shifting away from concessional debt to private equity. Equation (4) becomes:

$$b_t - b_{t-1} \equiv bgst_t + \frac{r_t^{EQ} - g_t}{1+g_t} a_{t-1}^{EQ} + \frac{r_t^{DA} - g_t}{1+g_t} a_{t-1}^{D} - \frac{r_t^{EQ} - g_t}{1+g_t} l_{t-1}^{EQ} - \frac{r_t^{DL} - g_t}{1+g_t} l_{t-1}^{D} + \varepsilon_t \quad (5)$$

where EQ and D identify the debt and equity components of external assets and liabilities and their respective rates of return.

30. **Once equation (5) is parameterized, the current account balance needed to stabilize the net external position is derived by setting $b_t = b_{t-1}$**. This stabilizing current account balance depends on the assumptions on economic growth, real returns on debt and equity assets and liabilities and their respective levels in percent of GDP.

Main assumptions

31. **The current account required to stabilize the NFL is derived using equation (5) and the following assumptions:**

- All debt instruments carry the Euro Libor as the base interest rate. External liabilities are assumed to carry a sovereign risk premium of 200 basis points. These assumptions are consistent with the assumption in the Debt Sustainability Analysis (DSA) in the staff report.

- The rate of inflation is set at 2 percent, both in Bosnia & Herzegovina and in Europe.

- Returns on equity, mostly FDI-related, is assumed to move together with GDP growth. At an aggregate level, returns on FDI will be correlated with the overall performance of the economy. Higher GDP growth translates into more profits and repatriation. Conversely, in a slowing economy, declining profits will reduce repatriation. The expected real returns on private equity are thus assumed to be equal to the projected real GDP growth plus a constant spread of 100 basis points over the growth rate[4].

- Transfers and non-financial income is assumed to remain stable. Therefore, most adjustment in the current account have to originate in the balance of goods and services.

Table 4. Assumptions on Real Rate of Returns and GDP Growth

Real GDP Growth	LIBOR Euro 1/	Government liabilities		FDI 2/
		Concessional	Non-concessional	
5.2	3.8	-0.8	3.8	6.2

1/ WEO (average over 2006-2011)
2/ Following Lane and Milesi-Ferretti (2006) we suppose a 100 point spread over the growth rate

32. **In an early adjustment scenario, a transitional path is derived starting in 2007 so that NFL would be stabilized in 2017.** The adjustment would span a 10-year period and is assumed to come mainly from continued growth in exports.

33. **To consider a delayed adjustment scenario, a transitional path is derived so that, NFL would be stabilized at end-2022.** In this case, the adjustment would also span a 10-year period, starting in 2012. During the transition, the current account deficit, while on a declining path, will hover above its NFL-stabilizing level, and external liabilities will continue to

[4] The spread of 100 bps over the GDP growth is similar to the assumption used in Lane and Milesi-Ferreti (2006).

increase. As liabilities continue to build up, the stabilizing current account is estimated again, in a recursive way.

34. **A series of assumptions pertain to the financing of the current account during the transition period for both scenarios.** The current account deficit is financed either by debt accumulation, foreign direct investment or drawing down of international reserves. During the transition, FDI is set at 3.3 percent of GDP, their level projected at the end of the medium term period. Net public debt accumulation is set at 1.5 percent of GDP, in line with the projected public deficit at the end of the medium term. Net external borrowing by commercial banks is linked to GDP. If these sources are insufficient to finance the current account, international reserves will decline. Lastly, a depreciation rate of capital of 5 percent is assumed. Real GDP growth is 5.2 percent.

D. Main Results

35. **In the early adjustment scenario, NFL would stabilize at 56 percent of GDP by end-2017 (Table 5).** The current account deficit needed to stabilize NFL in 2017, given an early adjustment, is around 5.5 percent of GDP, compared to the projected deficit of 13.5 percent in 2007. The required adjustment is thus about 8 percentage points of GDP.

Table 5 : BiH : External balance sheet (at end 2017)
(in percent of GDP)

	Assets	Liabilities
Monetary authority	46.4	
Commercial banks	13.6	25.6
Government		23.3
Private Equity		
Portfolio		18.0
FDI		49.3
Total	60.0	116.1

Source : Staff estimates

36. **In the delayed adjustment scenario, NFL would continue to build up, to reach about 90 percent of GDP by end-2022** (Table 6). Higher liabilities translate into higher net income payments at about 5.7 percent of GDP, compared with 4 percent of GDP at end-2012.

37. **The required adjustment in the current account would also be about 8 percent of GDP in this case**. The current account deficit required to stabilize external liabilities at this

level would be around 5.7 percent of GDP, compared with average projected current account of 13.5 percent between 2007-12.

38. **A delayed and long duration of adjustment will leave the country in a more vulnerable position** (Table 6). A level of NFL as high as 90 percent of GDP, way above the regional average, increases the vulnerability to shocks in interest rates, overall liquidity condition, and market sentiment. Government external debt will be about 40 percent of GDP. Reserves of the central bank would end up at a much lower level than at the onset of the adjustment, weakening the capacity to sustain the currency board.

Table 6 : BiH : External balance sheet (at end 2022)
(in percent of GDP)

	Assets	Liabilities
Monetary authority	22.8	
Commercial banks	13.6	25.6
Government		30.0
Private Equity		
Portfolio		18.0
FDI		53.2
Total	36.4	126.8

Source: Staff estimates.

E. Conclusion and Policy Implications

39. **This Chapter provides an estimate of Bosnia & Herzegovina's external portfolio**. In the medium-term baseline, the external position of Bosnia & Herzegovina remains sound, with large external inflows supporting investment and growth. However, net foreign liabilities continue to grow.

40. **The only way to stabilize net external liabilities is to lower the current account deficit.** The current account adjustment required to stabilize external liabilities is estimated using a steady-state debt dynamics framework. This is similar to the external sustainability

approach of the CGER methodology for exchange rate assessment. The adjustment in the current account deficit needed to stabilize NFL is estimated at about 8 percent of GDP.

41. **This magnitude of adjustment can only take place gradually over time, but a delayed adjustment would leave the country with a very high NFL level.** If the adjustment were to start now, the NFL would not increase much until it stabilizes at a level below 60 percent of GDP in 2017. This is still a relatively low level by international standards. A delayed adjustment period, however, will increase NFL to a very high level, leaving the country vulnerable to changes in external environment.

42. **The Chapter illustrates the importance of early adjustment, which is feasible if the recent export trends persist.** This would be conditional on further structural reforms to increase competitiveness of the economy and its attractiveness to foreign investors. The case for an early start of the adjustment is even stronger if Bosnia & Herzegovina is to undertake ambitious infrastructure investments in the coming years. Large investments, like the corridor Vc road projects, will generate sizeable additional foreign liabilities, be it debt or equity, which would require an even larger current account adjustment.

III. DEBT SUSTAINABILITY AND THE NEW BORROWING RULES[5]

Previous staff analysis indicated that the results of the medium-term public debt sustainability analysis in the 2006 staff report are potentially misleading. Even large primary deficits stabilize the debt ratio over the medium term since the existing debt is highly concessional. But growing primary deficits combined with the increasing share of non-concessional borrowing might lead to an explosive debt dynamics over the longer term.

This paper extends the previous analysis by assessing the impact of the newly-introduced borrowing rules on debt dynamics. The rules limit government borrowing by restricting allowable debt service as a percentage of past year's revenue. The paper assumes that the adjustments required to meet these ceilings are undertaken by slowing certain categories of expenditures when the limit is expected to be exceeded.

With these new rules in place, the behavior of the debt ratio is analyzed using a stochastic method. Uncertainty about macroeconomic conditions complicates the assessment of debt sustainability: while a policy may look sustainable under the most likely macroeconomic scenario, downward risks to the central projection may be substantial, potentially leading to costly policy adjustments in the future. The paper simulates future paths for the main macroeconomic variables taking into account their volatility and co-movements, and summarizes risks to debt dynamics using the frequency distribution of the future debt-to-GDP ratio ('fan charts').

The implementation of the borrowing rules puts the debt ratio on a firmly declining path. Debt ratios initially increase, but they are quickly reversed when the governments adjust to avoid breaching the rules. The consolidated budget improves after an initial decline.
But implementing the borrowing rules without a comprehensive policy framework may result in inefficient expenditure cuts. The projection horizon in the existing medium-term expenditure framework (MTEF) is too short to fully assess the implications of new borrowing on future debt servicing costs. In the absence of a longer planning framework, ad hoc adjustments would be necessary, which could be at odds with government spending priorities and compromise efficiency.

[5] Prepared by Wojciech Maliszewski.

A. Introduction

43. **An extended-horizon debt sustainability analysis (DSA) (see for example Chapter II in IMF Country Report No. 06/368) shows longer-term vulnerabilities not revealed in a standard medium-term debt sustainability analysis.** Over a 5-year horizon, public debt would remain stable even with relatively large primary deficits, due to high concessionality of the outstanding debt. But growing primary deficits and the increasing share of non-concessional borrowing would lead to explosive debt dynamics over the longer term (15-20 years).

44. **This paper analyzes the impact of the newly-introduced borrowing rules on the longer-term debt dynamics.** Debt laws adopted (or close to being adopted) in the State and Entities introduce borrowing rules limiting future debt service as a percentage of last year's revenue (see Box 1). Since the limit is imposed on total debt service in *any* year after the loan is contracted, full implementation of the rules requires projections of future debt service costs. A precise framework for the implementation has not yet been established, hence the paper compares two possible ways of applying the rules: using a three-year planning horizon (consistent with the current MTEF) and a five-year planning horizon (stipulated in the State Debt Law). The scope for possible adjustments to comply with the limits is assumed to be—in line with past adjustment efforts—limited to slowing down certain categories of expenditures. The analysis, however, does not specify how these adjustments are undertaken when the limit is expected to be breached.

45. **The analysis uses a stochastic method to evaluate risks to debt dynamics stemming from macroeconomic uncertainty** (see similar examples in Celasun, Debrun, and Ostry (2006), and Garcia and Rigobon (2004), Tanner and Samake (2006)). Uncertainty about macroeconomic conditions complicates the assessment of debt sustainability: while a policy may look sustainable under the most likely macroeconomic scenario, downward risks to the central projection may be substantial under other less likely, but still plausible scenarios. The stochastic method simulates future paths for macroeconomic and fiscal variables taking into account their volatility and co-movements, summarizes the risks to debt dynamics using the frequency distribution of the future debt-to-GDP ratio paths ('fan charts'), and shows a probability that borrowing rules' limits will be breached.

46. **Borrowing rules reduce but do not eliminate the impact of macroeconomic shocks on debt dynamics.** For instance, in case of negative shock to revenue, the rules could limit spending financed by borrowing to a certain extent. Because the expenditure adjustment is—by assumption—constrained, it may not be sufficient to ensure compliance with the rules and sustainability.

Box 1. Debt Laws

Laws on Debt and Borrowing ('Debt Laws') have been adopted by the State and the RS. The adoption of the Federation draft law has been slowed down by parliamentary procedures, but is expected soon.

Borrowing rules

- The debt service limit in any future year in the **Federation** is set at 18 percent of the previous year's consolidated revenue. Within this limit, the maximum value for cantons is 5 percent of their previous year's revenue. The limit for municipalities is initially tighter, at 3 percent of revenues for the first two years after the law is passed, but increases to 5 percent for the two following years, and to 10 thereafter. All limits cover debt guarantees.
- The debt service limit in the **RS** is set at 18 percent of the previous year's consolidated revenue. Municipal limit is also set at 18 percent.
- **State** debt service cannot exceed 18 percent of the previous year's revenue. The limit is set for a period of three years from the day the law becomes effective, and will be subject to annual review. State guarantees cannot exceed 30 percent of State revenue.

Institutional framework

- The **State** Ministry of Finance prepares a five-year State Debt Management Strategy in cooperation with Debt Committee. The Debt Committee is an advisory body composed of two representatives of the Council of Ministers (including a Minister), a representative of the Central Bank, two representatives of the Federation (including the Minister of Finance), two representatives of the RS (including the Minister of Finance), and the Director of Revenue Administration of the Brcko District.
- The Debt Committee in the **Federation** is composed of the Federal and cantonal Ministers of Finance and coordinates debt management in the Entity.
- **RS** municipalities must request an agreement from the Ministry of Finance to borrow in first three years after the adoption of the law. After the transition period, agreements will be required for foreign currency borrowing or if projected debt service exceeds 10 percent

B. Methodology

47. **Stochastic projections to assess debt dynamics with borrowing rules are constructed as follows:** (1) for a given year, macroeconomic variables are simulated using a simplified model of the Bosnian economy with stochastic shocks (see Annex); (2) 'unadjusted' fiscal projections are constructed for the same year, assuming—based on the simulated macro-variables—that revenues and expenditures grow in line with the GDP or respective tax bases, and taking into account known fiscal pressures and financing assumptions (see Box 2); (3) the projection is extended either 3 or 5-years ahead using a non-

stochastic version of the model (without shocks) to check if the borrowing rules' limit is exceeded; (4) if the limit is exceeded, the current year's budget is reduced by slowing expenditures, but still accommodating fiscal pressures described in Box 2. Projections are constructed for every year between 2008 and 2020, and the exercise is repeated several times to construct a random sample of possible macro- and fiscal-outcomes. Each outcome is associated with a certain debt path, and frequency distributions of the debt-to-GDP ratio are derived for each year of the projection.

48. **Fiscal adjustments, when needed, are assumed to be in line with previous episodes.** A substantial adjustment on the expenditure side between 2003 and 2006—equivalent to 4½ percent of GDP—was broad-based, but with pronounced reductions in capital expenditures (4 percent of GDP) and the wage bill (1½ percent of GDP). We analogously assume that when the borrowing limit is binding, future adjustments will restrict wage increases to the rate of inflation and keep capital expenditures unchanged in nominal terms. In addition, pension increases will be indexed to inflation, and transfers to households will remain unchanged in nominal terms. These adjustments are not necessarily optimal. Indeed cuts in investment spending may have adverse consequences on growth given the need for infrastructure improvements. But in the absence of a clear longer-term expenditure plan and a fiscal policy coordination mechanism between the Entities and the State, the only possible assumption about future adjustments to meet the debt servicing ceilings is that they will follow the pattern of past experience.

49. **Debt dynamics are summarized by 'fan charts', representing the frequency distribution of the debt ratio.** Different shades on the chart delineate deciles in the distributions of the ratio, with the zone in black representing a 20 percent confidence interval around the median projection, and progressively lighter grey zones respectively showing 40, 60 and 80 percent intervals. If the upper bound of the 80 percent interval is above the initial debt ratio for some projection years, it may be interpreted as an over 20 percent probability that the debt-to-GDP will increase above the initial level in these years.

50. **Probabilities of exceeding the borrowing limit are also derived**, constructed for all years as a frequency of exceeding the borrowing rules' limit in the sample simulated using the same stochastic framework.

Box 2. Fiscal Pressures and Financing Assumptions

- **Revenues gradually decline** due to trade liberalization and a slowdown in import and consumption growth (affecting trade taxes and VAT revenue), and worsening demographics (affecting social security contributions, with pension funds operating on current basis). Grants are also on decline.

- **Expenditures increase** with the unification of Military and Police wages, and worsening demographics affecting social security benefits under the current pension system.

- **Domestic claims** are assumed to add 18 percentage points of GDP to the debt level in 2007, and an additional 10 and 5 percentage points in 2008 and 2009 respectively. The 2007 jump is due to the settlement of frozen foreign currency deposits (FFCD), war claims, and general government obligations. The average grant element is 25 percent. Additional increases in 2008-09 are assumed to cover the possible recognition of additional domestic claims (losses of state enterprises, restitution claims, and other potential claims) on terms similar to those for the settlement of FFCDs.

- **Concessional external borrowing** shrinks, although grant support remains significant. IDA disbursements are assumed to fall from ½ percentage point of GDP in 2007 to zero after 2011. Grants decline gradually. Borrowing on commercial terms (with a projected maturity of five years and interest rate at LIBOR at 5 percent + 200 basis points and) is assumed to cover any additional financing needs.

- **Domestic borrowing** on commercial terms (five year maturity and interest rate equal to euro LIBOR simulated from the model as described in the Annex + 200 basis points) to cover additional financing needs.

- **Privatization receipts** amount to 7½ percent of GDP in 2007 in the RS (from the sale of the RS Telecom and refining operations) and of 1½ percent in the Federation (from the sale of Aluminij Mostar and Energoinvest). No further receipts are assumed after 2007.

C. Results

51. **The results indicate that the new borrowing rules would prevent the adverse debt dynamics under both three-year and five-year planning horizons.**[6] Debt would initially increase, but return firmly onto a declining path from 2009 in both Entities (Figures 1 and 2).

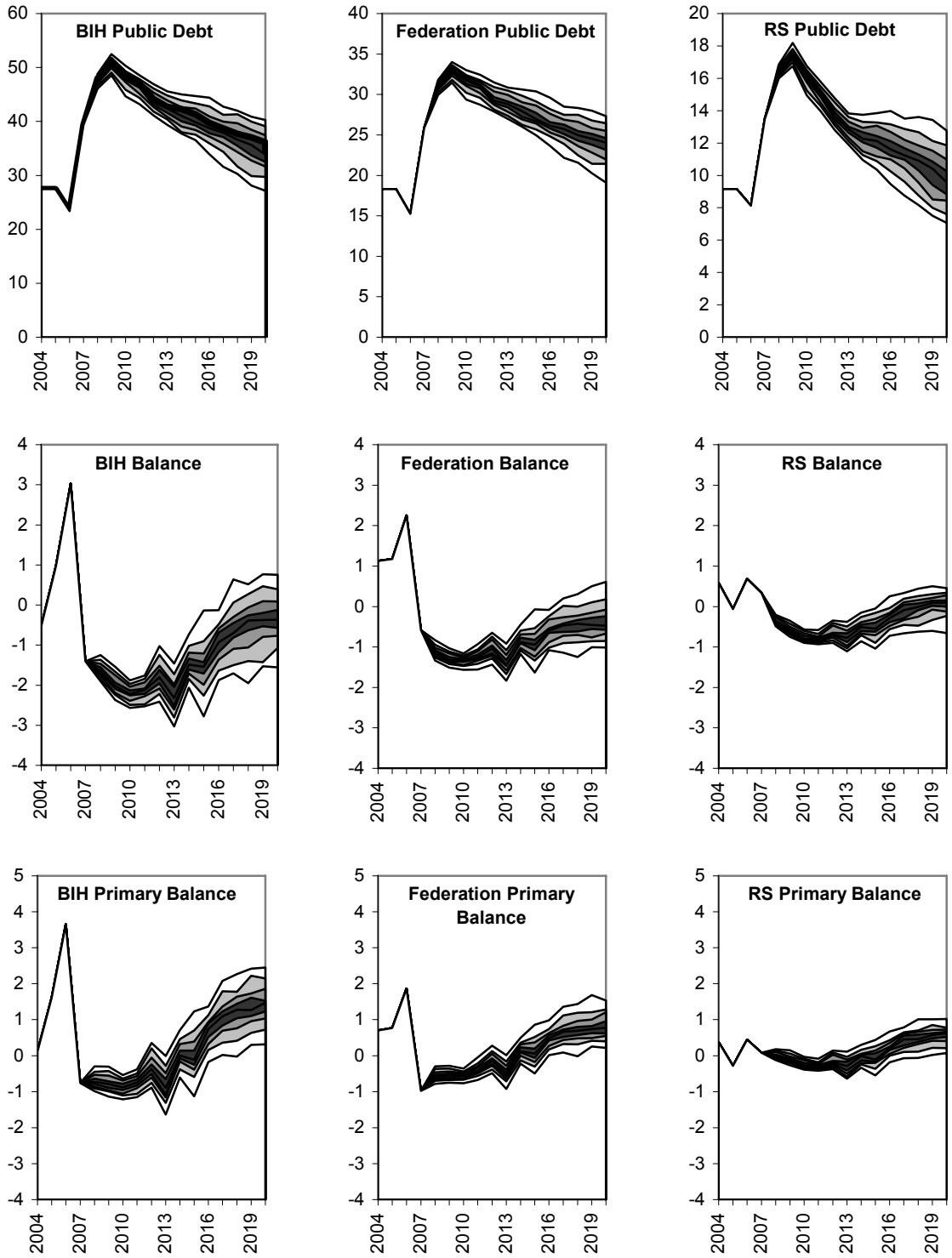
[6] Results without borrowing rules in place (not reported) are similar to those reported in IMF Country Report No. 06/368 Chapter II and show an explosive dynamics of debt driven by growing primary deficits combined with increasing costs of servicing the existing debt.

Debt reduction would be faster in the RS, where the initial 2007 fiscal position is stronger and substantial privatization receipts reduce borrowing needs. Possible macroeconomic shocks do not seem to have the potential to deflect debt from the declining path.

52. **The three-year planning horizon initially produces relatively high deficits, which recede slowly, leading to a high probability of exceeding the borrowing rules' limits.** At first, the governments do not fully anticipate the impact of a new borrowing on future debt service costs and increase expenditures. The resulting substantial increase in the deficit is difficult to reverse, as the paper assumes that adjustments are undertaken only through slowing down spending and that identified expenditure pressures are accommodated. In effect, the consolidated budget position improves slowly to achieve a close-to-balance position only at the end of the simulation period, and the borrowing rules' limits are likely to be exceeded. The probability of exceeding the limits increases to one in the Federation and to ¾ in the RS after 2015 (Figures 3). Despite breaching the limits, the assumed adjustment effort is still sufficient to ensure debt sustainability.

53. **The five-year planning horizon also generates an initial fiscal relaxation, but it is less pronounced than under the shorter horizon and reverses faster to a balance.** In this case, the extended planning horizon limits initial expenditure increases and allows governments to achieve a stronger fiscal position, which facilitates meeting the borrowing rules' limits. The fiscal position improves from a small deficit at the beginning of the period to close-to-balance in 2015 and beyond. The probability of exceeding the limits is lower than under the three-year horizon: it slowly approaches ¾ in the Federation in 2019 and then starts declining; and is negligible throughout the simulation period in the RS. The lower initial deficits, the faster adjustment to a balance, and the lower probability of exceeding the limit reflect the governments' ability to better anticipate consequences of increased expenditures on future debt service costs.

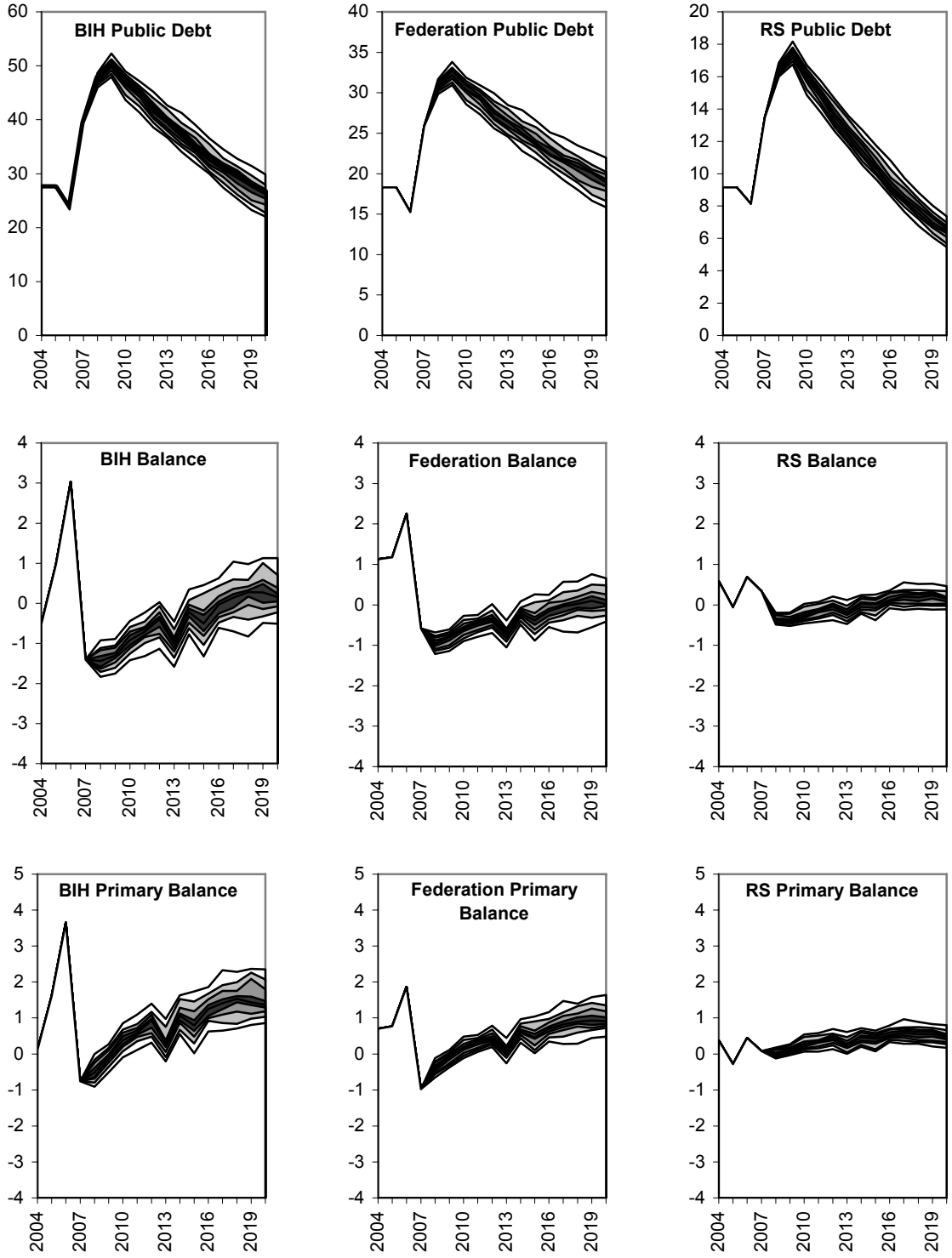
Figure 1. Bosnia & Herzegovina: Borrowing Rules with Three-Year Planning Horizon
(% of GDP)



Source: Staff calculations.

Notes: Charts present percentiles of projected outcomes. Black area corresponds to a 20 percent confidence interval.

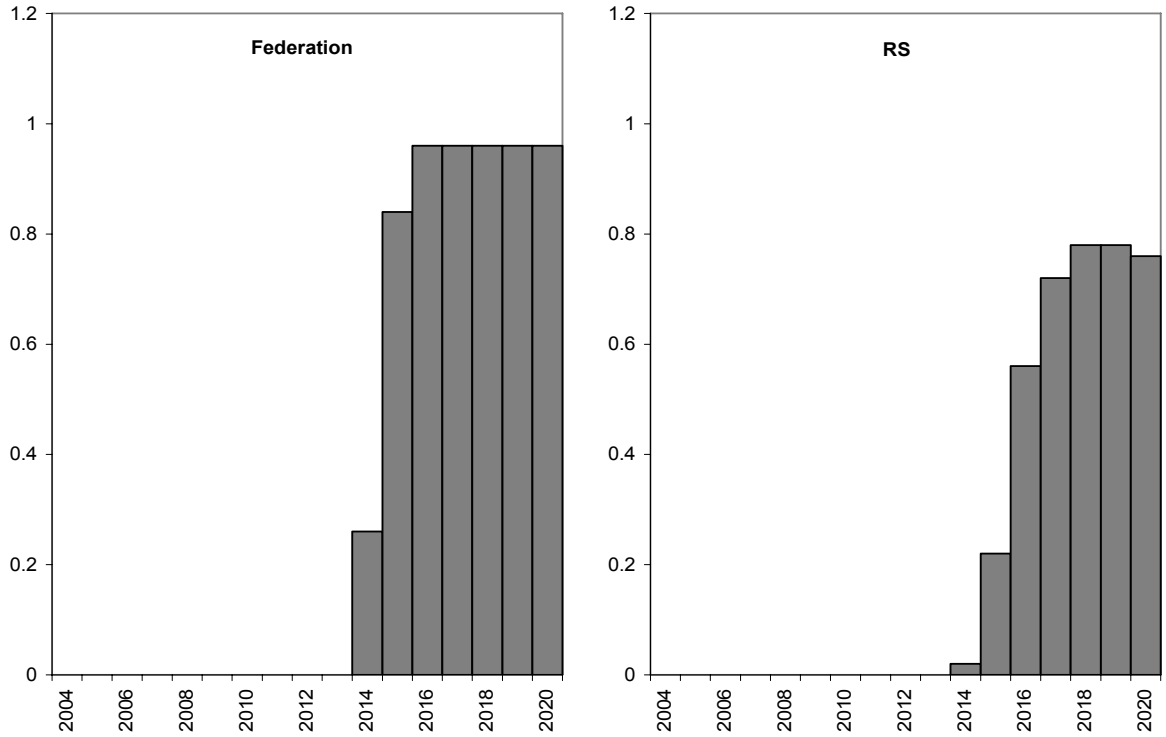
Figure 2. Bosnia & Herzegovina: Borrowing Rules with Five-Year Planning Horizon
(% of GDP)



Source: Staff calculations.

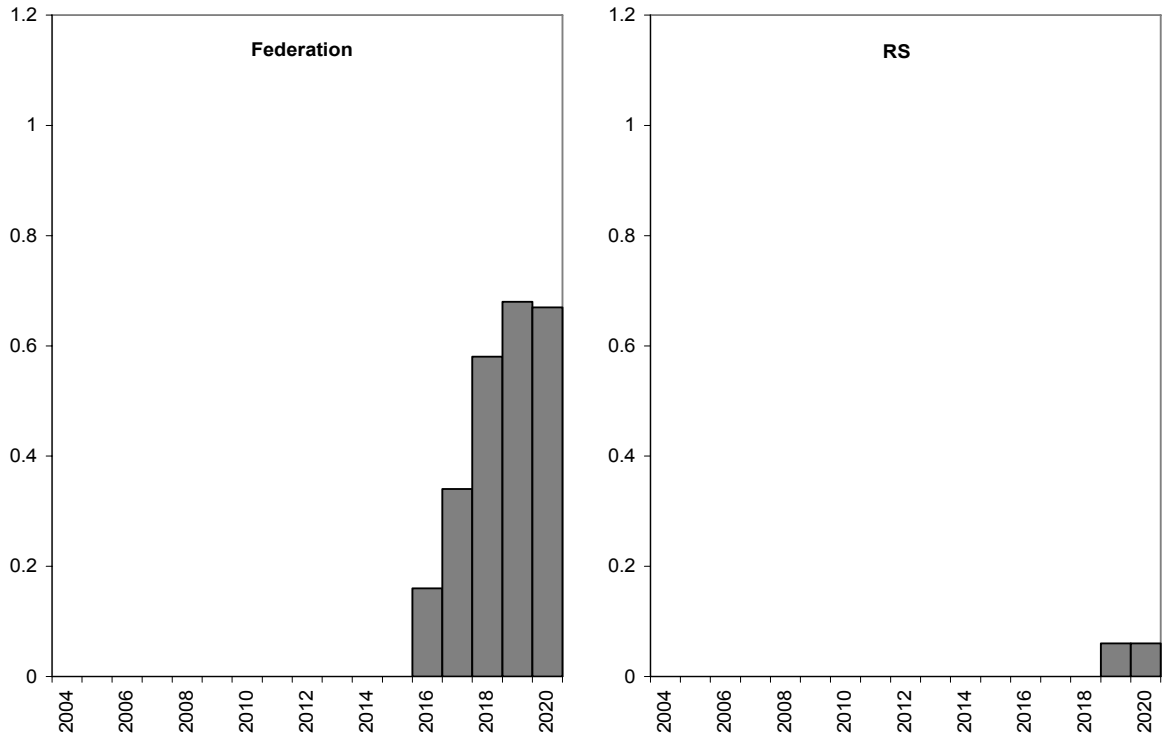
Notes: Charts present percentiles of projected outcomes. Black area corresponds to a 20 percent confidence interval.

Figure 3. Bosnia & Herzegovina: Probability of Exceeding Limits in Borrowing Rules with Three-Year Planning Horizon



Source: Staff calculations.

Figure 4. Bosnia & Herzegovina: Probability of Exceeding Limits in Borrowing Rules with Five-Year Planning Horizon



Source: Staff calculations.

D. Conclusions

54. **The borrowing rules are a useful tool to ensure sustainability, but their full implementation may be difficult due to capacity and political constraints.** The simplified rules considered in this paper can stop the adverse debt dynamics, although weak planning may make their implementation in Bosnia & Herzegovina difficult. The three-year horizon, though consistent with current MTEF, is too short to fully assess the impact of new borrowing on future debt service costs. Moreover, the MTEF does not yet guide the annual budget process: although MTEF targets should form a basis for annual budget plans, "last-minute" spending initiatives often overrule MTEF targets, pointing to a weak ownership of this exercise by policymakers. In the absence of a longer-term expenditure plan, ad-hoc adjustments to meet the rules will therefore likely be at odds with the country's needs and the government's spending priorities. A well-planned adjustment on the other hand, in line with the World Bank Public Expenditure Review recommendations, would be more efficient and would further reduce risks of unsustainable debt dynamics through deeper and potentially more durable adjustments.

55. **The balanced budget recommended by staff as a medium-term fiscal anchor avoids large fiscal swings generated by the simplified rules analyzed in this paper.** A sharp initial increase in expenditures would be compliant with the borrowing rules, especially when assessed using a short planning horizon. But increasing borrowing costs—stemming from the increase in expenditures but also from increasing costs of servicing the existing debt—would require subsequent adjustments. These adjustments would be politically difficult as they would be testing governments' commitments to the newly established rules. Maintaining a balanced-budget position would help avoid these problems.

56. **While the stochastic methodology is better at assessing risks than the standard deterministic approach, the results still need to be interpreted with caution.** There is substantial uncertainty surrounding the structure of the model (very simplified for the purpose of this exercise), estimated parameters, and assumptions about future policies. These factors are not reflected in the reported 'fan charts,' so the uncertainty surrounding debt dynamics is likely to be larger than reported on the graphs.

Annex—Projection Model

The model used in the projection is a simplified version of the staff macroeconomic framework with stochastic shocks. Macroeconomic variables are projected as follows:

- **GDP growth.** Real GDP growth is governed by Cobb-Douglas function with standard coefficients for labor and capital inputs (0.7 and 0.3 respectively) and exogenous productivity growth. Investment rate is fixed at 20 percent of GDP, with private investments determined residually. Capital depreciates at an annual rate of 5 percent. Initial capital stock (in 2000) is at 150 percent of GDP. Labor grows in line with projected working-age population growth (implying a gradual decline after 2015 due to adverse demographics). Average productivity growth is 1.4 percent per year (average for the 2000-05 period).

- **Net Exports.** Exports of metals depends on exogenous production assumptions (gradually expanding till 2012 and flat afterwards) and projected metal prices. Other exports grow in line with EU-wide GDP. Imports of petroleum products are positively related to Bosnia & Herzegovina's GDP growth and negatively to real KM oil prices (with an elasticity of -0.2). Imports of inputs for metal processing is proportional to metal exports. Imports for public investment projects are the sum of external (off-budget) project loans and grants. Other imports grow in line with GDP.

- **Consumption.** Consumption is determined residually from projected GDP, investments, and net exports. Private consumption is the residual from total minus public consumption.

- **External environment.** External variables in the model are euro-area GDP and CPI, euro LIBOR, euro/USD exchange rate, oil prices, WEO metal price index, and WEO euro-area import price index. Projections are constructed from a vector autoregression model (VAR) with one lag, estimated on the 1980-2006 sample (in some equations coefficients are adjusted to match the 2007-2012 WEO projection).

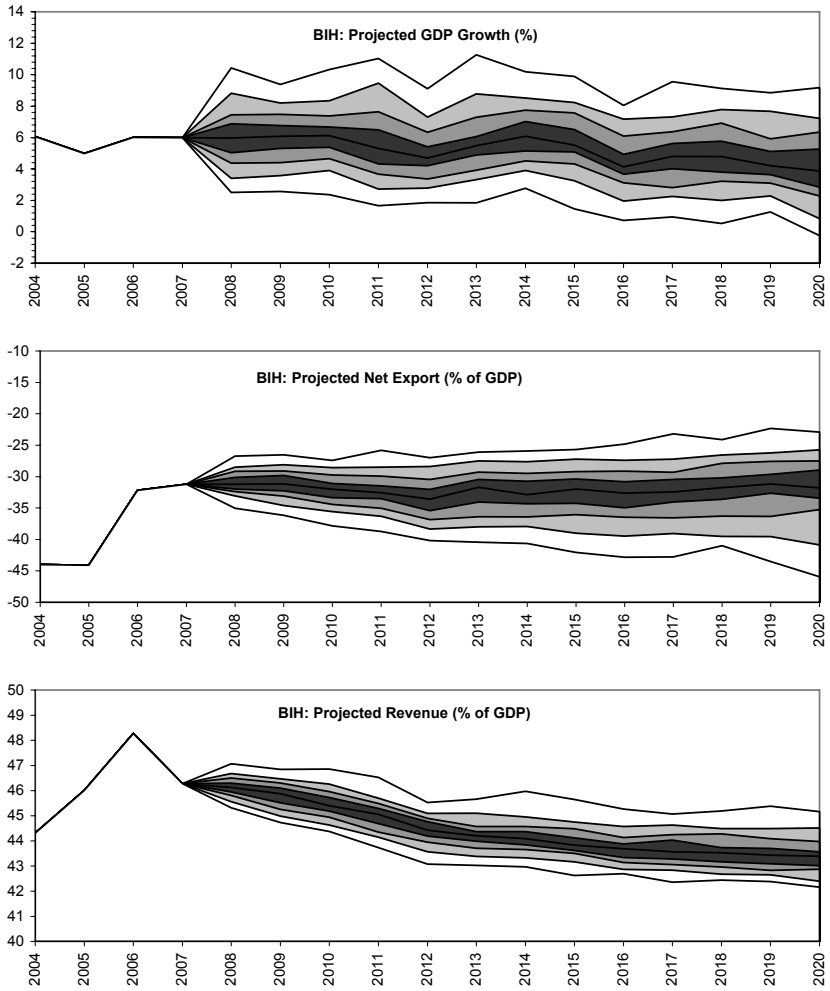
- **Exchange rate and prices.** The real exchange rate vis-à-vis the euro is constant, and consumer and import prices follow the euro-area level. Export prices are determined as a weighted average of metal prices and the euro-area CPI. Investment deflator is an average of import prices and the CPI. GDP deflator is an average of export and import prices, consumption deflator (CPI) and investment deflator, weighted by their respective shares in GDP.

- **Shocks.** Stochastic shocks affect external variables and Bosnia & Herzegovina's GDP growth rate. Shocks to external variables are estimated as residuals from the VAR model. Domestic productivity shock is estimated as a residual from the total 2000-05 GDP

growth minus changes in labor and capital inputs. In simulations, shocks are assumed to be distributed normally, with a covariance matrix constructed from these residuals.

The model projects declining GDP growth, strengthening external balance, and declining revenue ratio (Figure A1). GDP growth gradually decelerates from nearly 6 percent in 2008 to around 3½ percent in 2040. Net export improves from the projected 2007 level of -31 percent of GDP to -22 percent of GDP in 2040. This correction is not fully met by the reduction in public consumption, reducing private consumption. The reduction in consumption (and also in public investments in both scenarios with borrowing rules) implies a reduction in the VAT base, generating a declining revenue ratio.

Figure A1. Bosnia & Herzegovina: Model Projections



Source: Staff Calculations

Notes: Charts present percentiles of projected outcomes. Black area corresponds to a 20 percent confidence interval.

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IV. UNEMPLOYMENT AND LABOR MARKET[7]

A flexible, well-functioning labor market is essential for a successful economy. From this perspective, the high and persistent unemployment in Bosnia & Herzegovina—estimated between 20 and 30 percent of labor force—along with low labor participation is a source of concern for two reasons: first, because it represents a waste of economic resources; and second, because it suggests the existence of underlying rigidities that may complicate the economy's adjustment to the changing global economic environment.

What are the causes of high unemployment in Bosnia & Herzegovina? Limited and poor quality statistics make it difficult to answer this question in a definite way. But the data still allow us to draw some inferences that are important for policymakers.

After several years of robust growth, healthy wage increases, and a widening trade deficit, it is unlikely that deficient demand is at the root of Bosnia and Herzegovina's unemployment. Consequently, more expansionary macroeconomic policies would not only be ineffective but could also undermine the country's external competitiveness, eventually creating more unemployment.

Instead, there are several signs pointing to problems on the supply side. High unemployment among the young, and particularly those with low skills, suggests that the skills available in the labor force are not what the market demands. Also, prospects of employment abroad, income from remittances, or generous public employment and wage policies may also discourage unemployed workers from taking up jobs in the private sector. These problems are more difficult to fix: they require a reduction of the dominant presence of the government in the labor market and improvements in education and training.

There is also evidence of structural rigidities that hinder labor mobility and may discourage employment creation. The multiplicity and lack of harmonization among pension and health insurance systems and the limited portability of their benefits constrain labor movement within the country and undermine the creation of a single economic space. And the relatively heavy taxation of labor creates a strong disincentive to job creation in the formal (tax-paying) sector of the economy. Addressing these rigidities requires bold reforms in social security across Entity lines and reduction of the burden of labor taxes. Both have significant implications for the public finances and should be undertaken in conjunction with measures that ensure that their impact on the budget can be absorbed without compromising the financial position of the government.

[7] Prepared by Milan Cuc.

A. Introduction

57. **High and persistent unemployment has been a conspicuous feature of Bosnia & Herzegovina's economic performance.** Its coexistence with a recent growth in real wages raises broader questions about the workings of the labor market. This Chapter provides an overview of salient facts about unemployment in Bosnia & Herzegovina; places Bosnia & Herzegovina's unemployment in a perspective by comparing it with other transition economies; explores alternative explanations of unemployment; and considers policies that could help reduce it.

58. **The scope of the discussion is limited by lack of comprehensive data, in part a consequence of the large informal sector.** Some of the conclusions should therefore be seen as tentative. Nevertheless, there is still merit in examining the available data in detail, putting them in international perspective, and drawing as many implications as possible.

B. Basic Facts

Unemployment, employment, and labor participation

59. **Bosnia & Herzegovina's unemployment has remained stubbornly high despite a cumulative increase in GDP of almost 30 percent between 2000–05.** The estimates of the unemployment rate vary substantially (Table 1), ranging from 22.3 percent to 33.5 percent in 2004.[8] The most recent estimate, from the April 2006 Labor Force Survey, puts the unemployment rate at 31.1 percent.

60. **These divergences arise as a result of treatment of the large informal economy and associated unreported employment.** This is most striking when comparing the official statistics produced by the Entities' statistical offices with estimates from household surveys and the recent labor force survey. But the same data source, such as the household survey, can produce different results because of different definitions of unemployment: for example, the International Labor Organization (ILO) definition—where to be counted as unemployed, a person must actively search for a job—typically gives a lower estimate compared with self-reported unemployment.

61. **The Entities' high estimates based on registered unemployment data in all likelihood exaggerate the true unemployment.** This is because of the large role of the informal economy—with estimates of between 20 and 40 percent[9]—and the practice of informal sector workers to register as unemployed in order to obtain health coverage. For the

[8] Up to 44.9 percent, according to the Federation Statistics Office.

[9] See, for example, Petrova (2005).

purposes of the discussion that follows, we assume that the unemployment rate is in the 20–30 percent range.

62. **Over time, unemployment changes in response to net changes in employment and in the size of the labor force** (Tables 1 through 3). In Bosnia & Herzegovina, the increase in the unemployment rate between 2001 and 2004—from 16 percent to the 22–24 percent indicated by sources using a standardized methodology[10]—occurred against the background of robust GDP growth and rising labor participation and employment rates. In other words, the ongoing economic recovery was supporting employment growth, but employment growth was outstripped by increases in labor force. This suggests that the improving employment prospects drew more working-age population into the ranks of the labor force.

[10] Living Standards and Measurement Study (LSMS); World Bank; EBRD.

Table 1. Bosnia and Herzegovina: Estimates of Unemployment Rate

Source:		2001	2002	2003	2004	2005	2006	Note:
Labor Force Survey, 2006		...	...	...	...	...	31.1	April 2006, for working population 15+
Labor Force Survey, 2006		...	...	...	...	...	31.8	April 2006, for working population 15-64
LSMS, 2001–04	1/	38.8	37.0	32.4	33.5	...	...	
LSMS, 2001–04	1/	16.1	20.9	...	23.8	...	...	ILO definition
World Bank, December 2005		15.9	21.4	...	22.0	...	...	including informal economy
World Bank, December 2005		32.7	31.2	30.4	...	...	...	"self-reported" unemployment rate in LSMS
EBRD, Working Paper 101, October 2006		15.9	...	...	22.3	...	...	using LSMS, including informal economy
Government of Republika Srpska		...	...	...	...	36.8	36.2	Republika Srpska only
Federation Statistics Office		39.7	41.7	43.4	44.9	46.5	...	Federation only

1/ Living Standards Measurement Studies.

Table 2. Bosnia and Herzegovina: Estimates of Participation Rate 1/

Source:		2001	2002	2003	2004	2005	2006	Note:
Labor Force Survey, 2006		...	...	...	...	...	43.1	April 2006, for working population 15+
Labor Force Survey, 2006		...	...	...	...	...	51.3	April 2006, for working population 15-64
LSMS, 2001–04	2/	59.0	57.1	60.5	64.1	...	...	
LSMS, 2001–04	2/	52.8	57.4	...	59.6	...	...	ILO definition
World Bank, December 2005		47.8	53.9	...	59.0	...	...	including informal economy
EBRD, Working Paper 101, October 2006		48.3	...	...	57.8	...	...	using LSMS, including informal economy

1/ Labor force as percent of working-age population.
2/ Living Standards Measurement Studies.

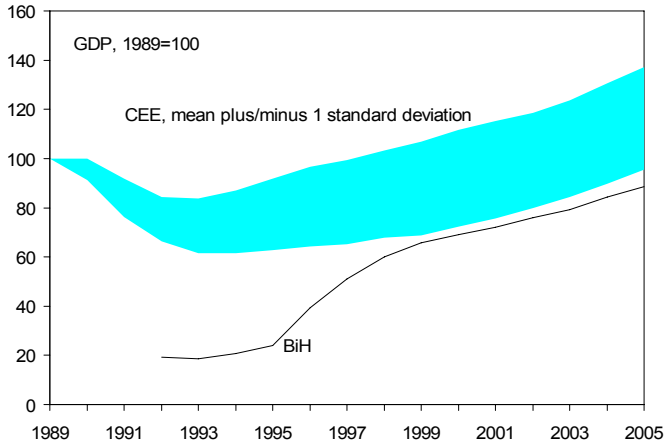
Table 3. Bosnia and Herzegovina: Estimates of Employment Rate 1/

Source:		2001	2002	2003	2004	2005	2006	Note:
Labor Force Survey, 2006		...	...	...	...	...	29.7	April 2006, for working population 15+
Labor Force Survey, 2006		...	...	...	...	...	35.0	April 2006, for working population 15-64
LSMS, 2001–04	2/	36.1	36.0	40.9	42.6	...	...	
LSMS, 2001–04	2/	44.3	45.4	...	45.4	...	...	ILO definition
World Bank, December 2005		40.2	42.4	43.4	46.0	...	...	including informal economy
EBRD, Working Paper 101, October 2006		40.6	...	...	44.9	...	...	using LSMS, including informal economy

1/ Percent of working-age population.
2/ Living Standards Measurement Studies.

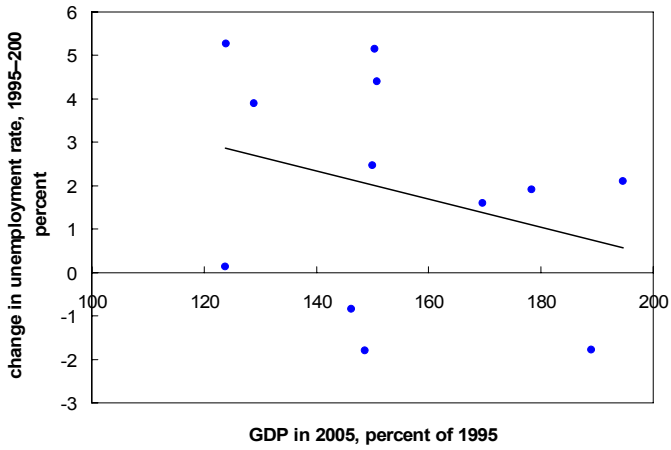
International comparisons

63. **Bosnia & Herzegovina's experience mirrors the experience of other transition economies.** The contraction in output and employment losses in the initial stages of transition gave way to a renewed growth, but employment initially stagnated or continued to fall. The nascent private sector began to generate new employment opportunities, but initially not on a sufficiently large scale that would absorb the excess labor.



Moreover, the new jobs typically required a different set of skills, complicating the transition of many unemployed from traditional industries, whose skills were not longer in demand. Gradually, however, the creation of new jobs started to reduce unemployment.

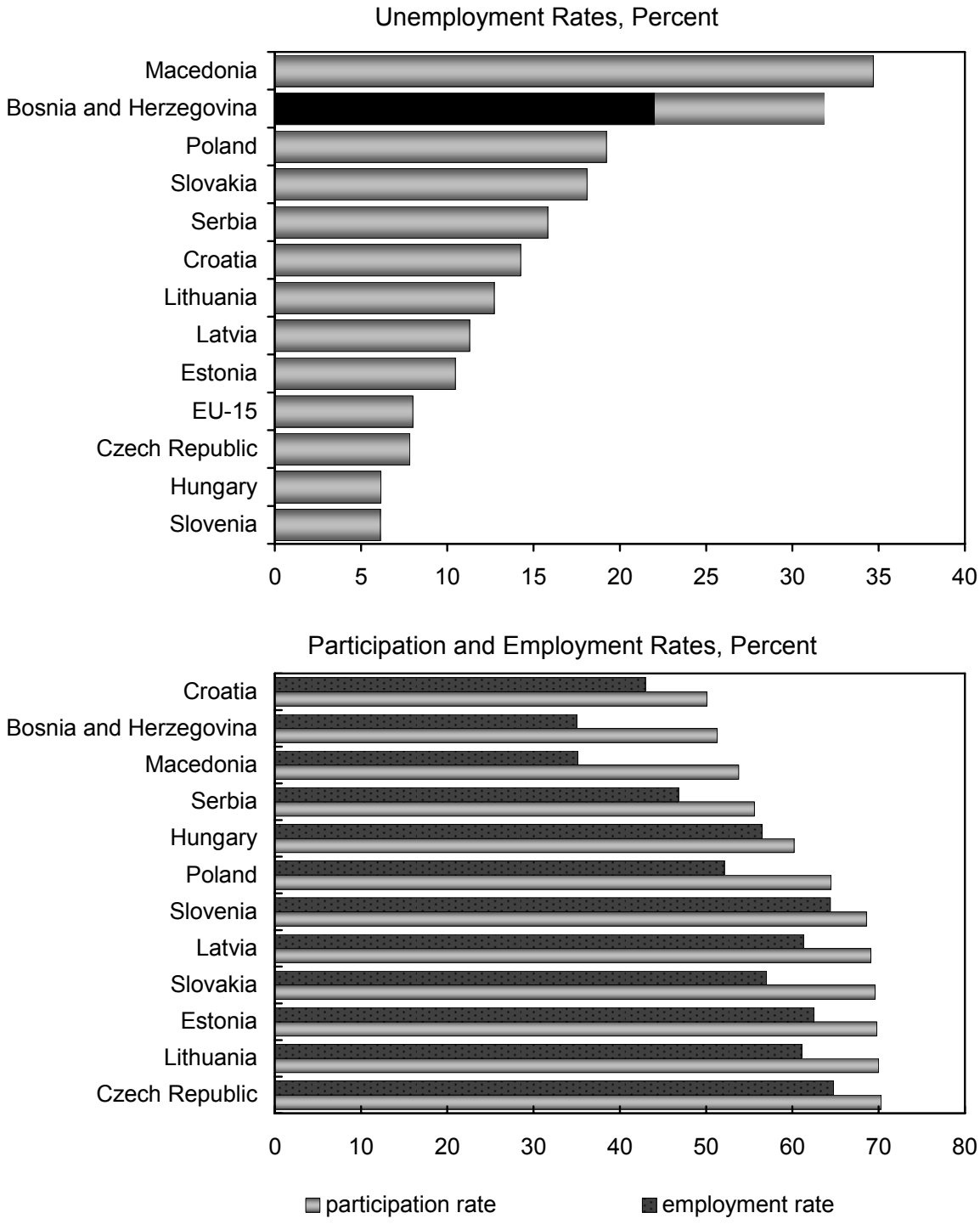
64. **Unemployment rate has responded to output gains in transition countries since their low point (on average, 1993–95).** Figure on the right relates the change in unemployment rate between 1995 and 2005 (vertical axis) to cumulative GDP change over the same period (horizontal axis). Not surprisingly, the fitted line is downward sloping: countries that recovered most of the lost ground also achieved better unemployment outcomes.



65. **Given this international pattern, Bosnia & Herzegovina's experience is not an exception.** Its relatively high level of unemployment is consistent with the relatively slow degree of recovery during the transition: in 2005, its GDP was still below its 1989 level.[11] More broadly, its labor market outcomes are close those in other Balkan countries, where both transition and accession to EU lagged behind Central and Eastern European (CEE) countries (Figure 1):

[11] The deep initial decline was also a result of the civil war.

Figure 1. Labor Market Outcomes, Regional Comparison, 2001–05



Sources: Eurostat; World Bank; national authorities; and Fund staff calculations.

The characteristics of unemployment

66. **Unemployment in Bosnia & Herzegovina is characterized by: high youth unemployment, high long-term unemployment and persistent differences in regional unemployment.** In that respect, the country broadly resembles other transition economies, although the severity of these problems makes it stand out even among them.

67. **Unemployment affects disproportionately the young.** Estimated at 62 percent, the unemployment rate for the 15–24 age group is at least twice as high as an average for other transition economies. Only FYR Macedonia, with a rate of 65 percent, has higher youth unemployment.

Labor Market Characteristics by Age Group

	Total	15-24	25-49	50-64	65+
Unemployment rate 1/	31.1	62.3	29.5	16.4	2.1
Participation rate 2/	43.4	33.4	66	36.6	5.6
Employment rate 2/	29.7	12.6	46.5	30.6	35.0

Source: Labor Force Survey, 2006.

1/ Percent of labor force.

2/ Percent of working age population (15+).

68. **In 2006, the highest unemployment rates were recorded for those with lower education**: 12.5 percent for those with university education, and 31 percent for those with elementary education. In this respect, it is worrisome that only 73 percent of 15-18 year olds are enrolled in secondary education. This compares with an 85–95 percent rate for most European countries.

69. **Most of Bosnia & Herzegovina's unemployment is long term**: 75 percent of the unemployed have been without a job for two years or more. Long-term employment is particularly high compared to other transition economies: in Bosnia & Herzegovina, the share of the unemployed out of work for more than a year is 86 percent, compared with a range of 40–60 percent reported for transition economies.[12] Only Macedonia has a similar level of long-term unemployment.

[12] Schiff and others (2006).

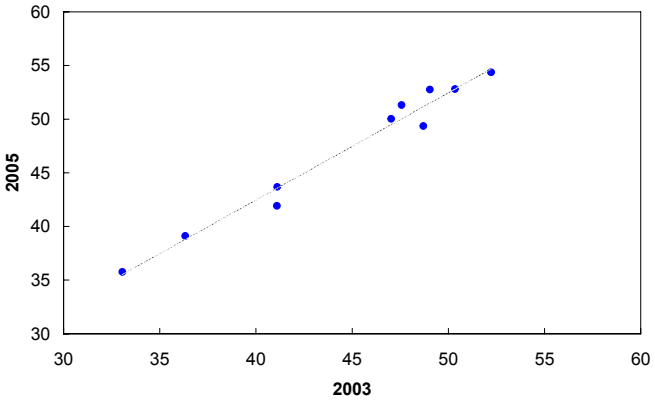
Unemployment by Job Search Duration

		Months				
	Total	0	0–5	6–11	12–23	24+
Percent of total	100.0	0.7	5.6	7.8	10.8	75.1

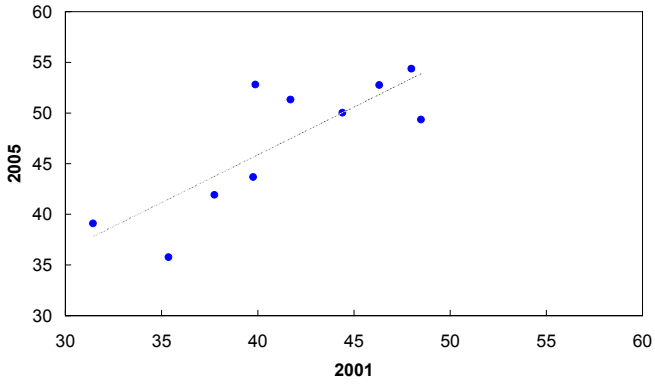
Note: 0 months means that the currently unemployed have found a job.
Source: Labor Force Survey, 2006.

70. **The process of transition does not affect all regions equally.** While differences in regional unemployment would be expected to widen initially, they should diminish over time, as workers move and find employment elsewhere. This seems to have happened in Bosnia & Herzegovina only to a limited extent. The figures show, on the vertical axis, the unemployment rate in 2005 and, on the horizontal axis, the unemployment rate at the starting point (2003 in the upper figure; 2001 in the lower figure). The positive correlation suggests little or no unemployment shifts between cantons. In 2005, cantonal unemployment rates within the Federation mirror closely unemployment rates registered in 2003. Even viewed over a longer period, the differences between regions seem to persist: cantons with relatively lower unemployment in 2001, tend to be the same ones with lower unemployment in 2005.

Persistence of unemployment in cantons, 2003–05



Persistent of unemployment in cantons, 2001–05



C. Explaining Unemployment

71. **At the risk of some oversimplification, we explore how the salient facts about Bosnia & Herzegovina's unemployment are consistent with three possible alternative explanations of its causes: deficient demand, supply-side problems and structural unemployment.**

Deficient demand

72. **Is the high unemployment indicative of the aggregate demand falling short of the potential output?** If that were the case, one could argue for more expansionary macroeconomic policies to help close the output gap. However, Bosnia & Herzegovina's performance does not support this proposition, for several reasons:

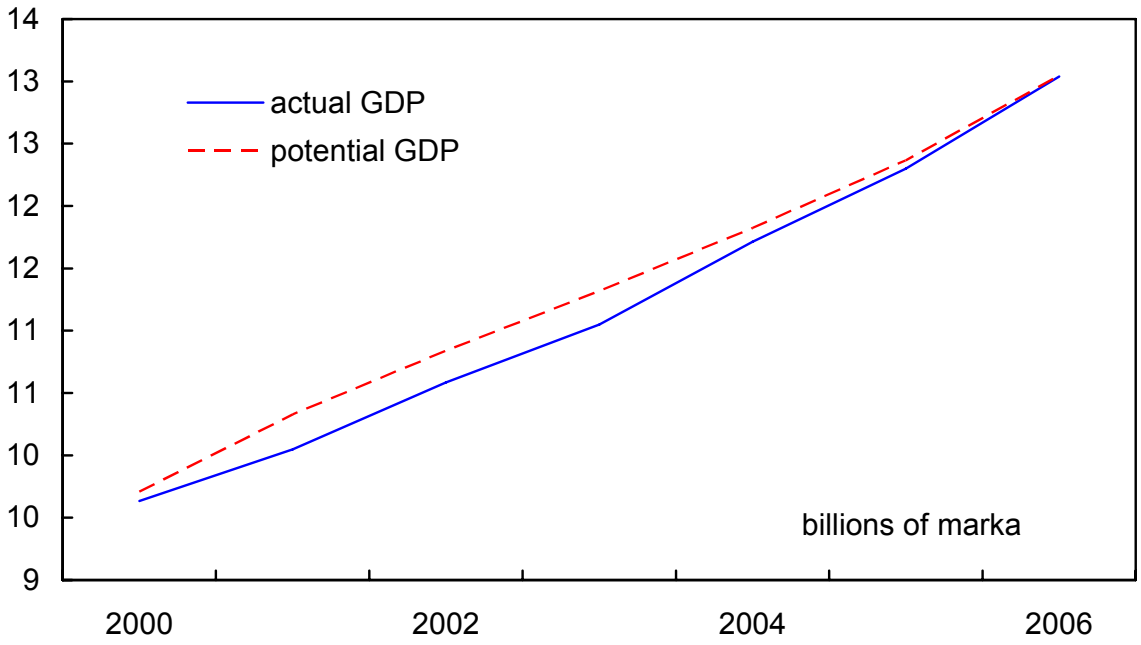
- Bosnia & Herzegovina has exhibited strong sustained growth, which—after an initial post-war spurt—has converged toward that of other CEE countries: 5.0 percent in 2000–05 (4.9 percent for CEE).[13] The estimates of potential output using the Hodrick-Prescott (HP) filter suggest that an output gap unlikely to exist (Figure 2).[14]

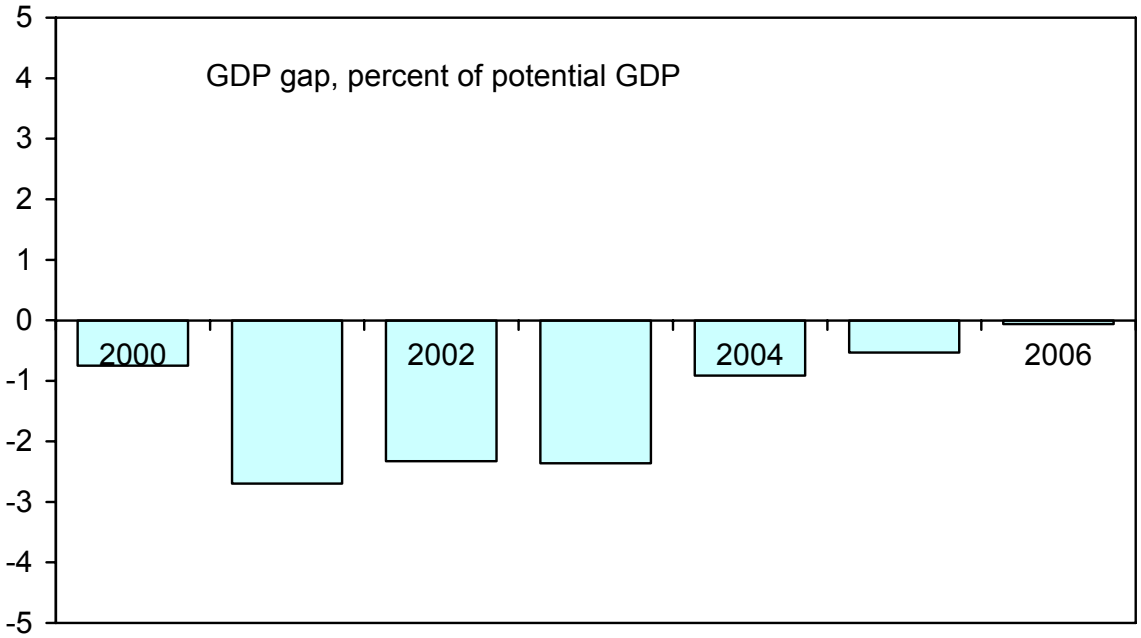
- The widening trade deficit—it almost doubled from $2.8 to $5.0 billion between 2000 and 2005—and the healthy pace of wage growth (close to 8 percent in nominal terms and 6 percent in real terms annually between 2000 and 2006) militates against concluding that deficient demand has been a problem in Bosnia & Herzegovina.

[13] In this respect, the difference in growth performance compared with Macedonia—another country with similar labor market characteristics—is striking. Macedonia's growth averaged 2.2 percent between 1998 and 2005; and only 1.4 percent between 2000 and 2005.

[14] Estimates of potential output always need to be interpreted with caution. Their usefulness may be limited in the case of Bosnia & Herzegovina, particularly because the country has experienced limited cyclical variations over the estimation period. Still, the HP estimates of potential output are consistent with other evidence on lack of deficient demand unemployment in Bosnia and Herzegovina.

Figure 2. Bosnia and Herzegovina: GDP and GDP Gap, 2000–06





Sources: BiH authorities; and IMF staff calculations and projections.

Supply-side factors

73. **If deficient demand is unlikely to be the cause of the observed unemployment, it may be appropriate to consider supply-side factors.** First, it is possible that, despite the employment opportunities generated through economic growth, workers are not willing to be employed at the prevailing wage in the private sector, either because they have other incomes or because they prefer to wait for more attractive jobs; in other words, workers have a reservation wage that is higher than the prevailing market wage and at least part of the observed unemployment is "voluntary". Second, it is possible that workers do not have the right skills to be employed in the private sector. Although in this case their unemployed status is "involuntary", the cause is again on the supply side. These two factors are not mutually exclusive but may be at work simultaneously.

High reservation wage

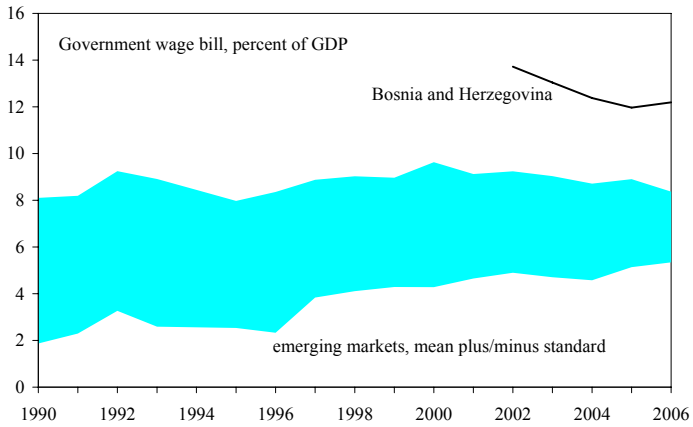
74. **A reservation wage is the wage at which unemployed workers are prepared to accept employment.** Its level will generally depend on the amount of alternative sources of income of the unemployed (unemployment benefits, for example), workers' valuation of their leisure, and other factors. If the reservation wage exceeds the wages offered by employers seeking to hire additional labor, the unemployed workers will forgo the offers of employment, because they will prefer waiting until better opportunities come along.

75. **Because data on job vacancies is lacking in Bosnia & Herzegovina, it is not possible to gauge directly the extent to which the unemployed may be refraining from taking up available employment.** Yet, it is also clear that there are several factors that may act to strengthen unemployed workers' reluctance to accept employment at the going wages. One of them is the existence of a large contingent of Bosnian migrant labor force working abroad (about one quarter of Bosnia & Herzegovina's population is estimated to live abroad). This suggests that there may be prospects, however uncertain, for Bosnians of finding employment abroad at a higher wage. The other side of the coin is the large amount of private transfers to Bosnian households sent from abroad (estimated at 30 percent of GDP) by emigrant workers. Some research (Chami and others (2003) for example) suggests that these remittance inflows can discourage work effort in the recipient country.

Public wages and employment

76. **Public wage and employment policy can strongly influence labor market performance and outcomes.** Demekas and Kontolemis (1999), for example, show on the example of Greece in the 1980s, how an expansion in public sector employment coupled with increases in government wages and benefits can lead to higher private sector wages and higher overall unemployment. This occurs as improved employment prospects (and higher

wages) in the public sector push up workers' reservation wage and reduce the attractiveness of private sector employment.



Sources: FAD database; Bosnian authorities; and Fund staff

77. **In Bosnia & Herzegovina, the public sector is large and average public wages particularly high.** Comparing its general government wage bill (in percent of GDP) with a group of 25 emerging market economies, Bosnia & Herzegovina is an apparent outlier. The average public administration wage exceeds significantly the economy-wide average in both entities, and appears particularly high in an international comparison.

Public Sector Wages—Comparison, 2006
(Percent of Average National Wage)

	Bosnia and Herzegovina								
	Federation	Republika Srpska	Bulgaria	Croatia	Czech Republic	Hungary	Romania	Slovak Republic	Slovenia
Public administration	132	148	123	106	113	130	172	128	118
Education	102	88	...	97	91	112	116	82	123
Health and social services	114	102	...	117	94	89	93	79	112

Sources: National authorities; Haver Analytics; and IMF staff calculations.

Skill deficiencies

78. **High youth unemployment is partly linked to the generally low quality of education in Bosnia & Herzegovina.** According to the World Bank, 40 percent of students lack basic skills and knowledge, while many students in vocational schools receive inadequate general education and remain unprepared for the demands of the market place.[15] The low school enrollment rates in secondary and tertiary education are also a serious problem.

79. **More generally, the very young (15–19 years of age) lack work experience, as they are only entering the labor market for the first time.** This limits their job possibilities even in developed countries—for example, in some countries of Western Europe youth unemployment rates exceeds 20 percent.

[15] For example, according to a 2003/04 survey, at least 40 percent of eight-grade students failed to obtain a satisfactory score on the mathematics assessment (World Bank (2006)).

Demographics

80. **Demographics also shape employment prospects for some age groups.** With its relatively young population, youth employment opportunities Bosnia & Herzegovina may be constrained by "cohort crowding"—a situation where larger youth cohorts face reduced job opportunities in the presence of wage rigidities and imperfect substitutability between workers of different ages.[16]

Structural unemployment

81. **In addition to demand or supply deficiencies, unemployment may also be caused by structural rigidities in the labor market.** The process of transition entails profound structural changes and sectoral shifts in production, requiring commensurate shifts in employment across sectors and regions. Because the reallocation of labor between declining and expanding sectors and regions is likely to take some time, unemployment arising from a structural transformation may persist. The length of this period will depend, among other things, on the structural characteristics of the labor market.

82. **There are indications of serious shortcomings in the functioning of the labor market in Bosnia & Herzegovina that interfere with optimal allocation of labor resources.** The strongest indication is the existence of a widespread informal sector. Reliance on informal employment—revealed by the divergence between reported unemployment rates that are twice the level of its level estimated from household surveys—typically emerges as a coping mechanism for employers seeking to hire labor and for job seekers that cannot find jobs in the formal sector.

83. **In a sense, the development of the informal economy could be viewed as a testimony to the resilience of the private sector in the face of structural impediments, but clearly it is a not an ideal solution.**[17] It points to the existence of institutional barriers which prevent normal functioning of product and labor markets, and underscores the urgency of reforms needed to correct these distortions. Possible factors that may help explain the presence of structural unemployment include: low wage flexibility; and limited labor mobility within the country.

[16] Jimeno and Rodriguez-Palenzuela (2002).

[17] Krstic and Sanfey (2007) points to the superiority of the formal over informal activities for reducing poverty and inequality and enhancing life satisfaction. It estimates that monthly earnings in the formal sector are on average about 30 percent higher than those in the informal sector.

Low wage flexibility

84. **With inflexible wages, unemployment will be slow to adjust.** Instead of falling in the face of increasing unemployment, wages will tend to remain relatively high. That will frustrate adjustment, which would otherwise see declines in wages help stem—and possibly reverse—employment losses over time. Some of the factors contributing to wage rigidity are: high minimum wages; centralized wage-setting process; and large labor tax wedge.

High minimum wage

85. **In Bosnia & Herzegovina, several factors point to low wage flexibility and responsiveness to regional economic conditions.** In the Federation, minimum wages in are set at relatively high levels and are binding for all regions within the entity.[18] Thus, even if regions face different economic conditions, wage response in a region affected by an adverse shock is constrained by the minimum wage legislation. The higher the minimum wage, the greater the number of workers that are likely to be affected. High minimum wages also help explain why youth unemployment is disproportionately high in Bosnia & Herzegovina—one would expect to find young, inexperienced workers at the lower end of the pay scale. In contrast, in the RS, the minimum wage—estimated at 40 percent of average wage in 2006, does not appear to be a binding factor, and is in line with the 30–40 percent range observed in other CEE countries.[19]

Centralized wage- setting process

86. **Another element limiting wage flexibility is the centralized wage-setting process.** General collective agreements specify a system of wages in fairly detailed and rigid manner, with the relative levels reflecting the complexity of the performed work and the worker's education level. Evidence suggests that these stipulations are only binding for the state-owned and mass-privatized sectors. In contrast, they are generally not respected in the new private sector.

[18] Each entity legislates their own minimum wage. The 2005 General Collective Agreement in the Federation stipulated a minimum wage of 55 percent of the average wage (about 51 percent of the 2006 average wage, , which one of the highest among CEE countries).Yet, in some Branch Collective Agreements, minimum wages are even higher (for the telecommunication and postal service sector, for example, 100–110 percent of the average wage in the Federation).

[19] However, the labor tax wedge for low wages is exceptionally large in the RS (see below), which discourages hiring of low-wage workers.

Labor tax wedge

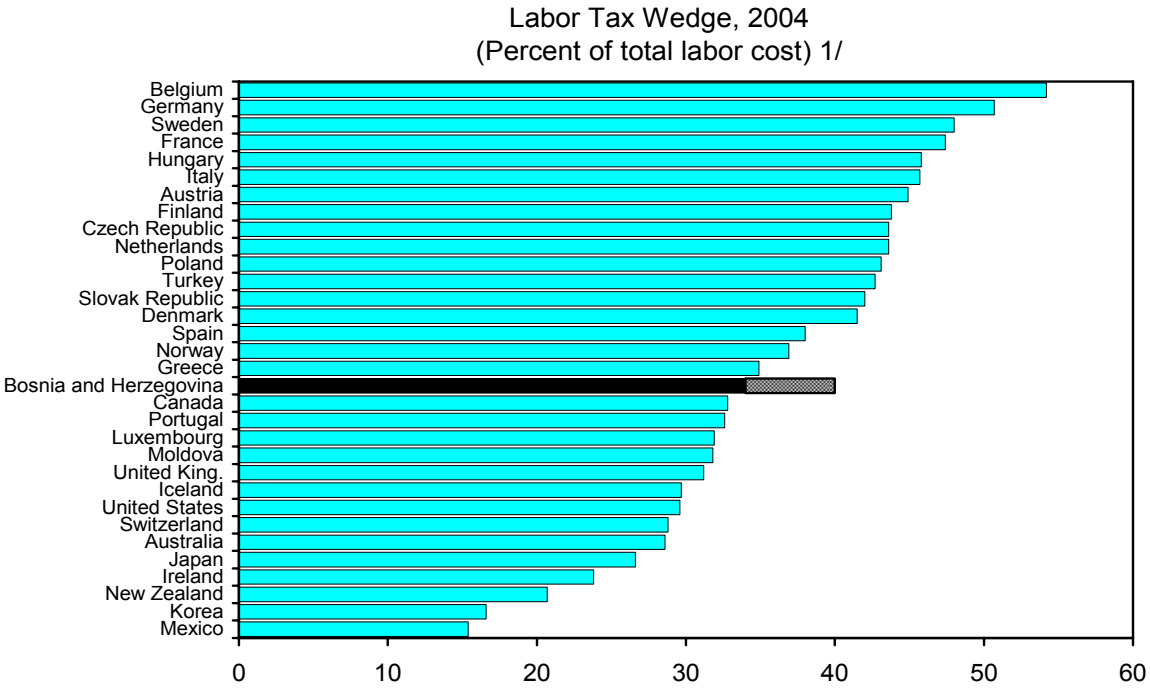
87. **One source of labor market distortion, which can lead to a lower-than-optimal level of employment, is the labor tax wedge**—the difference between the cost to the firm of employing a worker and the worker's take-home-pay. This wedge, which corresponds to labor income and payroll taxes, discourages employers from hiring new workers and employees from seeking employment. The distorting effect of the labor tax wedge may be particularly strong in an open economy like Bosnia & Herzegovina's where a large number in the labor force consider leaving abroad in search of employment.[20]

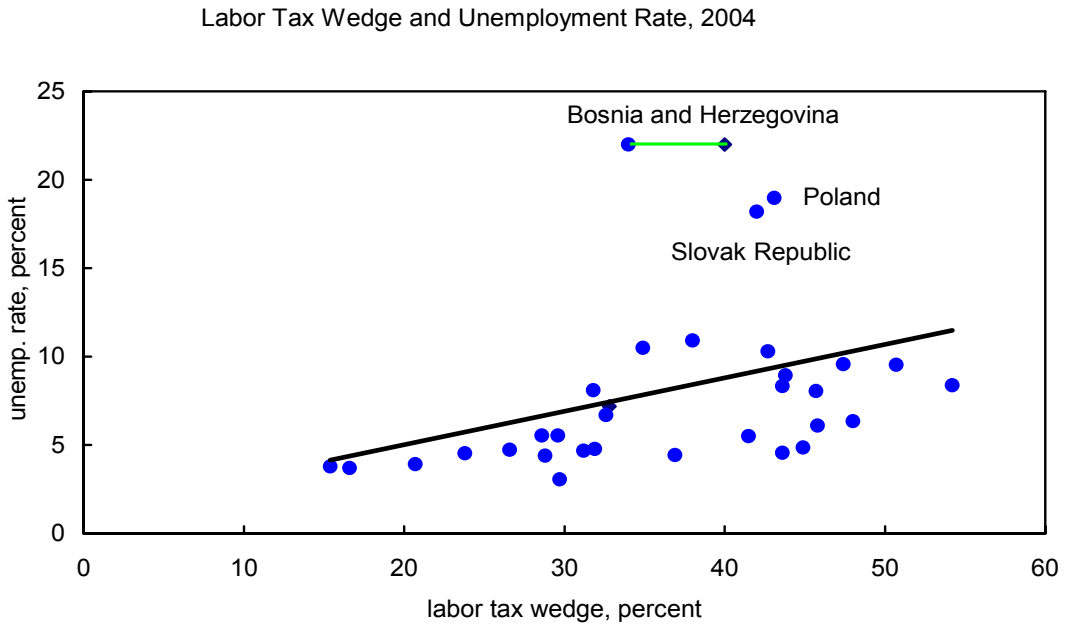
88. **Viewed against OECD countries as a group (Figure 3), Bosnia & Herzegovina is not an outlier, but the same data also suggests that countries with the higher labor tax wedge tend to have higher rates of unemployment.** The measure of the labor tax wedge includes all payments made to government on labor income, irrespective of whether these payments are made by the employee or the employer. It is expressed as a ratio of these payments divided by total labor cost.[21] Calculated at the average wage, it is 34–41 percent in the Federation, and 34 percent in RS. Bosnia & Herzegovina's high unemployment argues for exploring ways that would minimize any negative influence of the tax system on employment.

[20] See the 2004 Household Survey.

[21] Total labor cost includes gross wages paid to the employee plus the related payments to government made by the employer.

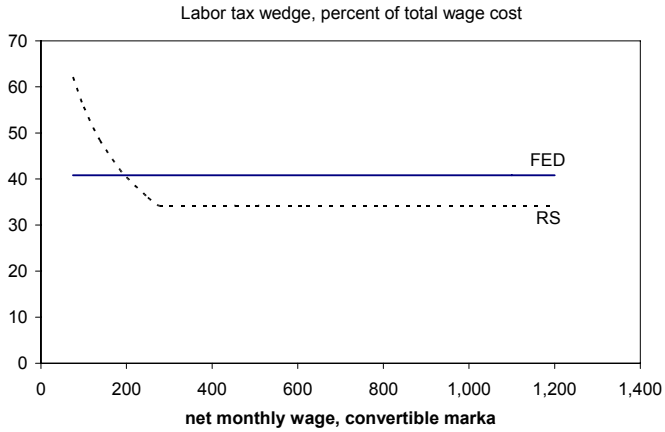
Figure 3. Labor Tax Wedge Comparison, 2004





Sources: OECD; World Bank; and Fund staff calculations.

89. **In the RS, the labor tax wedge becomes quite large at lower wage levels.** That is because of the provision in the current law, which stipulates that the basis for calculating the social contributions cannot be less than 50 percent of average net salary in the RS in the preceding month. This means, for example, that at a wage which is one third of the average, the labor tax wedge reaches 42 percent of total wage cost (up from 34 percent for the average wage). This discourages formal employment of workers at the lower end of the salary scale.



Limited regional mobility

90. **Limited spatial factor mobility weakens the mechanism by which regional differences in unemployment tend to even out**. In Bosnia & Herzegovina, factors that seem to contribute to a relatively low mobility include a general shortage of adequate housing, regional differences in physical infrastructure endowments, and apparent reluctance of households to leave their own communities. In the 2004 household survey, only about 2 percent of respondents indicated that employment was the reason for their move to their current residence; and only 3.6 percent indicated that it was very likely or quite likely that they would move in the upcoming 12 months. In addition, the multitude of pension and social insurance systems (at entity and cantonal levels) and limited portability of these plans discourage labor mobility within the country.

D. Policy Implications

91. **The preceding analysis does not allow to draw firm conclusions about the nature of unemployment in Bosnia & Herzegovina and the policy prescriptions that would work best; nevertheless, it does suggest caution in considering remedies and looking for quick fixes.** In particular, it indicates that efforts to reduce unemployment by stimulating aggregate demand would be ineffective at the current juncture and, by leading to higher wages, would run the risk of undermining Bosnia & Herzegovina's external competitiveness and exacerbating the macroeconomic imbalances. In contrast, strengthening the supply capacity of the economy by improving business environment and attracting private investment would not only raise sustainable growth, but also help absorb excess labor.

92. **To the extent that some of the labor market structural and supply-side factors are at play, some of the unemployment will decline only over time.** Yet, it is important that steps toward correcting some of the rigidities and shortcomings be taken early.

Education and training policies will be key to reduce skill mismatches. An early education reform is essential not only to improve the quality of education but also to reduce the waste in education spending by streamlining and refocusing the expenditure on priority areas.

93. **Public wage and employment policies require close attention.** The government is a sizable employer—particularly when compared with other countries—and its actions have spillover effects on the private sector. The indications that public sector wages may be excessive relative to the wages that could be supported by productivity levels in the economy is worrisome. This imbalance may even be higher if the nonmonetary dimensions of public sector employment—job security and nonwage benefits, unavailable to workers in the private sector—are taken into account. The public sector needs to promote wage moderation through its public wage and benefits policy.

94. **Accelerating privatization could be an important way of reducing the potentially distorting influence of the public wage and employment policies.** It would help harden the budget constraint for privatized companies, cut the transfers to cover their losses and limit their capacity to grant excessive wage settlements. At the same time, it would reduce the size of the public sector more generally.

95. **The large labor tax wedge argues for exploring ways that would minimize a negative influence of the tax system on employment.** One possible approach for consideration would be to cut social insurance contribution rates as a way to encourage growth in formal sector employment, including by removing incentives for tax evasion. To avoid the risk of emergence of financing shortfalls in the social funds, their revenues could be supplemented with transfers from the budget (using part of the VAT proceeds, for example).

96. **Steps toward harmonizing the provisions of the pension and social insurance systems and increasing their portability should be a priority area in a strategy aimed at promoting greater labor market flexibility.** While the limited portability of these systems may not be the only factor in explaining the persistent regional unemployment differences, its greater nationwide harmonization would likely remove part of the disincentives that currently discourage greater regional mobility.

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V. AN ASSESSMENT OF ECONOMIC COHESION[22]

Promoting economic cohesion in Bosnia & Herzegovina has been a key objective of both the International Community and the domestic authorities. Creating a single economic space makes sense in a small country like Bosnia & Herzegovina. It can also help efforts to nurture country-level identity and entrench peace and stability.

This paper examines the degree of economic cohesion in Bosnia & Herzegovina along two dimensions: (i) the degree of *convergence* of economic outcomes between the Entities and within the Federation, and (ii) the degree of economic *integration* between the Entities.

Evidence of economic *convergence* between the Entities is strong. This convergence has been driven by the Republika Srpska catching-up with the Federation. Alongside, the Republika Srpska appears to have fostered competitive advantages over the Federation.

By contrast, there is little evidence of economic convergence among the cantons in the Federation.

There is also little evidence of increased economic *integration* between the Entities, or within the Federation. Persistent unemployment differentials suggest that labor mobility is especially low, even across the cantons.

While there has been progress in harmonizing legislation and institutions at the country level, significant barriers to economic integration remain. These include a lack of portability of pension rights and health care insurance.

Improving economic cohesion in Bosnia & Herzegovina requires accelerating structural reforms in the Federation and eliminating remaining barriers to capital and labor mobility within and between the Entities.

[22] Prepared by Graham Slack with the assistance of Irena Jankulov.

A. Introduction

97. **Promoting economic cohesion in Bosnia & Herzegovina has been a key objective of both the International Community and the domestic authorities.** Creating a single economic space makes sense in a small country like Bosnia & Herzegovina because it provides unfettered access to capital, labor, and product markets thereby supporting domestic production of goods and services that are competitive on the local and international markets. It can also help efforts to nurture country-level identity and entrench peace and stability.

98. **This Chapter assesses the degree of economic cohesion in Bosnia & Herzegovina along two dimensions:** (i) the degree of *convergence* of economic outcomes between the Entities and within the Federation, and (ii) the degree of economic *integration* between the Entities. Economic convergence refers to the closing of differences and ultimately the equalization of economic variables like income and prices, whereas economic integration refers to the merging of economic processes and markets of different regions into a single whole. These concepts will be recognizable to readers familiar with the economic prerogatives of the EU.

B. Evidence of Economic Convergence

99. **The degree of economic convergence between the Entities, and within the Federation, is examined across several variables**: per capita GDP, price levels, net wage levels, and industrial production growth. There is strong evidence of economic convergence between the Entities across all variables. By contrast, there is weak evidence of economic convergence among cantons in the Federation.

Strong Entity convergence

100. **As shown in Figure 1, Republika Srpska (RS) has been catching up with the Federation over the past several years**.

- Large differences in *per capita GDP* have narrowed;
- Basic goods *prices* are now typically the same in both Entities;
- The gap between average net *wages* in the RS and Federation have substantially narrowed, though net wages have typically remained higher in the Federation; and
- After a period of divergence, industrial *production* level in the RS has caught up with that in the Federation.

Figure 1. Bosnia & Herzegovina: Entity Convergence

Figure 1a: Per capita GDP

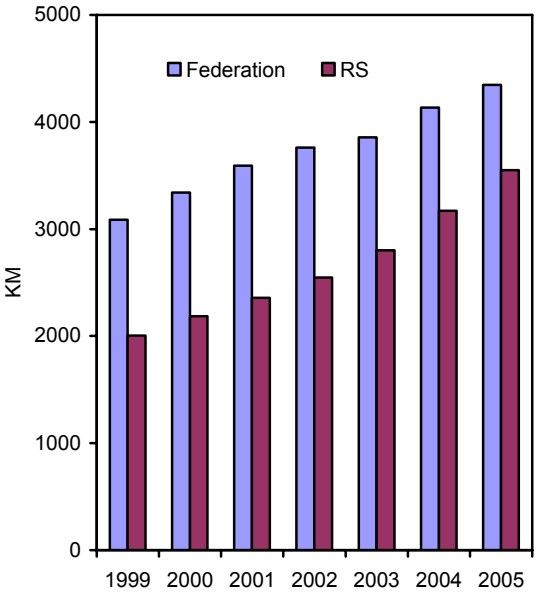


Figure 1b: Basic Goods Average Price Level

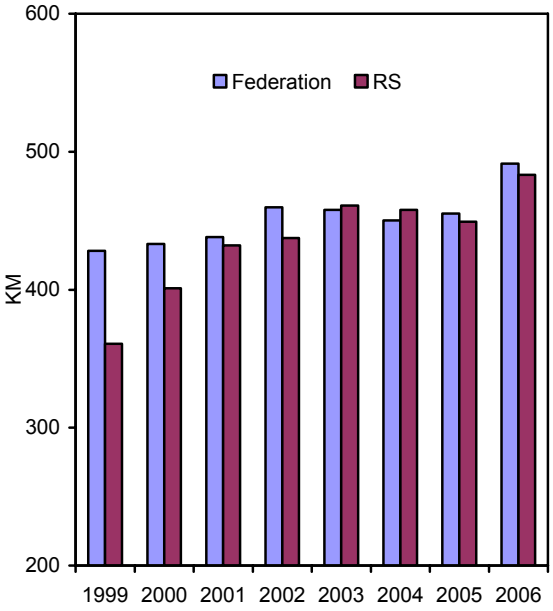


Figure 1c: Net Wage

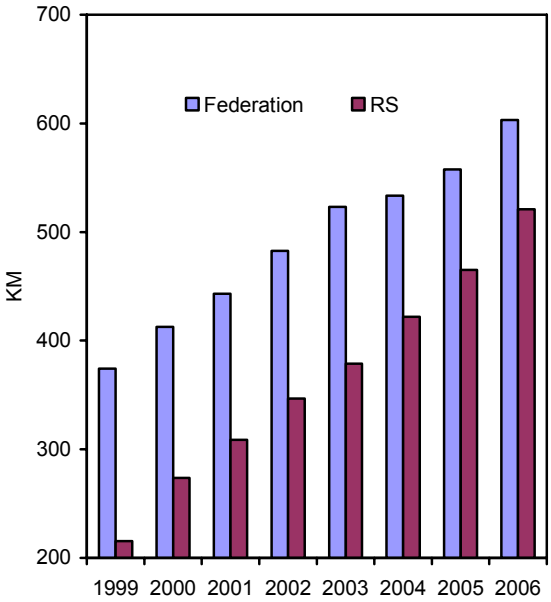
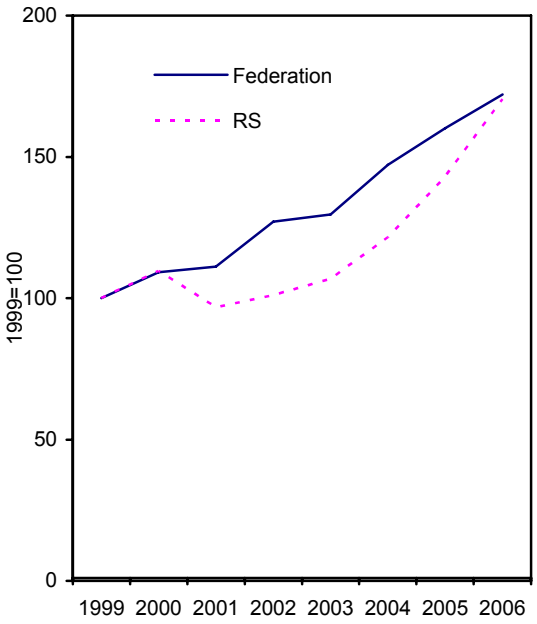


Figure 1d: Industrial Production Growth



Sources: Authorities and IMF Staff calculations.

Figure 2. Bosnia & Herzegovina: ULCs, and Financial Deepening

Figure 2a: Unit Labor Costs in Manufacturing
(Index: 2000=100)

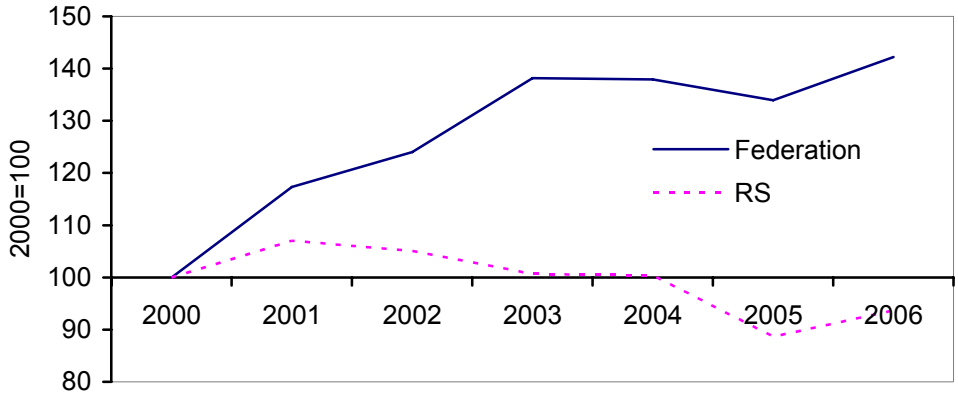


Figure 2b: Stock of Private Sector Credit to GDP
(percent)

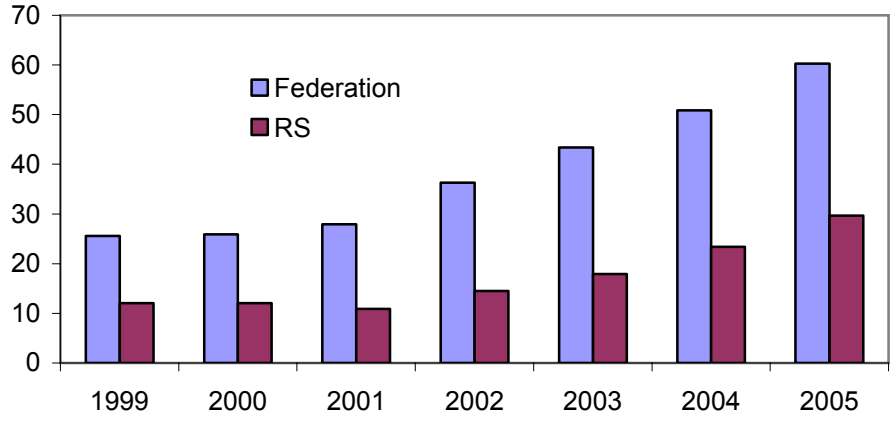
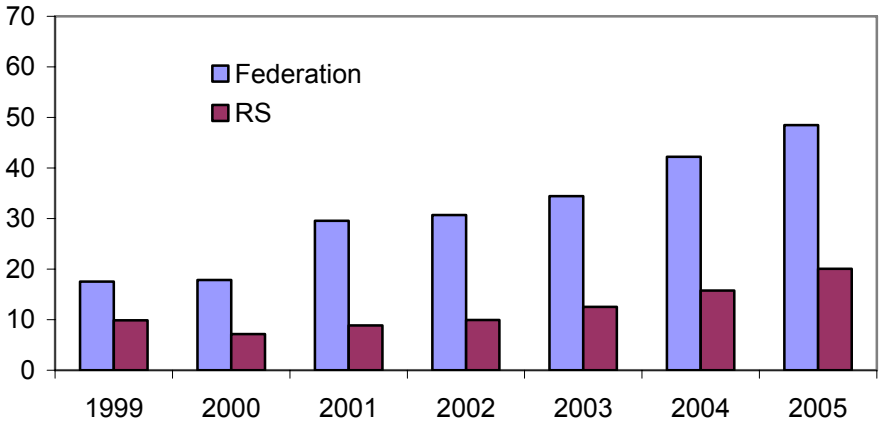


Figure 2c: Stock of Private Sector Deposits to GDP
(percent)



Sources: Authorities and IMF Staff calculations.

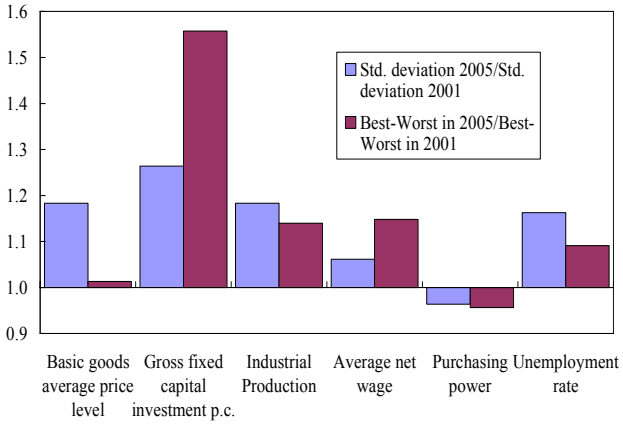
101. **Alongside, the RS has gained competitiveness relative to the Federation**. Unit labor costs in the RS are substantially lower than in the Federation (see Figure 2a) because increases in the wage bill have been kept in line with output growth. This picture is further supported by OECD analysis which shows the RS having a competitive advantage over the Federation across a range of indicators.[23]

102. **Data on financial deepening is also consistent with this picture of economic convergence between the Entities (see Figures 2b and 2c)**. The differences in the degree of financial deepening have begun to narrow recently. The remaining substantial differences in financial deepening between the Entities are though something of a puzzle.

Weak convergence within the Federation

103. **The apparent economic convergence between the Entities stands in contrast to the picture within the Federation**: available data suggest there has been very little convergence among the cantons.[24]

Figure 3: Desriptive Statistics for Cantons



104. **In fact, economic disparities among the cantons appear to have grown across a range of indicators**. As shown in Figure 3, the gap between the best and the worst performing canton increased between 2001 and 2005 across almost all indicators. Moreover, there appears to have been a *generalized* increase in the differences between economic performance of the cantons over this period. This can be seen in Figure 3 by the increase in the standard deviation (or variance) of economic performance of cantons relative to the average cantonal performance. The exception is that differences in the purchasing power of an average wage have narrowed slightly.[25] This is perhaps in part explained by efforts to equalize public sector pay across lower levels of government in the Federation.

[23] OECD Investment Reform Index 2006: Progress in Policy Reforms to Improve the Investment Climate in South East Europe.

[24] Data constraints mean it is not possible to compile identical indicators of convergence for the cantons and Entities.

[25] This is measured as the cantonal net wage relative to the average price of the basket of necessary goods in the same canton.

Figure 4. Bosnia & Herzegovina: Unemployment

Figure 4a: Diverging Entity Unemployment Rates

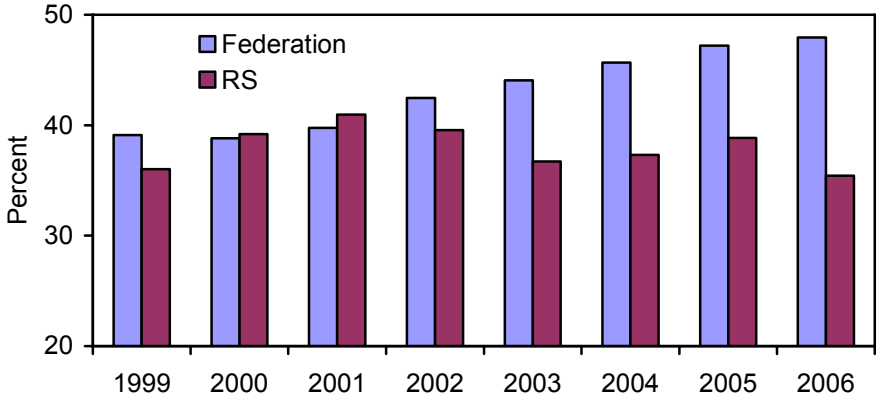


Figure 4b: Persistence of Unemployment in Cantons (2001-2005)

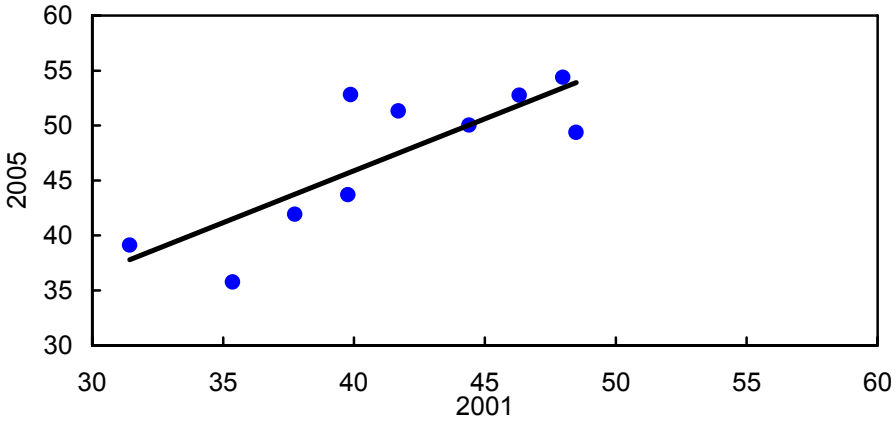
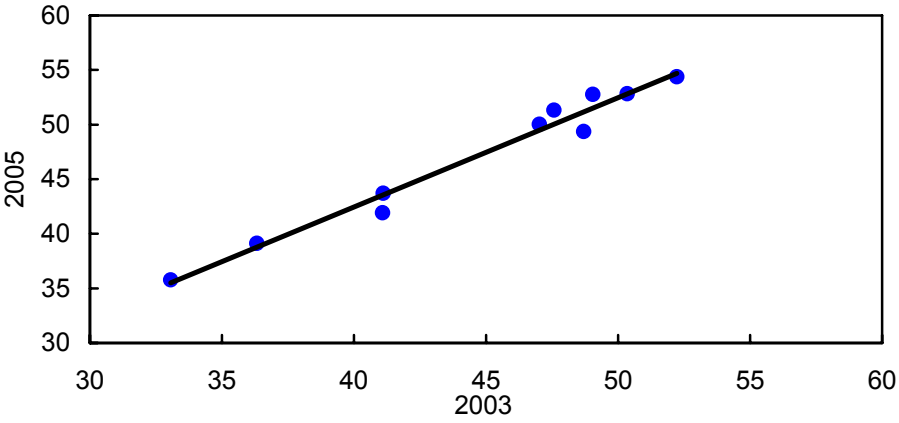


Figure 4c: Persistence of Unemployment in Cantons (2003-2005)



Sources: Authorities and IMF Staff calculations.

C. Evidence of Economic Integration

105. **At root, economic integration depends on the mobility of factors of production within an economic space**.[26] The available evidence suggest that the Entities are not economically integrated. The strong economic convergence noted above simply reflects the relative strengthening of the RS economy alongside minimal interaction between the Entities.

Labor mobility

106. **There are no direct measures of labor mobility available in Bosnia & Herzegovina. Inferences can though be drawn from data on unemployment**:

- Evidence of increasing differences in registered unemployment rates between the Entities point to low labor mobility. As shown in Figure 4a, registered unemployment rates appear to be much lower in the Republika Srpska than in the Federation.[27] Moreover, the trends in registered unemployment in the Federation and the Republika Srpska have been moving in opposite directions. While some divergence can be expected because of differences in the pace and nature of structural reforms, these differences would be expected to narrow overtime as workers find employment in the Entity with less excess labor supply. There appears little evidence, to date, that this has occurred in Bosnia & Herzegovina.[28]

- Evidence of persistent differences in unemployment rates across cantons is also consistent with this picture of low labor mobility, see Figures 4b and 4c. These figures show the correlation between unemployment levels at two points in time: accordingly, an upward sloping line means that higher unemployment in an earlier period is associated with higher unemployment in the later period. As the figures make clear, such a relationship emerges from the cantonal unemployment data: cantons with relatively higher unemployment in 2003 tend to be the same cantons with higher unemployment in 2005. Even viewed over a longer period (from 2001 to 2005), this pattern appears to hold.

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[26] Traditional neoclassical growth models predict that, other things equal, economic convergence and integration occur through mobility of factors of production—capital and labor. Regions with a relatively high capital-to-labor ratio will, under this model, experience a net inflow of labor because the marginal value added per worker and hence wage rates are relatively high. Conversely, regions with low capital-to-labor ratios will tend to experience a net inflow of capital as marginal returns on capital investment are relatively high. This process is often stymied however by barriers to factor mobility and self-reinforcing growth which attracts net inflows of both capital and labor.

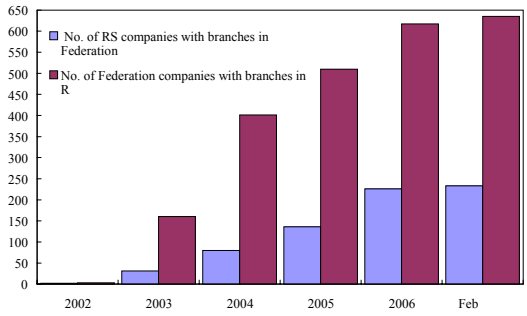
[27] The 2006 Labor Force Survey also shows large differences in unemployment rates between the Entities: youth unemployment was 52.4 percent in the RS and 66.7 percent in the Federation; and male youth unemployment was 48.7 percent in the RS and 65.2 percent in the Federation.

[28] The deep socio-economic and political factors affecting labor mobility in Bosnia & Herzegovina are discussed in Chapter IV.

Capital mobility

107. **There has been a steady increase in the number of companies with headquarters in the Federation or the RS that have established branch offices in the other Entity**.[29] This picture is in principle consistent with two different explanations: one is that capital mobility is increasing; the other is that such cross-border activity reflects the contortions needed to overcome legal and institutional barriers when conducting inter-Entity commerce. We are unable to distinguish between these two explanations given the available data. Anecdotal evidence, however, suggests that the latter explanation should not be discounted.[30]

Figure 5: Company Mobility



D. Institutional and Legislative Barriers to Integration

108. **As part of the effort to create a single economic space in Bosnia & Herzegovina, significant progress has been made in harmonizing legislation and institutions between the Entities**. A single currency has become an accepted means of payment throughout the country, facilitating inter-Entity transactions. Harmonized customs rules and duties are now applied at all points of entry to Bosnia & Herzegovina and a country-wide VAT has replaced an unharmonized domestic sales tax, facilitating price transparency beneficial to both consumers and producers. Modern and harmonized bankruptcy laws have also been adopted. Bank deposit holders are insured by a single and country-wide deposit insurance agency that, together with the establishment of a country-wide banking system, has aided the efficient investment of domestic savings, regardless of their geographic origin.

109. **Nevertheless, significant institutional and legislative barriers to economic integration remain.** There is little portability of pensions rights and health care insurance. Capital mobility is affected by varying and non-transparent property rights. The costs and procedures of doing business differ across the Entities because of varying degrees of red tape. While financial intermediation has deepened, there is still no single banking supervisor. And a host of industry-level legislation and labor regulations remain Entity specific.

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[29] Data on inter-entity investment would provide a more direct measure of capital mobility, but such data are not available.

[30] At the Foreign Investors Council (FIC) conference in Sarajevo on April 24, 2007, a FIC representative observed that "without a physical presence in both Entities it is more difficult for a company to conduct inter-Entity business than it is to undertake trade with a foreign country."

E. Conclusions

110. **The RS appears to be catching-up in economic terms with the Federation**. This may in part reflect the implementation of delayed reforms the RS. But it is now reforming faster and has fostered competitive advantages over the Federation that herald the prospect of it pulling ahead of the Federation in the coming years. The apparent lack of economic integration between the Entities underscores this prospect. Promoting internal economic cohesion in Bosnia & Herzegovina will require accelerating structural reforms in the Federation and eliminating the remaining barriers to capital and labor mobility within and between the Entities.

VI. CREDIT GROWTH, BANK SOUNDNESS, AND BANKS' FOREIGN LIABILITIES[31]

Bosnia & Herzegovina has experienced rapid credit growth in recent years. Foreign-owned banks, which account for of the bulk of banking system assets, are the main sources of credit growth. These banks have been largely relying on long-term foreign funding to finance the credit expansion.

Rapid credit growth, coupled with weaknesses in asset classification and provisioning as identified by the 2006 Financial Sector Assessment Program (FSAP), may mask the underlying credit risks. In addition, the reliance on potentially volatile foreign funding to finance credit growth may also create a risk for both financial stability and the macroeconomy, especially in the context of the currency board arrangement.

This paper examines the relationships between credit growth, bank soundness, and banks' foreign liabilities. It also tests for the effects of the policy measures that have been implemented by the Central Bank of Bosnia & Herzegovina (CBBH) to curb credit growth in the past few years. The empirical investigation is done using bank-level and macroeconomic data from the second quarter of 2003 to the third quarter of 2006. The measure of bank soundness used in this paper is the "distance-to-default", which measures the probability that losses exceed equity and thus captures the risk of insolvency.

The results show the following:

- There is no evidence that stronger banks expand credit faster.
- The policy measures of the CBBH have had no significant impact on credit growth.
- Credit growth improves bank soundness, possibly through boosting profits. Controlling for other factors, large foreign banks appear to run a higher risk of insolvency. This is because foreign bank subsidiaries keep capital-to-asset ratios low in order to raise return on equity. Insurance against this risk is provided by parent banks, which typically can be expected to provide additional capital when needed.
- Credit expansion, robust economic activity and strong profitability are the main determinants of banks' foreign borrowing. The tightening of the maturity matching requirements has also contributed to the increase in banks' foreign liabilities.

Since policy measures to curb credit growth have not been effective, it is even more important to strengthen prudential supervision to minimize the risks to financial stability. As large foreign subsidiaries tend to keep minimum amount of capital, supervisors should make sure that they build up adequate reserves that reflect the underlying risk through tightening provisioning requirements or requesting additional capital buffers. The results also highlight the importance of cooperating with home-country supervisors to closely monitor local subsidiaries of foreign banks.

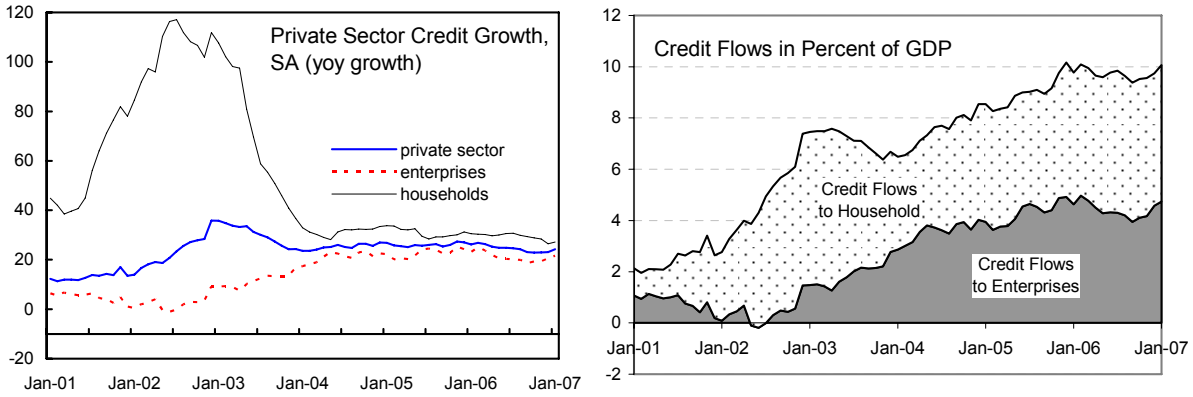
Relaxing the maturity matching requirements could help lessen the reliance on foreign borrowing to some extent.

[31] Prepared by Mali Chivakul.

A. Introduction

111. **Bosnia & Herzegovina has experienced rapid credit growth in recent years** (Figure 1). Real private sector credit growth averaged 22.8 percent between 2001 and 2006, and credit to GDP ratio more than doubled during the same period. This experience is not unique to Bosnia & Herzegovina: financial deepening and rapid credit growth have been prominent features of recent economic developments in the Central and Eastern European (CEE) and Southeastern European (SEE) countries. In Bosnia & Herzegovina, the credit expansion so far seems to be in line with the regional trends, given the low initial level and healthy consumer demand growth.

Figure 1. Bosnia and Herzegovina: Credit Growth, January 2001-07



Sources: CBBH and staff estimates

112. **Foreign-owned banks, which are the main sources of credit growth in Bosnia & Herzegovina, rely on long-term foreign funding to finance this expansion.** Most of the large foreign bank are subsidiaries of European banking groups, which set ambitious return on equity (ROE) targets for their CEE and SEE subsidiaries, including ones in Bosnia & Herzegovina. These subsidiaries finance their credit expansion by borrowing from abroad, mostly from their parent banks. In addition, in Bosnia & Herzegovina, the 2006 Financial Sector Assessment Program (FSAP) also suggested that the strict maturity matching requirements may have contributed to the reliance on foreign funding because the short maturity of local deposits limit their role in funding credit growth.

113. **The rapid credit expansion, coupled with its foreign funding, raises concerns about both prudential and macroeconomic risks.** During a credit boom, commercial banks' credit assessment capacity may be overstretched and credit risks could be underestimated. Although the entry of foreign banks has improved the soundness of the financial system (IMF (2006a)), they have introduced a new macroeconomic risk, which could materialize if there were a sharp fall in their foreign borrowing or a reversal of capital flows. Such sharp fall could, for example, be a result of a shift in risk appetite of foreign

banks. With the high current account deficit, a sudden stop or a slowdown of bank-related capital flow could put pressure on the balance of payment. In response to these risks, the authorities have implemented a number of measures aimed at curbing credit growth.

114. **This paper empirically analyzes the relationships between credit growth, bank soundness, and banks' foreign liabilities, and assesses the impact of the policy measures taken.** Specifically, the paper addresses three main questions:

- What is the relationship between credit growth and bank soundness? Do sound banks tend to lend more? Do those that lend more become less sound?

- What are the determinants of banks' accumulation of external liabilities? What is the relationship between credit expansion and bank-related capital inflows?

- What have been the effects of the policy measures that were implemented with an intention to curb credit growth? Have they been effective in reducing rate of credit growth?

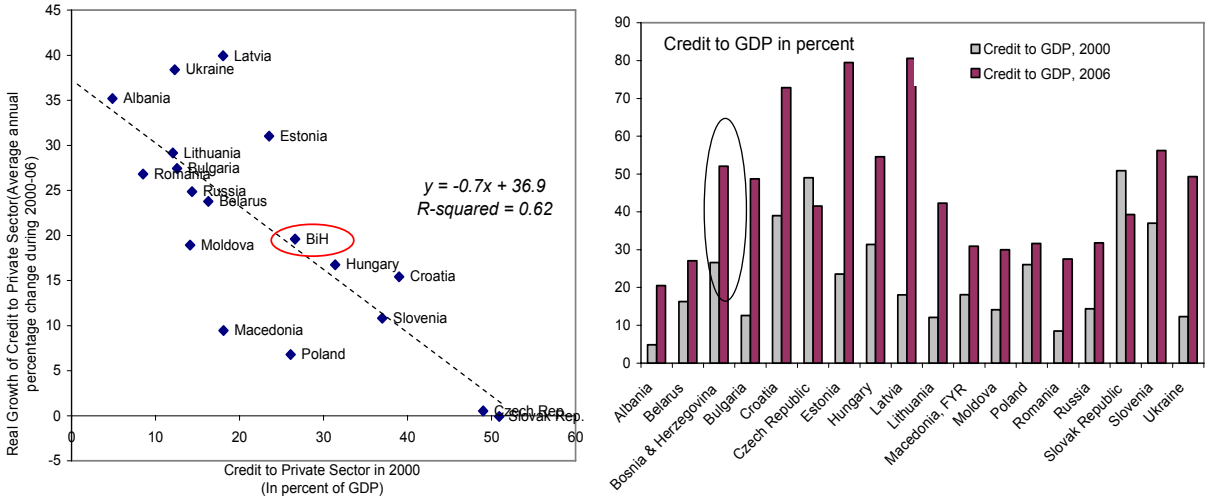
115. **The rest of the paper is organized as follows.** Section B describes recent developments in the banking sector in Bosnia & Herzegovina and sets them in the regional context. The Section also discusses prudential and macroeconomic risks associated with the credit boom. Section C describes the measures taken by the authorities to curb credit growth. Section D discusses the empirical model specification, describes the data, and presents the results. Section E concludes and provides policy implications.

B. Recent Developments in the Banking Sector

Developments in credit and market structure

116. **The recent rapid credit growth mainly reflects the financial deepening process** (Figure 3). Many studies suggest that countries in the CEE and SEE regions are going through a financial catch-up, where credit to GDP ratio is converging to the levels consistent with their incomes (Schadler and others, 2004; Backe and Zumer, 2005; Cottarelli Dell'Ariccia and Vladkova-Hollar, 2005, and Hilbers and others, 2005). In the case of Bosnia & Herzegovina, credit to GDP more than doubled between 2000 and 2006, and reached 52 percent in 2006. In fact, Bosnia & Herzegovina was categorized as a "late riser" in terms of credit growth, as its turning point only came in 2001, while credit in many CEE countries started its expansion path since late 1990s (Cottarelli, Dell'Ariccia and Vladkova-Hollar, 2003).

Figure 2. Central and Eastern Europe: Credit to GDP Ratio and Credit Growth, 2000-06



Source: IMF.

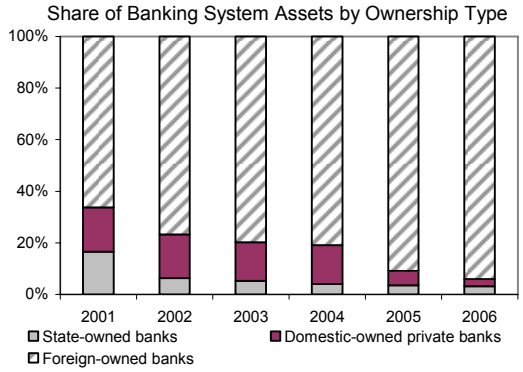
117. **Credit expansion has also been supported by favorable macroeconomic conditions.** Improved economic prospects have boosted financial intermediation. Demand for credit has been fostered by economic growth, low inflation, and healthy wage growth. On the supply side, foreign-owned banks have been taking advantage of benign global conditions and low world interest rates to finance credit expansion with low cost funds.

118. **Privatization and reforms of the financial sector have strengthened confidence in the banks.** As elsewhere, privatization and reforms in the financial sector have far surpassed those in the corporate sector. The EBRD index for banking reform has improved 1.7 points since the late 1990s, compared with a 1 point increase for enterprise reform. With institutions such as the currency board arrangement and the deposit insurance in place, there is rising public confidence in the banking system. Deposit growth took off in 2001 with the annual rate of 65 percent, and maintained an average rate of 22 percent up to 2006. The ratio of broad money to GDP rose from 22 percent in 2001 to 57 percent in 2006.

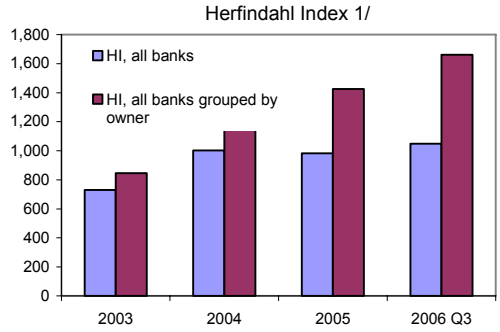
119. **Foreign participation and market concentration have increased markedly** (Figure 3). The financial sector attracted about 40 percent of the foreign direct investment stock until end-2005. By end-2006, foreign-owned banks accounted for 94 percent of the system assets. In particular, four banking groups from the EU countries account for 74 percent of the system assets, following consolidation both at the country and the European level. The Herfindahl index (HI), which measures the degree of market concentration, shows that the market reached the upper end of "moderately concentrated" by end-Q3 2006. This development in Bosnia & Herzegovina is similar to the experience of many CEE and SEE countries. Figure 3 shows that the share of foreign-owned assets was greater than 50 percent in all but four selected CEE and SEE countries in 2004.

Figure 3. Bosnia & Herzegovina: Developments in Market Structure

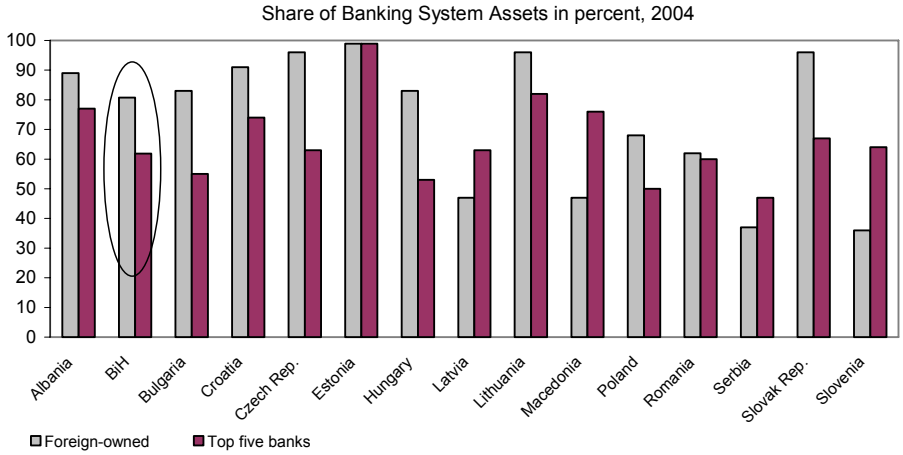
Foreign banks increasingly dominate the Bosnian market...



...while market concentration has increased.



This is similar to the experience of other CEE and SEE countries.



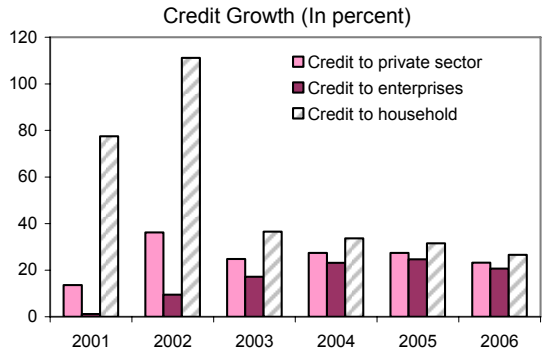
1/ A HI between 1,000 and 1,800 indicates moderate concentration. A HI above 1,800 indicates high concentration.

Sources: CBBH; FBiH Banking Agency; RS Banking Agency; Mihaljek(2006); and staff estimates.

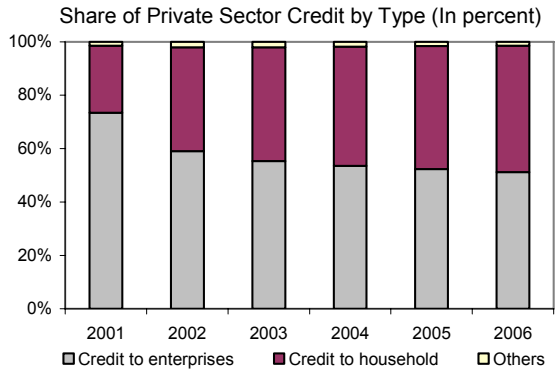
120. **As in most CEE and SEE countries, the rapid credit growth has been led by lending to households** (Figure 4). In Bosnia & Herzegovina, the average real growth of credit to household between 2001 and 2006 was about 50 percent, while it was only 13.5 percent for the credit to enterprises. Starting from a very low base, credits to household now account for 47 percent of total credit to private sector. Corporate lending only started to pick up in 2003-04. Most household loans are long term, and about 25 percent is housing-related credit, although commercial banks note that some consumer credits are also used for housing-related activities. Anecdotal evidence suggests that part of the household credit expansion has been led by a housing boom, although no aggregate housing price data are available. Competition to gain market share has led to a fall in lending interest rates.

Figure 4: Bosnia and Herzegovina: Key Features of the Credit Expansion

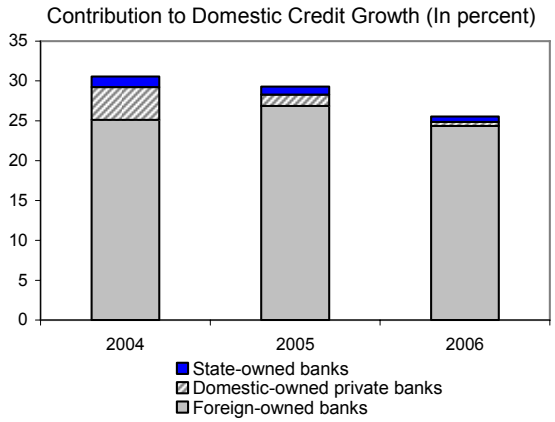
Household credit grew strongly from a small base...



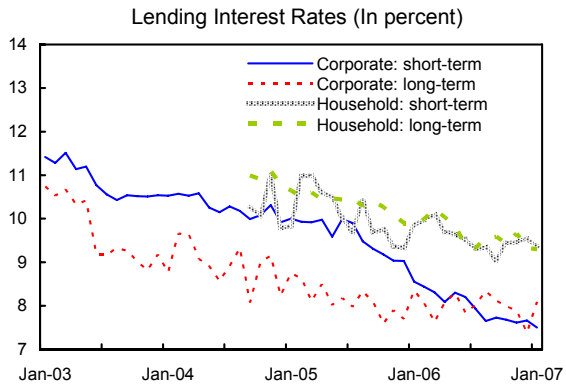
...leading to an even split between credit to households and enterprises by 2006.



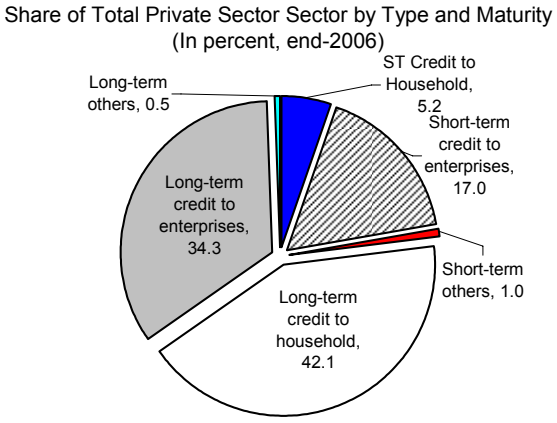
Foreign-owned banks are the main source of credit growth.



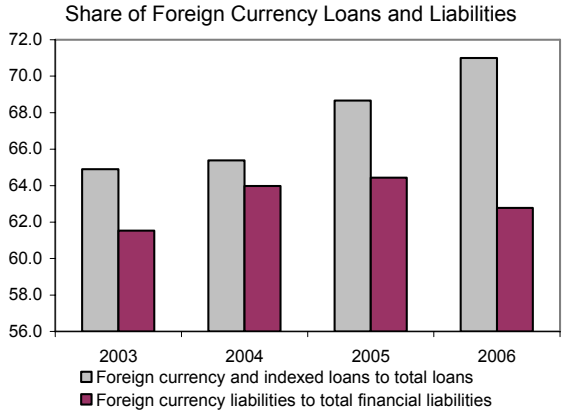
Intense competition has lowered lending rates.



The majority of loans have maturities longer than one year.



Ratio of foreign currency and indexed loans is high and rising.



Sources: CBBH; and staff estimates.

Financing of the credit expansion

121. **At the aggregate level, both customer deposits and foreign borrowing have been the main sources of funding, but the large increase of net assets at the CBBH shows banks' inability to intermediate much of short-term deposits** (Figure 5). On the asset side**,** private sector credit to GDP grew by 25 percentage points while net assets at the CBBH grew 9 percentage points. A simple accounting exercise shows that the main sources of growth in assets are private sector deposits, which account for about 19 percentage points, and net foreign liabilities, which account for about 8 percentage points. Government net deposits and other items together account for 7 percentage points.

122. **With cheap long-term funding from abroad, the existing maturity structure of loans and deposits, and tight maturity matching requirements, banks prefer to rely on long-term foreign funding to finance long-term credit.** The regulations require that almost 100 percent of short-term (less than one year) liabilities must be matched with assets of the same maturities (see more details in Section C). While short-term deposits accounted for 56 percent of total deposits at end-Q3 2006, short-term lending accounted for only 24 percent of total lending. As the FSAP suggested, banks therefore put short-term deposits at the CBBH as reserves or invest abroad in short-term foreign assets. Long-term credits, which is 76 percent of total lending, have to be financed mainly by long-term foreign borrowing.

123. **Bank-related inflows have been a major source of the increase in international reserves.** Bank-related inflows averaged 2.7 percent of GDP from 2001 to 2006, and gross foreign liabilities reached 25 percent of GDP by end-2006. This is comparable to the level observed in Croatia, Slovenia and Lithuania. Foreign funding, typically comes in a form of euro-denominated loans or non-resident deposits, is exchanged for KM at the CBBH as most lending is in KM indexed to the euro. As a result, these inflows has contributed directly to the international reserves.

Key risks

124. **Financial soundness indicators (FSIs), as illustrated in Table 1, suggest that the banking system is in good health.** Profitability has improved over the years, capital adequacy ratios are high and nonperforming loan ratios are moderate and falling. Banks are highly liquid.

125. **However, rapid credit growth, coupled with weaknesses in asset classification and provisioning, as identified by the FSAP, may mask the underlying credit risks.** With the weaknesses in the regulation of credit risk management, commercial banks may currently underestimate the extent of credit risks. If these credit risks materialize, they would have a major adverse impact on banks' profitability and capital adequacy, forcing banks to adjust their operating strategy accordingly. A downgrade in asset quality might also lead parent

banks to curb lending to their Bosnian subsidiaries, which in turn could jeopardize financial and external stability.

Figure 5. Bosnia and Herzegovina: Financing of Credit Expansion

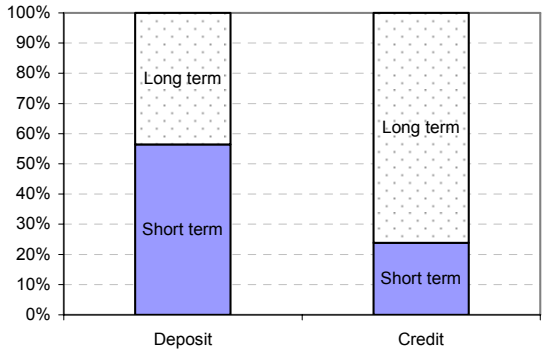
At the aggregate level, customer deposits and foreign debt are important sources of financing of credit growth.

Financing of Private Sector Credit Growth, 2001-06

	Cumulative Change in Percentage Points of GDP
Private sector credit	24.8
Assets	
Claims on noncentral government	0.1
Net assets held with the central bank	9.1
Liabilities	
Net foreign liabilities	8.1
Net central government deposits	2.1
Noncentral government deposits	2.0
Private sector deposits	18.9
Other items, net	2.9

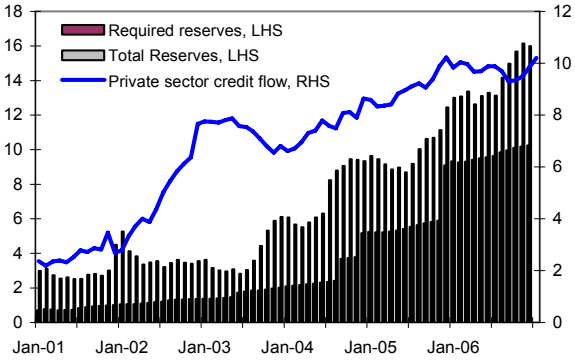
The structure of loans and deposits and the maturity matching rules, however, encourage banks to finance lon term credits with foreign funding.

Maturity Structure of Credit and Deposits, Q3 2006
(In percent)



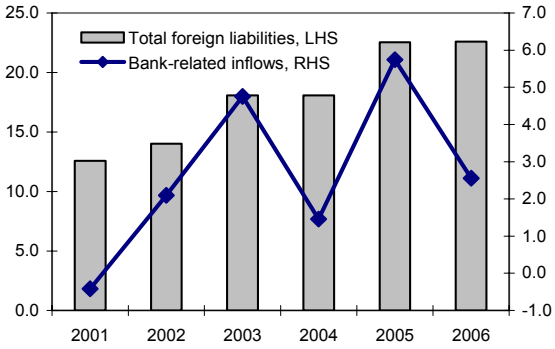
Rising excess reserves at the CBBH are one symptom of banks' inability to intermediate short-term deposits.

Reserves and Credit Flows (In percent of GDP)



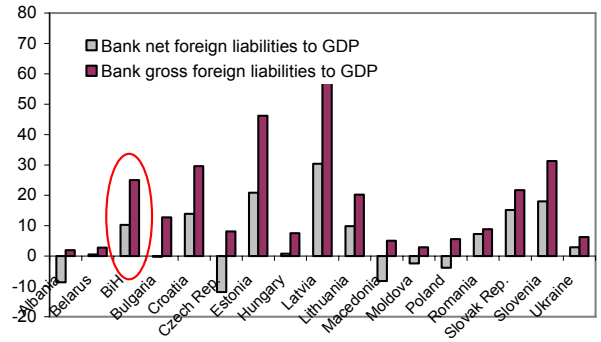
Bank-related capital flows have been sizable.

Bank Foreign Liabilities and Capital Inflows
(In percent of GDP)

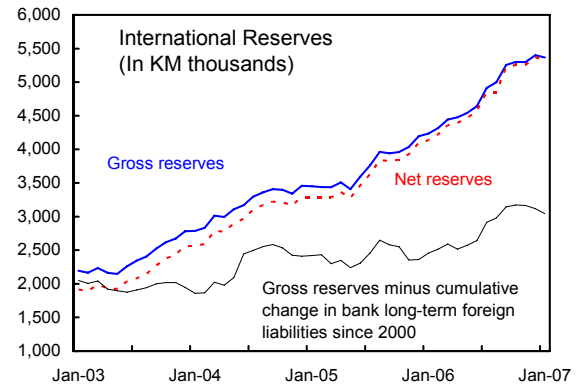


Bank foreign liabilities to GDP are comparable to Croatia's and Slovenia's.

Gross and Net Bank Foreign Liabilities, 2005
(In percent of GDP)



Capital inflows to finance credit account for a large share of the increase in international reserves.



Sources: CBBH; FBiH Banking Agency; RS Banking Agency; IMF; and staff estimates.

Table 1. Bosnia and Herzegovina: Financial Soundness Indicators, 2001-06

	2001	2002	2003	2004	2005	2006
Capital						
Tier 1 capital to risk-weighted assets (RWA)	22.4	18.2	15.9	14.9	13.7	13.6
Net capital to RWA	25.1	20.5	20.3	18.7	17.8	17.7
Quality of assets						
Nonperforming assets (NPAs) to total assets	9.2	6.9	5.2	3.8	3.3	2.5
NPAs net of provisions to tier 1	37.6	27.5	25.2	19.5	20.4	15.2
Nonperforming loans to total loans	17.9	11.0	8.4	6.1	5.3	4.0
Provision to NPAs	40.7	42.5	42.9	44.6	40.1	39.6
Profitability						
Return on assets	-1.1	-0.3	0.4	0.7	0.7	0.9
Return on equity	-4.8	-2.0	3.4	5.8	6.2	8.5
Net interest income to gross income	39.9	39.6	45.2	49.7	54.1	54.3
Noninterest expenses to gross income	106.7	101.9	95.2	91.3	90.1	86.4
Liquidity						
Liquid assets to total assets	44.6	33.8	35.1	35.7	36.1	35.9
Liquid assets to short- term financial liabilities	65.1	51.5	58.7	59.5	61.9	60.8
Short- term financial liabilities to total financial liabilities	83.2	77.6	69.0	68.7	66.1	67.1
Foreign exchange risk						
Foreign currency and indexed loans to total loans	...	...	64.9	65.4	68.7	71.0
Foreign currency liabilities to total financial liabilities	...	...	61.5	64.0	64.4	62.8
Net open position	...	...	42.2	11.6	8.3	8.9

Source: CBBH.

126. **In addition, indirect credit risks may also be significant.** Most loan contracts contain adjustable interest rates with links to euro interbank offered rate (Euribor). Anecdotal evidence suggests that many borrowers may not realize the implications of such provisions in their contracts. Commercial banks also admit that with fierce competition to gain market share, they have not adjusted the lending rates, although the Euribor has risen recently. Moreover, some banks have started offering Swiss franc-indexed loans, besides the common euro-indexed loans. This could expose banks more to exchange rate-induced credit risks. Movements in exchange rates or interest rates could have a significant impact on borrowers' capacity to pay.

127. **Finally, the reliance on potentially volatile foreign funding to finance credit growth has introduced an additional risk to both financial stability and the macroeconomy.** A fall in foreign funding could lead to a fall in international reserves. Under the currency board arrangement, this would have an immediate impact on the economy and could potentially lead to a sharp increase in non-performing loans. The stress tests performed by the FSAP based on June 2005 data suggest that a slowdown in credit growth and capital flows, coupled with a shift from KM into euro assuming declining confidence in the currency, could have a negative impact on financial stability. However, the system at the time appears resilient to such shock.

128. **These risks may be aggravated by the fact that there is only a limited number of foreign parent banks operating in the CEE and SEE countries, raising the possibility of**

cross-border contagion (Table 2). The parent and subsidiary relationship is largely asymmetric for a small country like Bosnia and Herzegovina; Bosnia and Herzegovina's portfolio only accounts for a very small share of parent banks' total portfolio. Therefore, a small change in the parent bank lending policies can have a big impact on capital flows and lending in Bosnia and Herzegovina. IMF (2006b) examines the determinants of capital flows to CEE and SEE countries and how changes in these flows may be related to a foreign bank group's overall exposure to the region.

Table 2. Bosnia & Herzegovina: Main Foreign Banks

Parent Bank	Local Subsidiaries	Credit Rating of Parent Bank	Share of Total Assets 1/
Unicredit Group (Italy)	HVB Central Profit Unicredit Zagrebacka	A+ (S&P), A1 (Moody's), A+ (Fitch)	24.9
Raiffeisen Zentralbank Österreich AG (Austria)	Raiffeissen	A+ (S&P), A1 (Moody's)	21.7
Hypo Group Alpe Adria (Austria)	HAAB Mostar HAAB Banja Luka	Aa2 (Moody's)	19.2
NLB (Slovenia)	NLB Razvojna Bank NLB Tuzlanska Bank	A2 (Moody's), A-(Fitch)	8.5

1/ End-Q3 2006
Sources: Banks' websites; CBBH and staff caluculation.

Measures taken to curb credit growth

129. **In response to concerns about credit growth, the authorities have introduced several measures aimed at tightening the regulatory framework.** First, banks were required to phase in tighter limits on their foreign exchange exposure from about 120 percent of capital in mid-2003 to 30 percent of capital by mid-2004. The definition of foreign currency assets and liabilities was also amended to include KM assets and liabilities indexed to foreign currency, in line with international practice. Second, banks were required to comply with the existing prudential regulations on maturity matching by June 2004, although some banks were allowed to delay compliance by September 2004 (Table 3).

Table 3. Bosnia & Herzegovina: Maturity Matching Requirements

Maturities	Requirements
Up to 90 days	At least 100 percent of fund sources must be placed in assets with the same maturity.
Up to 180 days	At least 95 percent of fund sources must be placed in assets with the same maturity.
Up to 365 days	At least 90 percent of fund sources must be placed in assets with the same maturity.

130. **The CBBH also tightened its monetary stance by expanding its required reserves base and increasing the reserve requirement** (Table 4). In fact, the reserve requirement was raised three times between 2004 and 2005. Remuneration on excess reserves was also cut to 1 percent to discourage excess reserves accumulation.

Table 4. Bosnia & Herzegovina: Changes in Reserve Requirements

Time	Changes
June 2003	The base for calculation of required reserves was expanded to include foreign currency deposits; the required reserves ratio was reduced from 10 to 5 percent and cash holding in banks vaults was eliminated as an eligible assets for maintenance of required reserves. All bank reserves were remunerated at market rates, the rate earned by the CBBH on its overnight deposits of foreign exchange reserves
December 2003	Required reserves continued to be remunerated at market rates, but remuneration of excess reserves was cut to 1 percent.
September 2004	Reserve requirements were increased to 7.5 percent.
December 2004	Reserve requirements were increased to 10 percent.
December 2005	Reserve requirements were increased to 15 percent.

Source: CBBH

C. Empirical Investigation

Data and methodology

131. **The relationships between credit growth, bank soundness, and banks' external liabilities are explored using bank-level data.** Bank-level data were obtained from the CBBH, the Banking Agency of the Federation of Bosnia & Herzegovina (FBiH Banking Agency) and the Banking Agency of the Republika Srpska (RS Banking Agency). The data are unpublished and include individual banks' financial statements, ownership, and detailed classifications of assets and liabilities, as well as some of the prudential reports submitted to the regulators. Annual data are available from 2001-2005 (except for interest rates, data on which are only available starting in 2002) and quarterly data are available from Q2 2003 to Q3 2006. For more details on data definitions and sources, see Appendix I.

132. **Bank soundness is measured by the risk of insolvency, or "distance-to-default".** This measure—widely used in measuring bank soundness—is directly related to the probability of loss exceeding equity capital, and thus captures the risk of insolvency. The measure is based on the option pricing model by Black and Scholes, and Merton.[32] It can be summarized as:

$$DD = \frac{k + \mu}{\sigma}$$

[32] See for example Chan-Lau (2006) for derivation and further explanation.

where μ is average return on assets, k is equity capital as percent of assets and σ is the standard deviation of returns on assets, a proxy for return volatility. Daily market data on equity combined with annual accounting data are typically used to calculate the market value and the volatility of assets. Without liquid equity market, however, market values may be biased. In this case, a simpler measure of distance to default based on balance sheet and income statements is used.

133. **Credit growth is modeled as a function of bank soundness, macroeconomic and bank-specific factors, and policy variables,** following Igan and Tamirisa (2006), Cihak and Tamirisa (2006), and Moreno-Badia (2007), who examine similar questions in the new EU member states and the Euro area. The baseline specifications for credit growth and bank soundness are:

$$CrediGr_{i,t} = \alpha_i + \beta_1 CreditGr_{i,t-1} + \beta_2 DD_{i,t} + \beta_3 DD_{i,t-1} + \beta_4 Macro_{i,t-1} + \beta_5 BankSpecific_{i,t-1} + \beta_6 Policy_t + \mu_i + \varepsilon_{i,t} \quad (1)$$

$$DD_{i,t} = \alpha_i + \beta_2 DD_{i,t-1} + \beta_1 CreditGr_{i,t-1} + \beta_3 Macro_{i,t-1} + \beta_4 BankSpecific_{i,t-1} + \beta_5 Policy_t + \mu_i + \varepsilon_{i,t}, \quad (2)$$

where i indexes bank, and t indexes quarters. $CrediGr_{i,t}$ is real credit growth, *DD* is the measure of bank soundness—distance to default—for each bank in each observed quarter; *Macro* is a set of macroeconomic variables;[33] *BankSpecific* is a set of bank-specific variables;[34] *Policy* is dummies for policy measures; μ_i are bank-specific fixed effects and $\varepsilon_{i,t}$ is a serially uncorrelated error term. In the distance-to-default equation, the credit growth variable starts at its first lag; this is to capture the nonimmediate effect of credit growth on bank soundness. Both quarter-on-quarter and year-on-year credit growth are used for the credit growth variable. All control variables are in their first lags to avoid endogeneity.

134. **The banks' external liabilities are modeled as a function of credit, macroeconomic and bank-specific factors, and policy variables.** The model is based on the empirical work on determinants of international bank lending (see Jeanneau and Micu (2002) for example). The baseline specification is

$$FL_{i,t} = \alpha_i + \beta_1 FL_{i,t-1} + \beta_2 Credit_{i,t} + \beta_3 Credit_{i,t-1} + \beta_4 Macro_{i,t-1} + \beta_5 BankSpecific_{i,t-1} +$$

[33] The original set of macroeconomic variables considered was real industrial production growth, FBiH real retail sales growth, real interest rates and real exchange rate depreciation. Quarterly GDP or GDP per capita is not available, and the official unemployment rate may be overestimated.

[34] The original set of bank-specific variables considered was measures of profitability (net interest margin), efficiency (cost-to-income ratio), liquidity (loan to deposit ratio), risk (nonperforming asset ratio), ownership (state ownership, foreign ownership, and EU bank ownership dummies) and size (log (total assets)).

$$\beta_6 Policy_t + \mu_i + \varepsilon_{i,t} \quad (3)$$

where *FL* is log banks' foreign liabilities and *Credit* is log private sector credit. The two main variables are in log format so that the coefficients can be easily interpreted as elasticity.

135. **The equations are estimated with the generalized method of moments (GMM) system estimator ("system GMM").** The estimator addresses the problems with independent variables that are not strictly exogenous, with fixed effects, and with heteroskedasticity and autocorrelation within individuals. System GMM as developed in Arellano and Bover (1995) and Blundell and Bond (1998) estimate a dynamic equation system by combining the original equation into the differenced equation, and uses the lagged difference variables as instruments for level variables. It was developed to improve efficiency in the difference GMM in Arellano and Bond (1991), or "difference GMM," where the first difference of each variable is used to eliminate the fixed effect, and the lagged levels of variables are used as instruments.

136. **One advantage of system GMM over differenced GMM is that it can capture the full effect of policy changes.** When differenced, the policy dummies, which are equal to one only after the policy implementation, and equal to zero otherwise, will only show up as one only in the quarter that the policy is implemented. Difference GMM would therefore only estimate the initial effect of the quarter that policy was implemented. System GMM, by bringing back the level equation, is able to explain the full impact of policy measures.

137. **Unit root test for panel data shows no sign of specification problems.** Maddala and Wu (1999) tests for panel unit roots show that no series used in the empirical investigation has a unit root.

Results

138. **Tables 5 to 7 report the estimation results.** The two-step robust estimates with standard errors that are corrected for finite sample bias (the Windmeijer correction) are reported. All lags are used for each of the endogenous variables. All regressions show no sign of second-order serial correlation, and the Hansen test for overidentification is not rejected. Adding the second lag of the explanatory variables (for credit growth in equations (2) and (3) in particular) does not add any more information, and is therefore not included in the equations.

Credit growth

139. **Although the coefficients are small and not statistically significant, sounder banks seem to have higher credit growth,** (Table 5).[35] Both distance-to-default and its first lag have positive but statistically insignificant coefficients. Surprisingly, the real interest rate has a positive and significant impact on credit growth, while more robust economic activity, proxied by real retail sales growth, has a negative, though insignificant, impact. Although these results seem to contradict conventional wisdom, they explain the initial jump in credit growth at the beginning of the period when interest rates were high.

140. **The policy measures do not have a statistically significant effect on credit growth.** The results confirm the nonbinding nature of each increase in reserve requirement observed in Figure 5. The dummy variables for the policy changes in September 2004 (which include both the tightening of maturity matching and the increase in reserve requirements), December 2004, and December 2005 have positive but statistically insignificant coefficients.

Bank soundness

141. **The annual credit growth seems to have no significant impact on bank soundness, while the more immediate quarter-on-quarter credit growth seems to boost bank soundness** (Tables 6 and 7). In both sets of equations, bank soundness is also found to have positive persistence—banks that are sound today are likely to be sound tomorrow. As expected, a higher NPA ratio has a negative impact on distance-to-default, although this result is statistically significant only in one specification. Higher interest rates have a negative although statistically insignificant impact on bank soundness, perhaps reflecting higher indirect credit risk in the face of higher rates that is not offset by higher profitability. Bank vulnerability decreases with an increase in inefficiency, or cost-to-income ratio, and the result is statistically significant.

142. **Controlling for other factors, large foreign banks, appear to have higher risk of insolvency.** Large foreign banks have higher risk of insolvency, especially banks that are subsidiaries of European banking groups. The interaction terms between foreign ownership and size, and between EU bank ownership and size show negative and statistically significant coefficients. A possible explanation is that these subsidiaries, though enjoying strong profits, can afford to keep capital-to-asset ratios low in order to raise reported ROE, since the parent banks typically can be expected to provide additional capital when needed (IMF,2006a). In turn, the positive and statistically significant coefficient for the state-ownership dummy reflects the high capital ratios of state-owned banks, although their profitability is low.

[35] Only year-on-year credit growth is used here as quarter-on-quarter credit growth does not pass the test for AR(1), i.e. no serial correlation is observed in the first difference.

143. **The increase in the reserve requirement in December 2004 may have had a negative impact on bank soundness.** Other policy changes, however, have had no significant effect on banks' risk of insolvency.

Table 5. Credit Growth Regressions

Variable	(1)	(2)	(3)	(4)
Credit Growth (t-1)	0.663 ***	0.653	0.658 ***	0.662 ***
	0.044	0.047	0.046	0.048
Distance to default (t)	0.004	0.005	0.005	0.005
	0.007	0.006	0.007	0.007
Distance to default (t-1)	0.003	0.003	0.003	0.002
	0.005	0.005	0.005	0.005
Real retail sales growth (t-1)	-2.212	-2.071	-2.202	-2.279
	1.391	1.360	1.412	1.418
Real interest rate (t-1)	1.889 **	2.164 **	2.133 **	2.873
	0.772	0.996	0.835	1.965
Net interest margin (t-1)	-2.010	-2.384	-2.850	-2.137
	4.220	4.415	4.391	4.642
Cost to income ratio (t-1)	-0.066	-0.067	-0.065	-0.074
	0.047	0.051	0.050	0.049
Policy dummy: Q3 2004		0.166		
		0.149		
Policy dummy: Q4 2004			0.062	
			0.095	
Policy dummy: Q4 2005				0.118
				0.160
State ownership	-0.113	-0.157	-0.163	-0.124
	0.199	0.241	0.255	0.201
Foreign ownership	0.135	0.163	0.164	0.137
	0.105	0.120	0.124	0.110
Constant	0.214	-0.018	0.106	0.129
	0.196	0.304	0.237	0.269
Quarter dummies	yes	yes	yes	yes
Number of observations	226	226	226	226
P Value for Hansen test	0.78	0.765	0.767	0.769
P-Value for AR(1) test	0.036	0.039	0.037	0.037
P-Value for AR(2) test	0.173	0.166	0.136	0.223

* indicates significant at 10 percent; ** significant at 5 percent and *** significant at 1 percent.

Table 6. Distance to Default Regressions, with year-on-year Credit Growth

Variable	(1)	(2)	(3)	(4)	(5)
Distance to default (t-1)	0.698 ***	0.715 ***	0.722 ***	0.701 ***	0.719 ***
	0.148	0.155	0.154	0.144	0.148
Credit Growth (t-1)	0.310	0.180	0.179	0.209	0.242
	0.496	0.418	0.466	0.543	0.493
Cost to income ratio (t-1)	2.511	2.770 **	2.691 **	2.391 *	2.919 **
	1.731	1.198	1.256	1.206	1.210
Real interest rate (t-1)	-20.523	-5.455	-10.256	-20.100	-15.857
	23.129	21.016	19.361	17.380	34.103
NPA ratio (t-1)	-111.350 *	-76.812	-78.703	-77.344	-78.032
	61.264	64.404	60.420	63.819	72.627
Size (t-1)	0.470	4.196 *	4.092	2.833	4.434 *
	2.118	2.386	2.754	2.558	2.509
State ownership	7.146	9.425 *	9.525	8.413	9.535
	6.842	5.527	5.879	6.127	6.130
Foreign ownership	-2.079				
	2.538				
Foreign ownership* size(t-1)	-0.454 **				
	0.213				
EU bank parent		-1.361	-1.525	-0.471	-1.812
		4.656	4.479	4.094	4.914
EU bank parent*size (t-1)		-0.978 *	-0.953 *	-0.902 **	-0.983 *
		0.484	0.490	0.406	0.509
Policy dummy: Q3 2004			-1.513		
			1.343		
Policy dummy: Q4 2004				-1.782 *	
				0.913	
Policy dummy: Q4 2005					-0.860
					2.701
Constant	7.020	-40.221	-37.304	-21.090	-42.591
	29.536	30.277	35.114	32.079	32.226
Quarter dummies	yes	yes	yes	yes	yes
Number of observations	226	226	226	226	226
P Value for Hansen test	0.485	0.155	0.155	0.241	0.130
P-Value for AR(1) test	0.088	0.086	0.083	0.080	0.086
P-Value for AR(2) test	0.178	0.174	0.165	0.165	0.179

* indicates significant at 10 percent; ** significant at 5 percent and *** significant at 1 percent.

Table 7. Distance to Default Regressions, with Quarter-on-Quarter Credit Growth

Variable	(1)	(2)	(3)	(4)	(5)
Distance to default (t-1)	0.673 ***	0.671 ***	0.711 ***	0.689 ***	0.677 ***
	0.192	0.168	0.142	0.154	0.153
Credit Growth (t-1)	0.517 **	0.606 **	0.653 **	0.638 **	0.615 ***
	0.252	0.275	0.309	0.275	0.269
Cost to income ratio (t-1)	0.978	1.984 *	1.900 *	1.885 *	1.996
	1.743	1.178	1.003	1.031	1.241
Real interest rate (t-1)	-2.952	-6.477	-19.133	-15.483	-5.800
	15.246	14.408	19.176	17.667	19.667
NPA ratio (t-1)	-46.543	-25.913	-21.001	-23.030	-25.382
	44.396	39.459	49.270	44.512	47.671
Size (t-1)	0.431	1.924	1.839	1.735	1.945
	2.259	2.138	1.615	1.780	2.114
State ownership	7.332	9.126 *	7.830	8.310 *	8.660 *
	6.874	5.224	4.677	4.912	5.134
Foreign ownership	-1.561				
	2.904				
Foreign ownership* size(t-1)	-0.357				
	0.355				
EU bank parent		0.389	0.924	0.639	-0.508
		2.764	3.983	2.937	3.693
EU bank parent*size (t-1)		-0.638	-0.609 *	-0.610 *	-0.566
		0.425	0.308	0.338	0.371
Policy dummy: Q3 2004			-0.602		
			1.270		
Policy dummy: Q4 2004				-0.497	
				1.111	
Policy dummy: Q4 2005					0.560
					1.625
Constant	6.059	-14.990	-15.030	-13.025	-15.673
	32.771	27.143	18.872	21.600	26.129
Quarter dummies	yes	yes	yes	yes	yes
Number of observations	296	296	296	296	296
P Value for Hansen test	0.317	0.377	0.495	0.450	0.401
P-Value for AR(1) test	0.063	0.068	0.059	0.063	0.070
P-Value for AR(2) test	0.115	0.123	0.102	0.112	0.126

* indicates significant at 10 percent; ** significant at 5 percent and *** significant at 1 percent.

Banks' Foreign liabilities

144. **Credit expansion, robust economic activity, and strong profitability all positively affect banks' foreign borrowing** (Table 8). If credit grows by 1 percent both in the last quarter and in the current quarter, banks' foreign liabilities will increase by between 0.3-0.7 percent. In other words, the elasticity of foreign liabilities to credit is about 0.3-0.7. This finding confirms the notion that European parent banks are seeking higher returns by investing low-cost funds from home into their Bosnian subsidiaries where interest rates and profit margins are higher than what they could get in the EU market. Controlling for other factors, ownership does not have a significant impact on the level of foreign liabilities.

145. **In addition, the empirical results show that the tightening of maturity matching requirements has contributed to the increase in banks' foreign liabilities.** Controlling for other factors, the dummy for this policy measure shows positive and significant coefficients. The coefficient, however, is not large, compared with the effects of other economic factors such as credit, economic activities, interest rate, and interest margin.

146. **The results yield an empirical estimate of the link between credit, foreign liabilities, and international reserves.** This estimate is useful for its macroeconomic implications. If credit growth slows down to zero in two quarters, foreign liabilities would fall by around 7-16 percent. Assuming a one-to-one fall in international reserves and taking the maximum value, this would translate to a decline of €864 million in international reserves, or from 5.1 months to 4.3 months of imports (end-2006 figures). The magnitude of this shock is similar to the assumption used in the FSAP stress tests.

Table 8. Banks' Foreign Liabilities Regressions

Variable	(1)	(2)
Log bank foreign liabilities (t-1)	0.702 ***	0.708 ***
	0.143	0.140
Log private sector credit (t)	2.390 ***	2.230 **
	0.804	0.911
Log private sector credit (t-1)	-1.877 **	-1.956 **
	0.754	0.858
Interest rate (t-1)	0.775 ***	0.717 ***
	0.284	0.262
Real retail sales growth (t-1)	1.761 *	1.862 *
	1.041	1.014
Inflation (t-1)	7.998 **	7.993 **
	3.158	3.434
Net interest margin (t-1)	9.939 *	12.046 *
	5.206	6.311
State ownership	0.011	-0.301
	0.661	0.637
Foreign ownership	0.431	
	0.373	
EU bank parent		0.624
		0.715
Policy dummy	0.402 *	0.461 *
	0.214	0.230
Constant	-11.726 ***	-8.590 *
	4.214	4.366
Quarter dummies	yes	yes
Number of observations	289	289
P Value for Hansen test	0.963	0.953
P-Value for AR(1) test	0.052	0.047
P-Value for AR(2) test	0.376	0.488

* indicates significant at 10 percent; ** significant at 5 percent and *** significant at 1 percent.

The results in regional perspective

147. **Unlike the empirical results from similar investigations in the new EU member states (NMS) and Bulgaria, the results for Bosnia & Herzegovina show that credit growth seems to have a positive and immediate impact on bank soundness** (see

Appendix Table). Igan and Tamirisa (2006) find that credit growth has statistically insignificant effect on bank soundness in the NMS, while Herdershee and Ong (2006) find that banks with positive loan growth strategies have higher solvency risk on average in Bulgaria. The results from Bosnia & Herzegovina are similar to the findings for Greece and the euro area, where the first lag of credit growth has a positive impact on bank soundness (Moreno-Badia (2007)).

148. **Large foreign banks in Bosnia & Herzegovina seem to run a higher solvency risk than their domestic counterparts, again unlike those in the NMS and Bulgaria.** According to Igan and Tamirisa (2006), foreign ownership has a positive impact on distance-to-default for banks in NMS. The same is true for Bulgaria, where locally-owned private banks are more vulnerable to shocks than foreign-owned subsidiaries.

D. Conclusions and Policy Implications

149. **The process of financial deepening in Bosnia and Herzegovina—in line with the regional trends—has been supported by favorable economic conditions and the consolidation and competition in the banking sector.** The banking system is well-capitalized and profitable, although inherent risks exist in an environment of rapid credit expansion.

150. **Since policy measures to curb credit growth have not been effective, it is even more important to strengthen prudential supervision.** The empirical investigation shows that the increases in the reserve requirement have had no statistically significant impact on credit growth. The authorities thus have only prudential tools to minimize the risks to financial stability.

151. **As large foreign subsidiaries tend to keep the minimum amount of capital, supervisors should make sure that they build adequate reserves to cover the underlying risks**. This could be done by tightening provisioning requirements or requesting additional capital buffers. The banking agencies should urgently address the weaknesses in asset classification and provisioning rules as recommended by the FSAP. Moreover, they could request additional capital requirements for market risks, such as foreign exchange risks (see examples in Appendix III).

152. **The results also highlight the importance of cooperation with home-country supervisors.** Because large foreign banks are keeping a minimum amount of capital and rely on capital injections from their parent banks if the risks materialize, it is important that the supervisors closely monitor the health of the parent banks. Although all parent banks of large subsidiaries in Bosnia & Herzegovina are reputable and have high credit ratings, future capital injections would depend on the financial performance of the parent banks at that time.

153. **The links between foreign borrowing, credit expansion, and the role of maturity matching requirement are empirically established.** Credit expansion, robust economic activity, and strong profitability all positively affect banks' foreign borrowing. In addition, the empirical results also show that the tightening of the maturity matching requirements have contributed to the increase in banks' foreign liabilities.

154. **Relaxing the maturity matching requirement could thus help lessen banks' reliance on foreign funding**. The maturity matching requirement is strict by international standards (see Appendix III for more details), and it has not encouraged domestic intermediation. Relaxing it could help lower foreign borrowing to some extent, as such borrowing is driven mainly by other economic factors.

APPENDIX I—DATA SOURCES AND DEFINITION

Bank-level data were obtained from the CBBH, the FBiH Banking Agency and the RS Banking Agency. Macroeconomic data were taken from the Federation Statistics Office and the RS Institute of Statistics.

To ensure that the analysis was not affected by potential mismeasurement and misreporting, observations on the tails of the distributions of credit growth and distance to default were dropped.

Variables	Sources
Private sector credit, foreign liabilities, lending interest rates	CBBH
Bank balance sheet and income statement items	FBiH Banking Agency and RS Banking Agency
Bank ownership	FBiH Banking Agency, RS Banking Agency, and parent banks' website
Retail sales index	Federation Statistics Office

Variables	Definitions
Distance to default	Return on average assets plus equity as a percent of assets divided by the standard deviation of return on average assets over the period. Balance sheet data are used for the calculation.
Private sector credit growth	Percentage change in total private sector credit in real term (deflated by CPI), year-on-year and quarter-on-quarter.
Banks' foreign liabilities	Outstanding foreign liabilities in the banks' balance sheet in KM.
Inflation	CPI inflation.
Real retail sales growth	Year-on-year percentage change in Federation retail sales index in real term (deflated by CPI).
Real interest rates	Commercial bank lending rates in KM, deflated by CPI inflation (data for lending rates in euro or euro-linked loans are only available from January 2007).
Cost to income	Total operating expenses divided by total operating income.
Net interest margin	Net interest income divided by average assets.
Size	Bank size. Logarithm of total assets.

APPENDIX II—REGIONAL COMPARISON OF EMPIRICAL RESULTS

Studies	Countries/Period	Empirical strategy	Main Results
Moreno-Badia (2007)	Greece and euro area, annual data, 1990-2005	Difference GMM	Stability increases with first lag of credit growth, but deteriorates two years after credit increases. Vulnerability rises with cost efficiency and size. Credit growth has a larger and more immediate negative effect on the stability of Greek banks during real downturns Credit growth has a more pronounced impact on vulnerability for banks with higher credit growth.
Igan and Tamirisa (2006)	New Member States, annual data, 1994-2004	Three-stage least squares	Credit growth has a statistically insignificant negative impact on bank soundness so far but recently weaker banks have been expending credit as rapidly as sounder banks. Credit growth is positively correlated with distance to default of the parent banks. Lending by foreign-owned banks does not depend on bank soundness. Foreign-owned banks have statistically higher distance to default.
Herderschee and Ong (2006)	Bulgaria, quarterly data, Q4 1999 to Q4 2005	Pooled OLS	Banks with positive loan growth strategies have higher solvency risk on average. Locally-owned private banks have higher solvency risks than foreign subsidiaries. Credit ceiling has no effect on solvency risk.

APPENDIX III—PRUDENTIAL REGULATION: INTERNATIONAL EXAMPLES

As recommended by the FSAP, comprehensive guidelines on foreign exchange risk and other market risks should be introduced in Bosnia & Herzegovina. The foreign exchange exposure limit is in line with the practice in other countries with dollarized financial systems (Appendix Table 1). However, the supervisors should also require capital for foreign exchange exposure. This practice has become increasingly popular among regulators as it makes it more difficult for weakly capitalized banks to take on new risks. Capital requirements give a bank greater flexibility in choosing the risks it will accept by allowing managers to allocate a bank's capital between credit and market risk, including foreign exchange risk (Cayazzo and others,2006).

Table 1. Foreign Exchange Risk Requirements: Selected Countries

Countries	Limits on Foreign Exchange Exposure	Foreign Exchange Risk Capital Charge
Central and Eastern European countries		
Croatia	20 percent	10 percent
Latvia	...	10 percent
Poland	No.	8 percent
Romania	20 percent	8 percent
Slovenia	...	8 percent
Other emerging markets		
Argentina	30 percent	No.
Brazil	50 percent	30 percent
Chile	30 percent	No.
Lebanon	...	12 percent

Source: Cayazzo and others (2006)

The maturity matching requirements in Bosnia and Herzegovina are strict by international practice. The banking agencies in Bosnia use a minimum liquidity ratio and maturity matching requirements to regulate banks' liquidity. For the minimum liquidity ratio, banks have to maintain average 10-day minimum liquidity in cash funds up to at least 10 percent of short-term funds sources according to book value. Country practices vary but most countries with partially dollarized banking systems have laxer requirements (Appendix Table 2). Only Romania seems to have a system as strict as Bosnia's while Chile has a 100 percent requirement but it only applies to assets and liabilities of up to 30 days. In Slovenia, although the coverage must be at least 100 percent, demand deposits are given a weight smaller than 100 percent.

Table 2. Liquidity Requirements: Selected Countries

Countries	Minimum Liquidity Ratio	Limits on Maturity Gaps
Central and Eastern European countries		
Croatia	35 percent only for foreign currency	No
Latvia	30 percent for less than 30 days	No
Poland	...	No
Romania	...	Yes. Minimum liquidity ratio is 1.0. It is measured for all time buckets on a cumulative basis.
Slovenia	100 percent only for foreign currency of up to 6 months	Yes. Liquidity coefficient (investments/liabilities) must be at least 1.0 separately for foreign and domestic currency for up to 30 days and up to 180 days. Household and corporate demand deposits are given a weight of 85 percent for up to 30 days, and 60 percent for up to 180 days.
Other emerging markets		
Argentina	Rates range from 20 percent for current account deposits to 80 percent for demand deposits.	The sum of the balances of the eligible items cannot be less than 60 percent of the total requirement for up to 30 days.
Brazil	8-45 percent only for domestic currency	No
Chile	...	Yes. Liabilities with a term of less than 30 days cannot exceed 1 time the assets of the same maturity. Liabilities with a term less than 90 days cannot exceed 2 times the assets of the same maturity. The rule holds separately for domestic and foreign currency and for total assets and liabilities. However, banks can consider an excess of foreign currency assets to cover domestic liabilities.
Lebanon	10 percent	No.

Sources: Cayazzo and others (2006); and Hayward and Byskov (2005).

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