January 2010
IMF Country Report No. 10/20

Former Yugoslav Republic of Macedonia: Selected Issues for the 2009 Article IV Consultation

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INTERNATIONAL MONETARY FUND

FORMER YUGOSLAV REPUBLIC OF MACEDONIA

Selected Issues

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Approved by Wes McGrew

November 30, 2009

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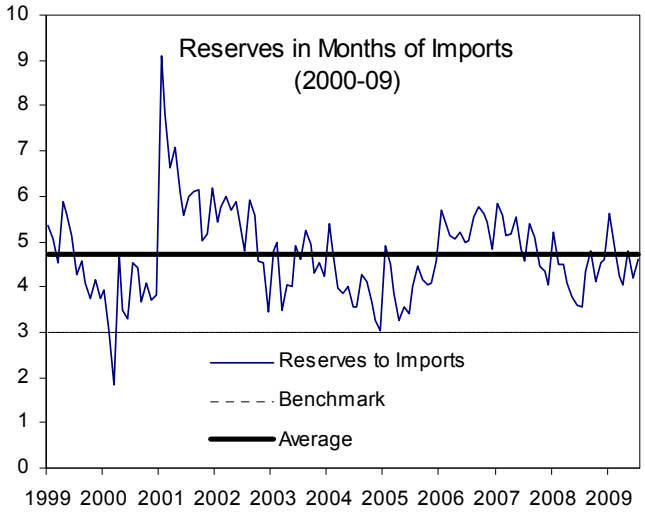
I. Assessment of Reserve Adequacy in Macedonia[1]

A. Introduction

1. **This chapter seeks to assess the desired level of foreign exchange reserves in Macedonia given its commitment to maintain the exchange rate peg**. This is an important question as it is a key consideration in setting the stance of monetary policy. A variety of methods including popular rules of thumb, comparisons with other emerging countries (EMs), and model based estimates suggest a target range of €1.5–2 billion for reserves.

2. **Reserves coverage has been stable in the course of the last decade** (except for a brief period during the civil unrest in 2000−01). On average, reserves were sufficient to meet 5 months of imports including the period of large current account deficits of 2007 and 2008. Entering the crisis in the fall of 2008, international reserves were €1.7 billion. By May 2009 they had fallen to a low point of below €1.2 billion as the central bank sold €500 million to defend the peg. Reserves recouped much of their losses over the summer and fall and are expected to end the year at somewhat over €1.4 billion.



Source: NBRM and IMF staff estimates.

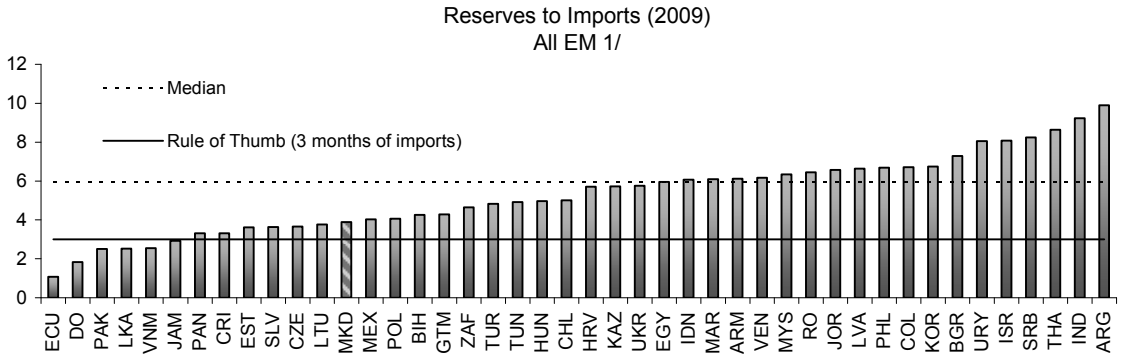
3. **The remainder of the chapter is organized as follows.** Section B looks at reserve levels that would be implied by popular rules of thumb and at benchmarks suggested by other emerging market countries (both pegged and floating rate regimes).[2] The rules of thumb are based primarily on current and capital accounts and monetary aggregates. Section C focuses on a model-based approach to reserve adequacy based on Jeanne and Ranciere (2006), and section D concludes.

[1] By Ferhan Salman (SPR).

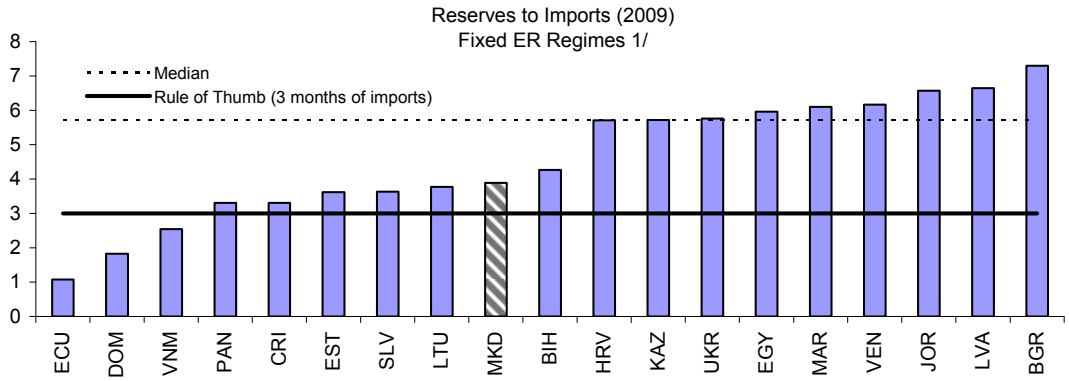
[2] The cross-country comparisons are based on a sample of 51 emerging markets, including 22 with de facto pegs.

B. Popular Measures and Cross-Country Approach to Reserve Adequacy

4. **The most popular current account based rule of thumb is that a country should maintain reserves at a minimum of three months of prospective imports.** This provides a buffer in the event of a sudden drop in export revenues or loss of access to external financing. Macedonia meets this three-month rule, but falls short of the emerging market median for import coverage. It is expected to end 2009 with reserves at close to 4 months of imports of goods and services. However, this falls short of the emerging market median of 6 months. It fares somewhat better compared to the subset of emerging markets with pegged exchange rates, where the median level is 5.7 months coverage.



Source: IMF Staff Calculations
1/ Except Peru, Lebanon, Iceland, Brazil, Russia, China, Algeria (ratio over 10).

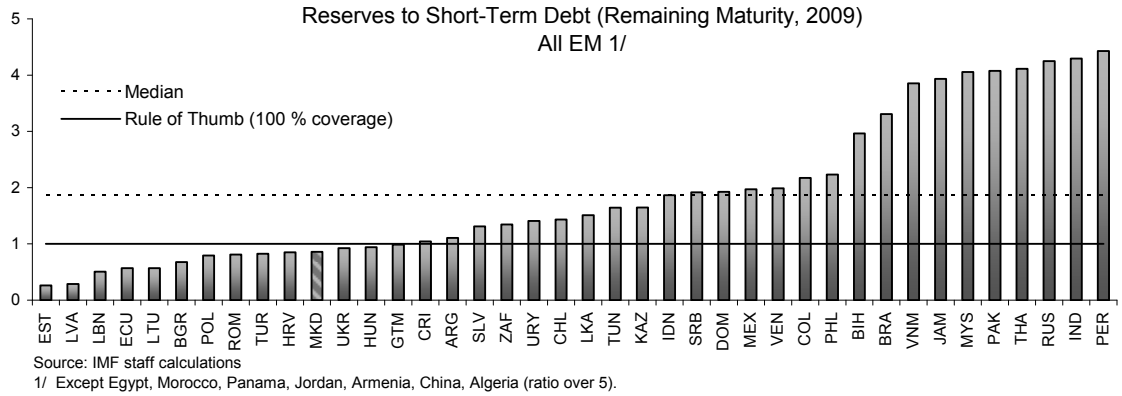


Source: IMF staff calculations.
1/ Except Lebanon, China, and Russia.

5. **Macedonia falls short of the "Greenspan-Guidotti rule," which says that a country should maintain full coverage of short-term debt at remaining maturity**.[3] The 100 percent cover ratio would require Macedonia to hold €1.6 billion in reserves, compared to the €1.4 billion expected at end-2009. The median reserve coverage of short-term debt

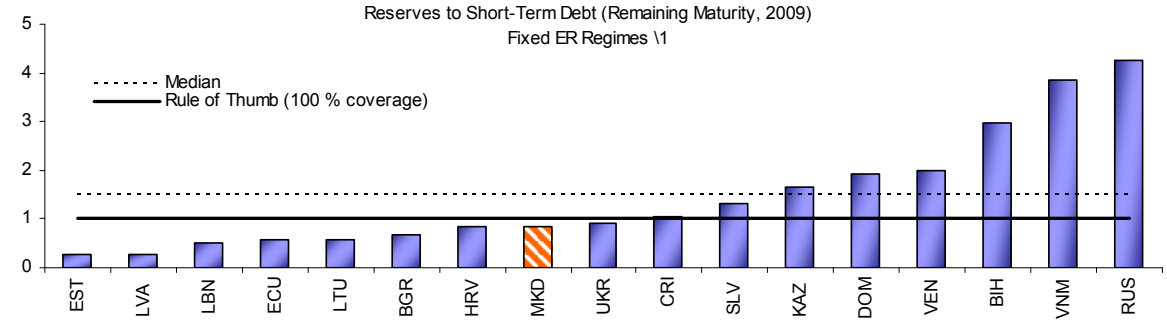
[3] On separate occasions in 1999, Argentinean Deputy Finance Minister Pablo Guidotti and later in the year Alan Greenspan, the Fed chairman, indicated this ratio in their remarks on reserve adequacy. Bussière and Mulder (1999) provided empirical support for this rule.

among emerging markets is 190 percent. For Macedonia to match this median level would require reserves of €3 billion. However, Macedonia is closer to the median coverage ratio of 150 percent among emerging market peggers.



Source: IMF staff calculations

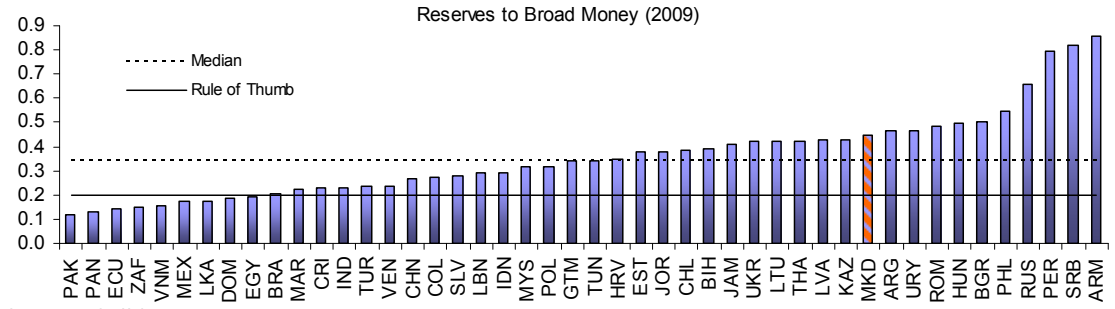
1/ Except Egypt, Morocco, Panama, Jordan, Armenia, China, Algeria (ratio over 5).



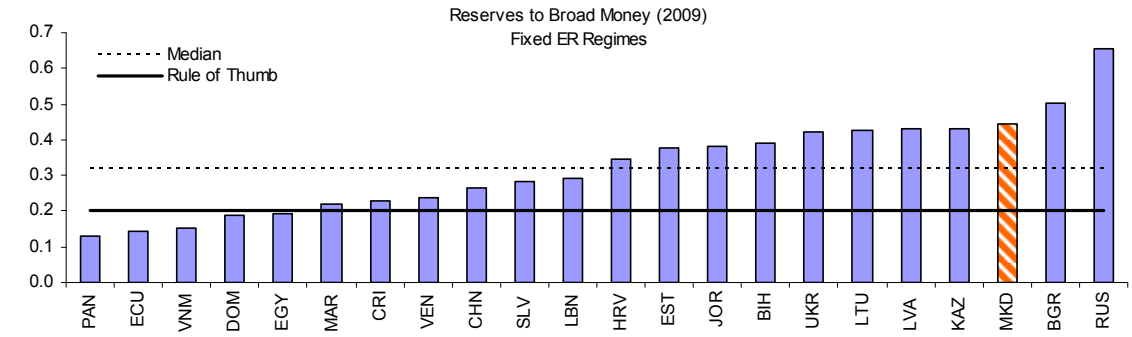
1\ Except Panama, Egypt, China, Morocco, Jordan

Source: IMF Staff Calculations

6. **Macedonia compares favorably to other emerging markets in reserve coverage of broad money.** Coverage of broad money is considered relevant because of the potential for deposit outflows by residents. There is no generally accepted view on the desired coverage ratio of broad money. Wjinholds and Kapteyn (2001) suggested a range from 5 to 20 percent as a "minimum" threshold for this ratio. The lower end of the ratio is considered appropriate for flexible exchange rate regimes and the upper for fixed exchange rate regimes. On this measure, Macedonia's 45 percent coverage is well above the median of 34 percent among the emerging market sample and 32 percent among emerging market pegged regimes.

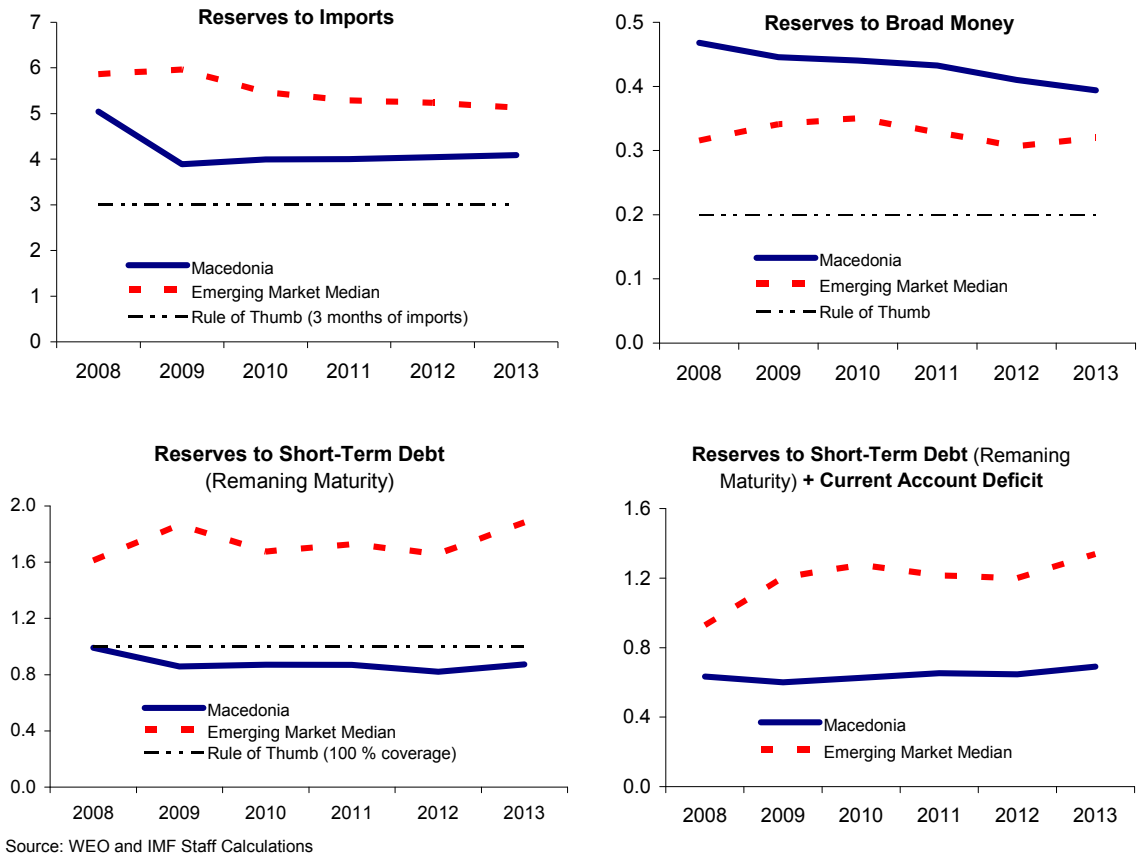


Source: IMF Staff Calculations
1\ Except Algeria



Source: IMF Staff Calculations

7. **Macedonia's reserve coverage ratios relative to benchmarks and to other emerging markets are expected to remain fairly stable over the medium term**. These comparisons are based on WEO projections (and updated staff projections for Macedonia).



Source: WEO and IMF Staff Calculations

C. Model-Based Approach to Reserve Adequacy

8. **There are several models in the recent literature that seek to find the desired reserve level by solving an optimization problem**. These models typically postulate both benefits of holding reserves (such as reducing probability of crisis and smoothing consumption in a crisis) and costs. Cabellero and Panageas's (2004) model focuses on the real costs of a sudden stop of capital flows that significantly constrains current consumption. Garcia and Soto (2004) assumes that reserves affect the probability of a crisis as well as the cost of a crisis in a setting where the policy maker is risk neutral. Aizenman and Lee's (2005) empirical results support the precautionary motives of holding reserves.

9. **This section uses the Jeanne and Ranciere (2006) framework, based on welfare maximization in a small open economy that is vulnerable to sudden stops in capital flows**. In this model, risk averse policy makers choose the level of reserves to maximize the utility of consumers. When a sudden stop occurs, external debt cannot be rolled over and output falls below its long-run growth path. More reserves mitigate the fall in output and smooth consumption. However, there is a cost to holding reserves, since they yield a lower return than other assets in the economy. In this model, the optimal level of reserves is

determined by the size and probability of the sudden stop, the potential loss in output and consumption, the opportunity cost of holding reserves, and the degree of risk aversion.

10. **Based on this model, the optimal level of reserves for Macedonia is calibrated to be 27 percent of GDP, or €1.8 billion**. This is around €400 million above the projected level of reserves at end-2009.

D. Conclusion

11. **Although there is no unambiguous answer to what reserve level Macedonia should target, popular and model-based measures suggest a range of €1.5−2 billion.** The different benchmarks looked at in this paper suggest a minimum of €1.1 billion and a maximum of €3 billion. Leaving out the extreme values of these benchmarks would suggest that a range of €1.5−2 billion would be appropriate for Macedonia.

Table 1. Suggested Level of Reserves
(In billions of euros)

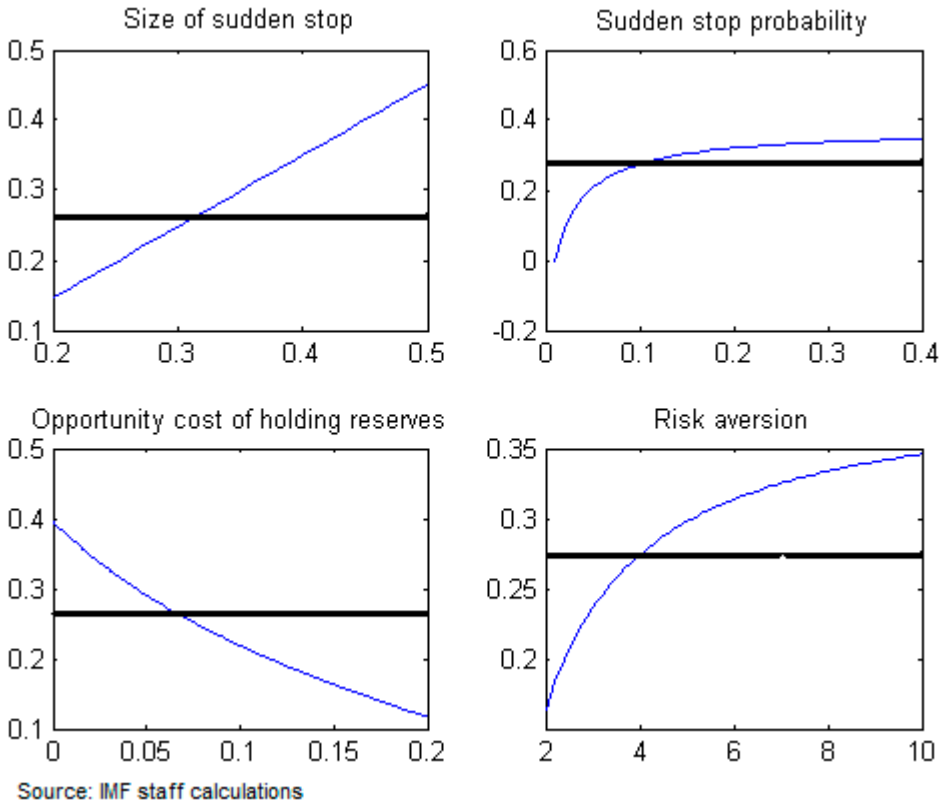
Import Coverage	3-months of imports	1.1[1]
	EM Median	2.0
Reserves to Short-term debt	100 percent	1.6
	EM Median	3.0
Reserve to Broad Money	EM Median	1.1
Model Based		1.8

1/ Based on 2008 level of imports

Box 1: Sensitivity Analysis

Baseline parameters for calibration are taken from the recent data on Macedonia and emerging markets. The size of the sudden stop is assumed to be 31 percent of GDP, which is the sum of the projected 2009 current account deficit (9.5 percent of GDP) and short-term debt at remaining maturity (21 percent of GDP). The probability of a sudden stop (8 percent) and a cumulative loss in output (6.5 percent) are taken from Jeanne and Rancier (2006) based on their analysis for an average middle income economy. The risk aversion parameter is assumed to be 4 percent, based on estimates in the literature.[1/] The potential growth rate of 4 percent is the average growth rate of Macedonia in the past 10 years, and the opportunity cost of reserves is 6 percent, based on average cost of domestic and external debt.

The optimal level of reserves is sensitive to the choice of parameters. The charts below look at alternative scenarios with varying parameter values for the size of the sudden stop, sudden stop probability, the opportunity cost of holding reserves and risk aversion. The reserve to GDP ratio is on the vertical axis and the varying parameter values on the horizontal axis. The solid line lines represents the relationship between the parameters and the reserve level. The dashed line is the optimal reserve level calibrated with benchmark parameters.



Source: IMF staff calculations

1/ Based on Salman's (2005) median estimate.

II. Framework for Assessing Monetary Policy in Macedonia[4]

A. Introduction

12. **This paper aims to outline a framework for assessing monetary policy in Macedonia.** The paper suggests four key questions in determining the appropriate stance: first, what is the optimal level of reserves; second, what are the current dynamics in the balance of payments; third, what is the strength of monetary transmission; and fourth; what is the desired speed of adjustment.

Box 1. Monetary Policy Guidelines in Macedonia

The de jure primary target of monetary policy in Macedonia is price stability. Financial stability and economic policy are secondary de jure targets. Since October 1995, the nominal anchor has been a fixed exchange rate, first against the Deutsche Mark and then the Euro as of January 2002. The peg serves as an intermediate target for achieving the de jure goals listed above. The primary monetary instrument is the 28-day Central Bank bill. Other monetary and prudential instruments include reserve requirements on domestic and foreign currency liabilities, credit growth ceilings, the Lombard rate, and liquidity ratios.

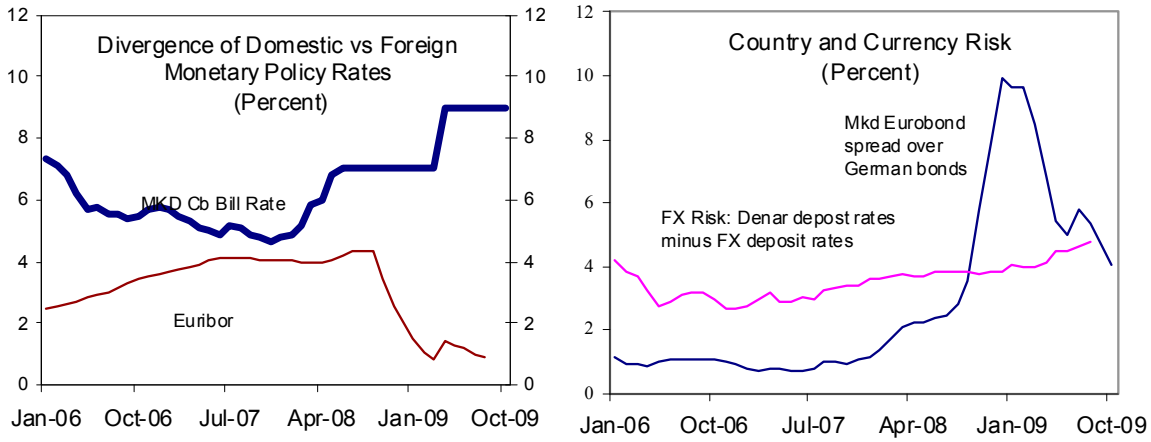
B. Monetary Policy as a Choice in a Fixed Exchange Rate Regime

13. **In the textbook case of a fixed exchange rate, monetary policy is ineffective.** That is, any effort to increase the money supply (and reduce interest rates) beyond equilibrium levels puts downward pressure on the exchange rate through capital and current account outflows that swiftly return the money supply and interest rates to their original equilibrium. Persistence of excessively loose policies would quickly deplete reserves and undermine the peg.

14. **Imperfect capital mobility weakens the link, albeit only in the short run, between the monetary policy stance and reserves.** Under these circumstances, a variety of policy stances can be sustained in the short run and the Central Bank has a degree of near-term policy autonomy. It also means that the job of the central bank may be harder, because time lags between monetary policy changes and reserve flows create uncertainty and provide room for public debate on the appropriate stance. This limited independence is likely to hold for Macedonia as well as in many other emerging markets.

[4] Prepared by Geoff Gottlieb (EUR).

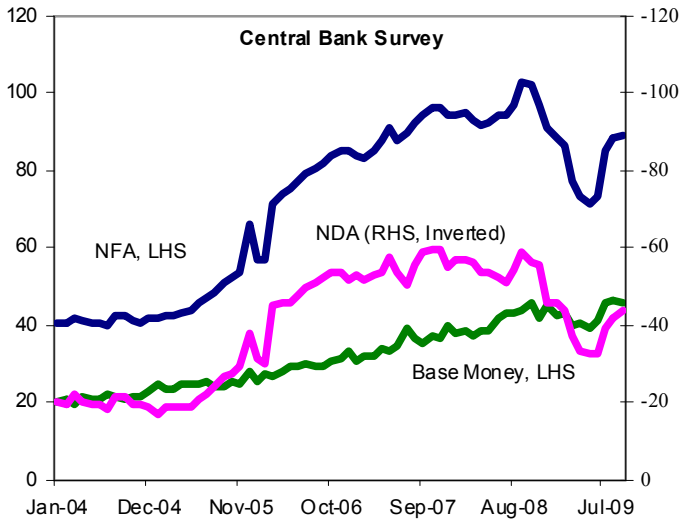
15. **In Macedonia, this near-term autonomy can be observed in two respects.** First, domestic interest rates diverge from foreign interest rates, in a way that cannot be readily accounted for by risk premia. That is, the gap between policy rates in Macedonia and Europe has continued to steadily rise throughout the crisis. Meanwhile, indicators of Macedonia specific risk, namely the spread of Macedonian Eurobonds over German bonds (country risk) has fallen steadily in 2009; meanwhile, exchange rate risk (the spread between denar and euro deposits) has widened much less than the spread between the central bank policy rate and the euribor rate. Such divergence suggests the interest rate parity condition is not perfectly enforced.



Source: Bloomberg; NBRM

16. **Second, base money does not automatically adjust with foreign exchange interventions as one would expect in a pure peg.** The Central Bank uses net domestic assets (in particular, its own debt instruments) to sterilize flows and smooth liquidity conditions, allowing base money to grow broadly smoothly, basically in line with nominal GDP.

17. **Nonetheless, the choices made by monetary authorities in Macedonia and other fixed regimes must ultimately be consistent with the nominal anchor**. Consistency means that reserves are adequate to maintain the credibility of the peg itself. While the monetary authority has latitude in the short term to set domestic rates, if it sets them too low sustained balance of payments outflows could deplete reserves and undermine the peg.



Source: NBRM

C. A Framework for Deciding the Monetary Stance Under a Fixed Exchange Rate

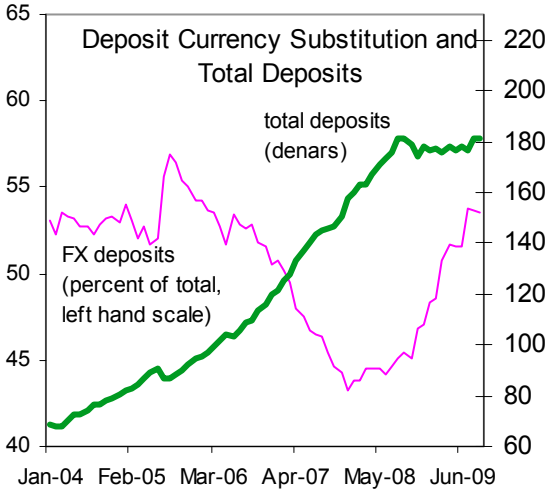
18. **To identify the appropriate monetary stance in a fixed exchange rate regime, one must address four key issues.** First, what is a suitable level of reserves given the vulnerabilities facing that particular country? Second, what are the underlying balance of payments trends that govern the movement of reserves? These first two questions are essential for assessing the appropriate direction of monetary policy. Two further questions, which are more difficult to answer with precision, relate to the size and speed of any desired policy changes. Third, how much (and how fast) do reserves respond to changes in the monetary policy stance? And fourth, how quickly does the system need to adjust? This section will treat each question in turn.

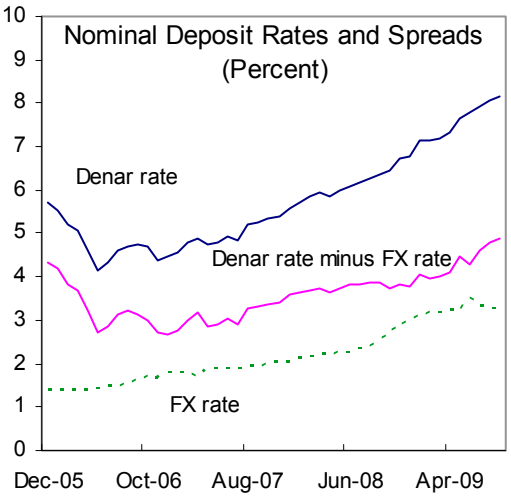
Optimal Level of Reserves

19. **The optimal reserve level is one that can absorb reasonably likely shocks to the current and capital accounts.** Chapter One of the Selected Issues Paper suggests a €1.5−2 billion optimal reserve range based on a variety of metrics. The projected end-2009 reserve level is somewhat below this range.

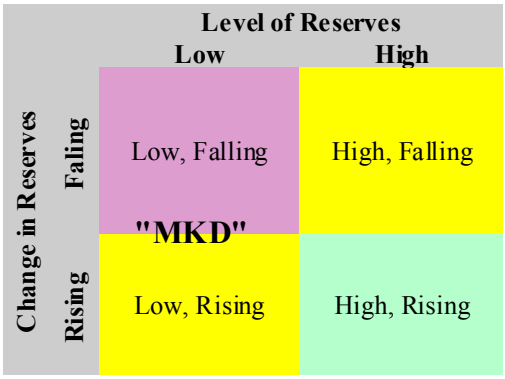
Dynamics of the Balance of Payments

20. **The underlying flow of reserves is also critical for assessing monetary policy.** This requires an evaluation of both current and capital account trends. Such an assessment is particularly difficult in light of current uncertainties about the global economy and financial system. Staff projects that reserves will be roughly steady over the next year before gradually rising (but remaining near 90 percent of short-term debt). However, this projection is subject to risk. In particular, the large current account deficit leaves Macedonia dependent on external financing and exposed to terms of trade and other capital account shocks. Moreover, key proxies for risk (currency substitution and the denar-Euro deposit spread) remain elevated, suggesting confidence levels have not fully recovered.





21. **In sum, reserves are a) at the low end of the target range and b) expected to be stable or to rise, but are subject to high risks**. The interplay between the level and the direction of change in reserves can be illustrated with a simple decision matrix diagram. When reserves are high and rising, there is latitude to ease without fear of impending risk. When reserves are low and falling, it is clear that a desire to maintain the peg would imply tightening. But when reserves are in "intermediate" categories, the appropriate direction of monetary policy is subject to greater uncertainty. In staff's view Macedonia's reserve level and balance of payment outlook place it in a "somewhat low, and stable" (but subject to risks) position.

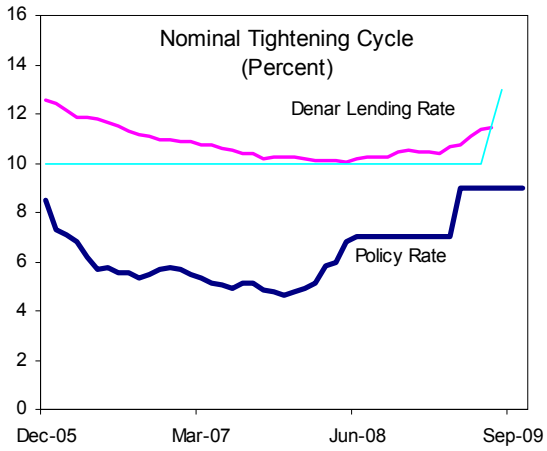


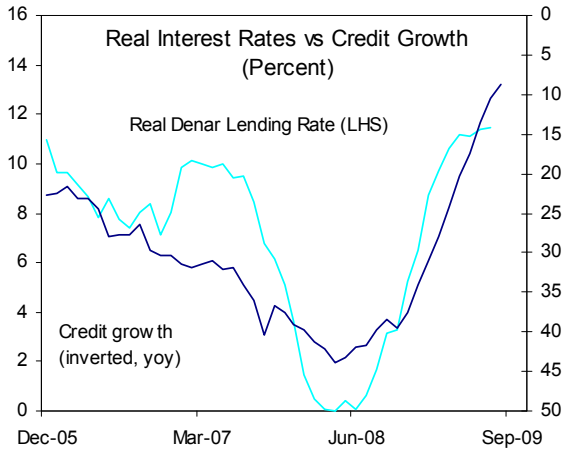
Effectiveness of Monetary Transmission

22. **The level and direction of reserves indicate whether the central bank should tighten or loosen**, but the extent of the needed change in policy instruments is a function of the efficacy of monetary transmission. The core part of monetary transmission relevant to exchange rate pegs is the process by which Central Bank policy tools can affect foreign exchange reserve levels by changing financial conditions and the real economy. Because of limited capital immobility, reserves are largely affected via the current account through the interest rate channel and the credit channel. The former channel relates to the impact of changes in the price of credit while the latter refers to the quantity of credit. Ideally, the central bank would be able to calibrate precisely how monetary policy changes are transmitted to reserves. In reality, it is very difficult to quantify this—in Macedonia or any other country.

23. **There are many challenges to modeling the monetary transmission process in Macedonia.** First, as with many emerging markets, Macedonia has a small financial sector, limiting the liquidity and depth of credit markets. Second, with a fixed exchange rate, the monetary authorities lose the exchange rate channel which is typically strong for emerging markets. Third, Macedonia is roughly 50 percent euroized and dual currency money supplies tend to be harder to control. And fourth, data series are short which limits the monetary authorities' ability to model relationships among relevant variables.

24. **Despite this difficulty, it is apparent that the central bank's tightening phase in 2008−09 played a key role in slowing aggregate demand**. One way to see this is in stylized charts showing policy instruments, lending rates, and credit growth. The tightening of the policy rate and reserve requirements contributed to a rise the denar lending rate which contributed to a sharp slowdown in credit growth. The research department of the NBRM has

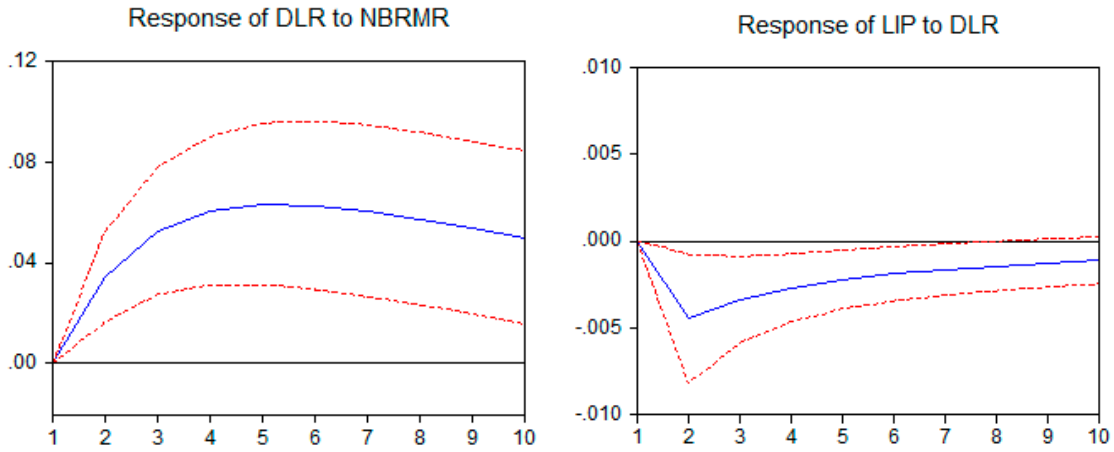




done research on the strength of monetary transmission mechanisms. The focus of their work is the impact of the policy rate on market determined rates in the economy, including both the interbank rate and the denar lending rate. A core result of their work is that changes in the policy rate show up fully in the denar lending rate over 14−16 months. However, the transmission is gradual with only 2−3 percent of the rate change showing up in the lending rates in the first month. They do not look at the impact of changes in other policy tools (such as reserve requirements) nor do they investigate whether changes in market rates affect credit or output.

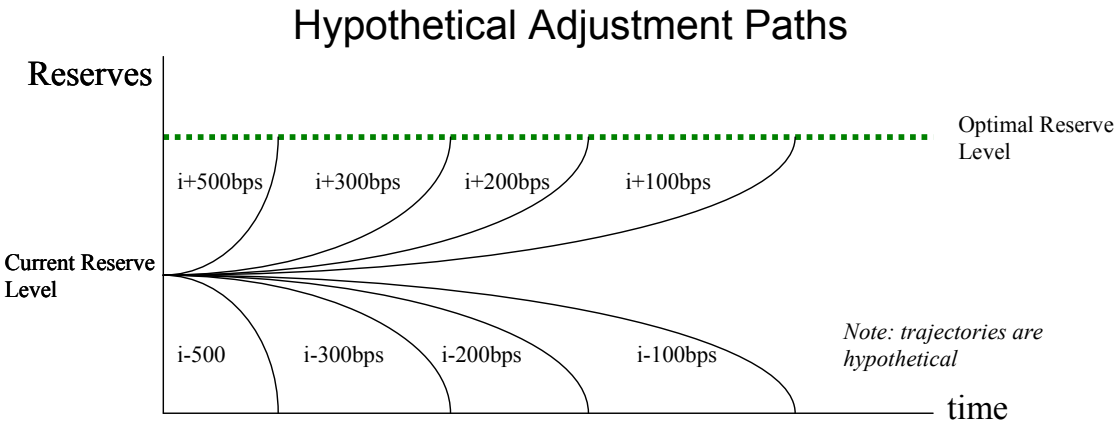
25. **To look at some of these relationships more quantitatively, we develop a vector autoregression model that measures the impact of changes in policy instruments** (the central bank bill rate and the monetary base) on output as a proxy for the central bank's ability to influence reserve accumulation (Appendix). Due to a short time series and breaks in the data, it is difficult to discern strong relationships. The results suggest that changes in policy rates (NBRMR) have a statistically significant but small impact on lending rates

(DLR) and that changes in lending rates have a statistically significant but modest impact on output (LIP). Shocks to the quantity of loanable funds (the credit channel) were not found to have a statistically significant impact on output. However, a longer time series is necessary to verify this more fully.



Desired Speed of Adjustment

26. **The final question in the framework for assessing the appropriate monetary stance involves deciding how aggressively the monetary authorities should adjust policy instruments.** For any given efficacy of monetary transmission, the speed of tightening or loosening will always involve a tradeoff: a sharper contraction means faster reserve accumulation per the figure below but at a cost of weaker output.



27. **In weighing this tradeoff, there are two core considerations.** First, what is the extent of peg vulnerability? Using the matrix cited earlier in this paper, it is critical to determine how low reserves are versus an optimal level and what direction the balance of payments pressures are in. If reserves are low and falling, the authorities must seek a more

aggressive speed of adjustment. Second, what are the potential unforeseen consequences of sharp adjustment? In the case of aggressive tightening, one potential negative consequence could be a destabilization of the financial sector. This could result both from direct exposure of banks to interest rates and indirect exposure through loan quality in the face of weaker growth.

D. Conclusions and Policy Considerations

28. **Looking backward, applying the above framework to assess the NBRM's response to the crisis is helpful and suggests the authorities responded well**. First, the Central Bank had lost 30 percent of its reserves, reaching levels well below optimal using standard metrics. Second, the dynamics in the balance of payments suggested further reserve loss was possible given that imports were not adjusting and currency substitution continued. Both the level and direction of reserves suggested tightening was necessary. Third, the authorities know that monetary transmission is imperfect and thus used several measures to slow aggregate demand and reduce capital flight including higher policy rates, tighter reserve requirements, new liquidity requirements, and credit growth speed bumps. And fourth, the rapidity of the fall in reserves and distance from comfortable levels suggested that an aggressive policy response was needed.

29. **Looking forward, the framework suggests the authorities are getting closer to the position where it would be appropriate to begin easing, but are not there yet**. First, reserves are still at the bottom end of the desired band. Second, they have flattened out and are projected to rise gradually over the medium term, but this outlook is still subject to considerable uncertainties.

Appendix: Empirical Results

We examine the impact of changes in monetary policy instruments on output and prices using a vector autoregression analysis (VAR). The VAR approach is well suited for capturing the indirect effects common in monetary policy transmission because the current level of each endogenous variable depends on past movements of that variable and all other variables in the system.

Our unrestricted VAR is given by[5]

$$Y_t = A(L)Y_{t-1} + B(L)Z_t + \varepsilon_t$$

where Y_t is a vector of endogenous variables and Z_t is a vector of exogenous variables. In the baseline model, the vector of endogenous variables consists of industrial production y_t as proxy for GDP, p_t is consumer price index, and i_t is the CB bill rate. The ordering of the variables reflects the view that prices in transition economies are likely to adjust to shocks to policy variables more quickly than output; however, the results are robust to other orderings of the variables.

$$Y_t = [y_t, p_t, i_t]$$

Meanwhile, the vector of exogenous variables is given by

$$Z_t = [p_t^*]$$

where p_t^* is the IMF commodity price index.

In extensions of the model, we introduce different quantity and price instruments to the monetary transmission analysis. In terms of quantity, we test the impact of shocks to bank reserves and private sector credit on output and inflation. On prices, we introduce lending interest rates both to see the pass through of Central Bank instruments to lending rates and from lending rates to output and inflation.

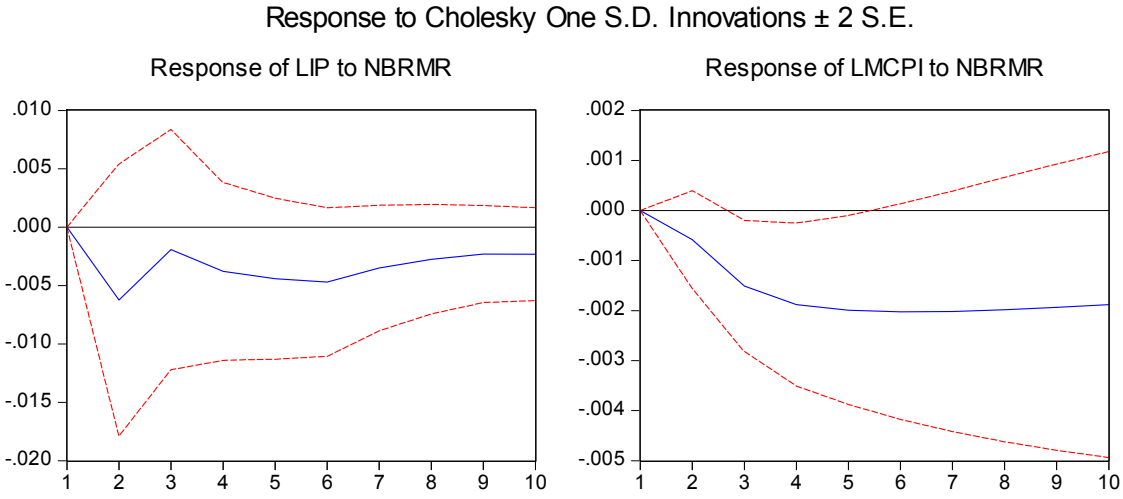
[5] Kuijs (2002) notes that many studies of monetary transmission in emerging markets use a structural VAR rather than the unrestricted VARs that are more common in advanced economy studies. This reflects the fact that the data sets often have short time series and an abundance of structural changes reducing the likelihood of finding meaningful relationships based purely on the data. This will be an area of for future work.

Data availability limits the study to monthly observations between December 2005 and October 2009 (81 observations). All data except for the interest rates are seasonally adjusted and put in log form. Because of the short time series and focus on impulse response over near term, the data is used in levels rather than first differences despite properties of nonstationarity. Lag length is selected using Akaike and Schwartz information criteria.

Scenario 1:

$$Y_t = A(L)Y_{t-1} + B(L)Z_t + \varepsilon_t \qquad Y_t = [y_t, p_t, i_t] \qquad Z_t = [p_t^*]$$

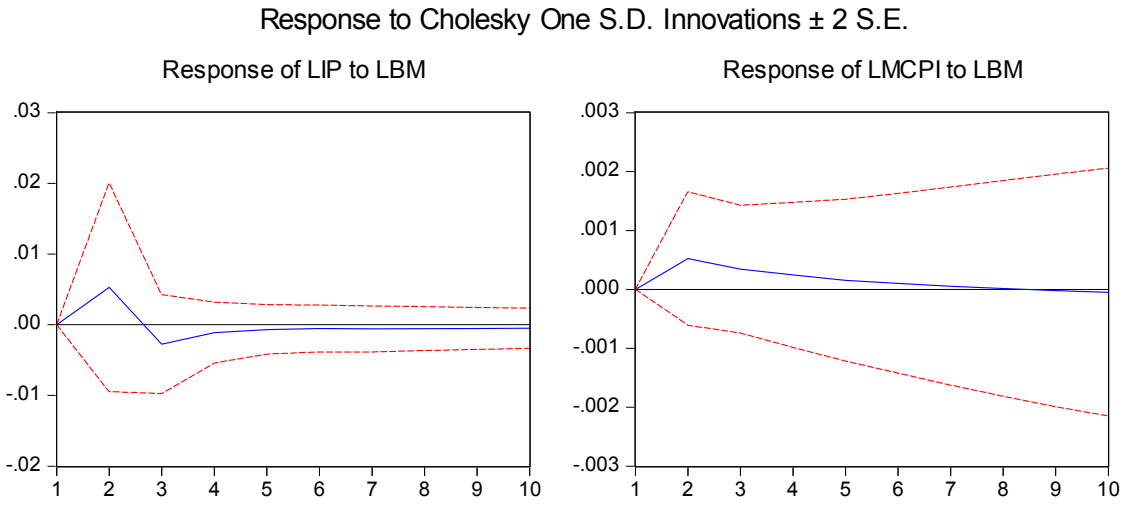
Scenario one includes only one policy instrument, namely the interest rate on Central Bank bills. In general, the results are consistent with intuition but not statistically significant. A hike in the policy rate results in lower output and lower price level.



Scenario 2:

$$Y_t = A(L)Y_{t-1} + B(L)Z_t + \varepsilon_t \qquad Y_t = [y_t, p_t, m_t, i_t] \qquad Z_t = [p_t^*]$$

Now we add a second policy instrument in the form of the monetary base. Note that this includes both denar and euro reserves as Macedonia has a dual money supply. Again, the results are not statistically significant but generally conform to intuition. A positive shock to base money (via perhaps less than expected sterilization) results in an initially positive impact on both output and cpi.

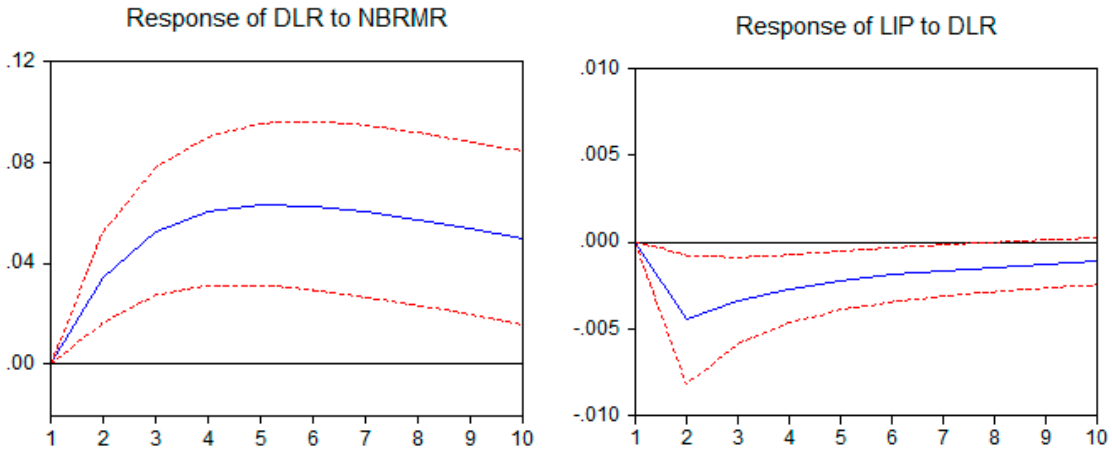


Scenario 3

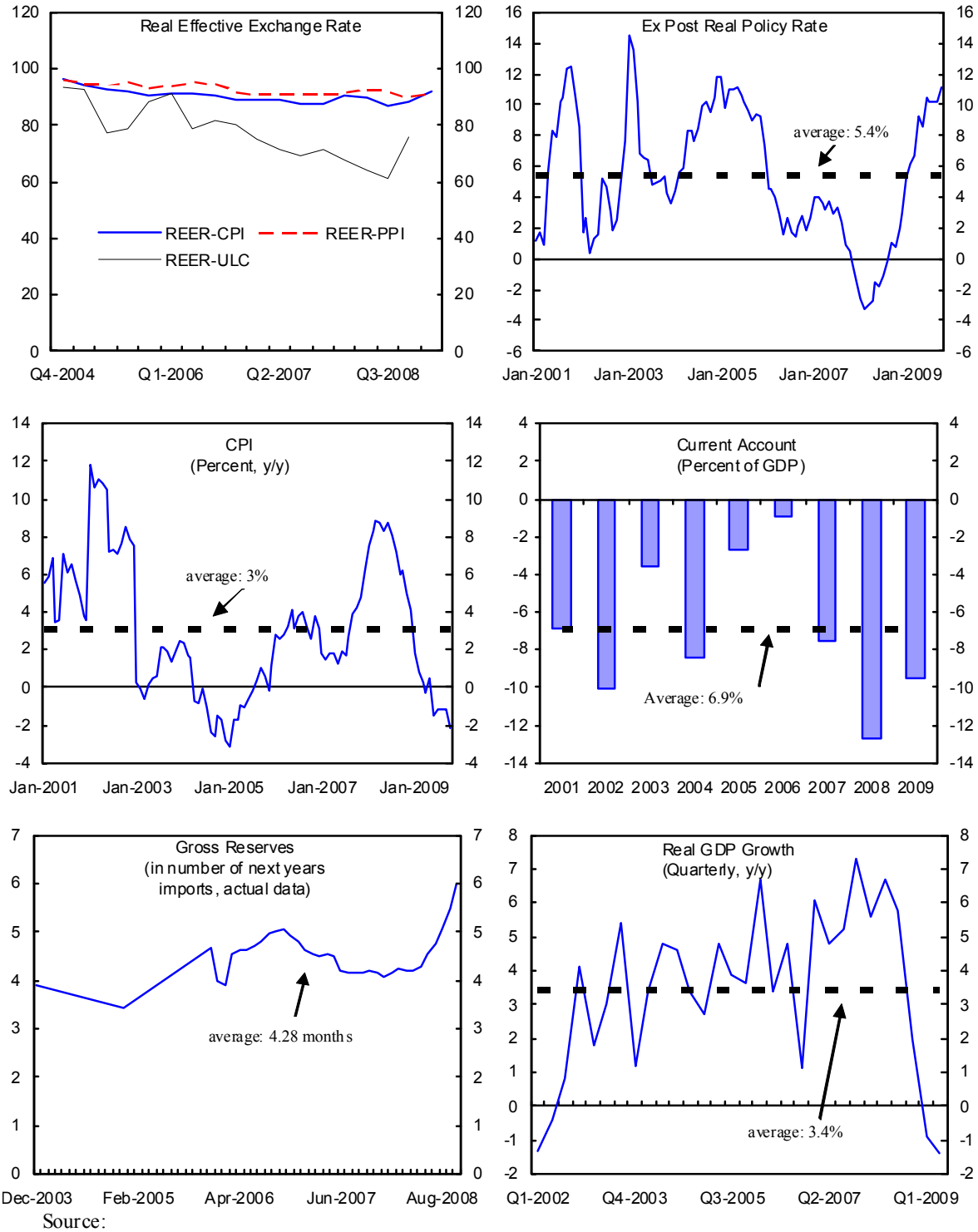
In this scenario, we go back to the model from Scenario 1 (without base money) but add the denar lending rate (l_t) ordered after the policy rate. This allows us to focus on the interest rate channel by looking at two dynamics: first, the impact of policy rates on financial conditions proxied by the level of lending rates and second, the impact of lending rates on agents decisions by looking at output and prices.

$$Y_t = A(L)Y_{t-1} + B(L)Z_t + \varepsilon_t \qquad Y_t = [y_t, p_t, l_t, i_t] \qquad Z_t = [p_t^*]$$

We see that a shock to the policy rate results in an immediate, positive, and persistent impact on denar lending rates. Further, we see that a positive shock to the denar lending rates has a rapid negative impact on output. Though both results are statistically significant, the size of the impact is negligible.



Appendix: Average Historical Data



Source:

III. A MEDIUM-TERM FISCAL FRAMEWORK FOR FYR MACEDONIA[6]

30. **Fiscal policy should seek to satisfy both medium-term sustainability and short-term macroeconomic management goals.** The coherence of these two goals has become a global policy issue this year, as economic recessions have led to increased deficits and debt accumulation worldwide, including in the South East Europe region. This chapter provides a framework for assessing and guiding fiscal policy in Macedonia, focusing on two benchmarks: appropriate cyclically-adjusted fiscal stances and a prudent medium-term government debt ratio. It concludes that (1) the targeted fiscal stances for 2009-10 are appropriate from a cyclical perspective; and (2) it would be prudent to set medium-term public debt limits at around 25 percent of GDP.

31. **Other considerations are also relevant in assessing the fiscal response to a recession, including availability of financing and external sustainability**. If the government lacks adequate financing, for instance due to undeveloped domestic debt markets, crowding out, or poor access to international markets, it may need to follow a more restrictive stance. External sustainability is another important consideration, especially under a fixed exchange rate regime, where allowing automatic stabilizers to work could hamper needed external adjustment.

A. Cyclical Behavior of Fiscal Balances

32. **Disentangling the cyclical and discretionary components of fiscal balances is essential for assessing the appropriateness of policy** from the perspective of demand management over the business cycle and fiscal sustainability.

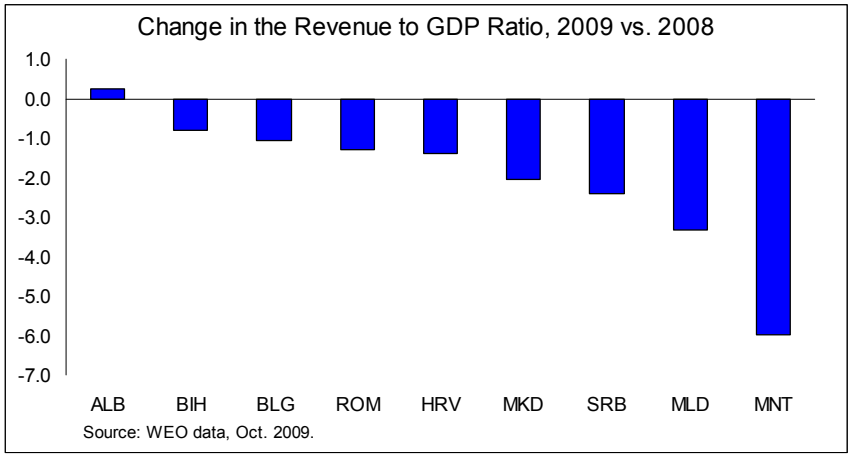
- Allowing automatic fiscal stabilizers to work fully avoids adding to negative demand pressures during a downturn (e.g., by not cutting expenditures when a recession reduces tax revenues).

- Cyclically-adjusted balances also provide a measure of the underlying fiscal stance relevant for assessing sustainability, since with no policy change, the actual fiscal balance will converge to the structural balance once the temporary impact of the cycle passes.

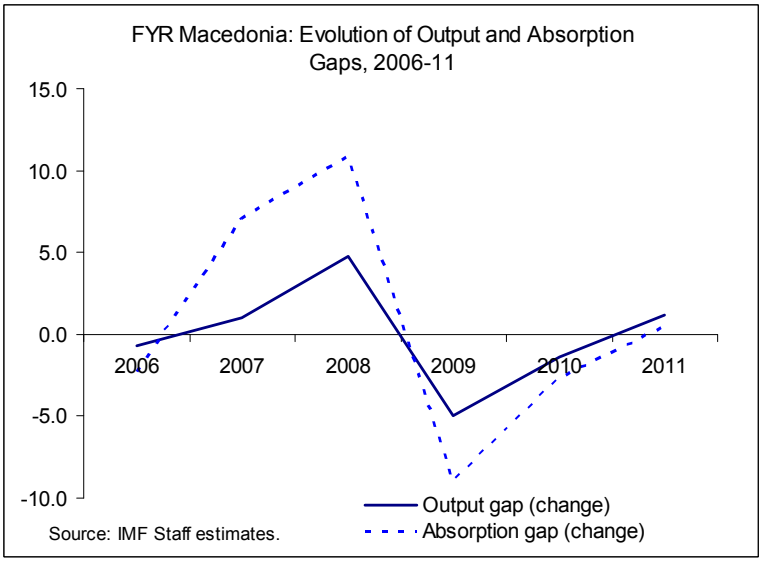
[6] Prepared by G. Dobrescu (FAD).

Methodology[7]

33. **Cyclical revenues are assumed to fluctuate with output and domestic absorption** (Box 1), while expenditures are assumed to be entirely discretionary.[8] This methodology (in particular the inclusion of absorption gaps) is motivated by the fact that there were significant pre-crisis current account deficits in Macedonia. These temporarily boosted absorption and indirect tax revenues, independently of trends in output. This year, the narrowing of current account deficits in Macedonia (and across the region) appears to be one of the reasons that revenues have fallen more than output.



34. **To estimate the cyclical component of revenues, both output and absorption gaps are estimated.** The output gap is calculated using two filtering methods (HP and Baxter-King). The absorption gap is calculated based on the output gap and the current account gap (the difference between the actual current account and its equilibrium value or "norm," which is estimated based on CGER methodologies). Indirect revenues (such as the VAT) are assumed to vary proportionately with absorption, while direct revenues vary with output.

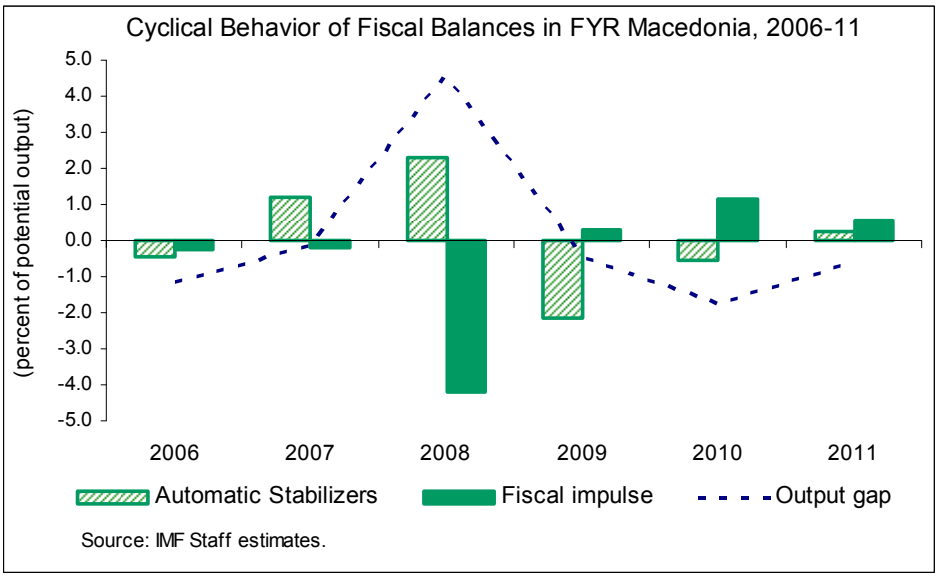


[7] This methodology is drawn from IMF Technical Note 09/05, IMF Country Report 07/390, OECD (2005).

[8] Cyclical fiscal expenditures usually refer to social benefits that vary with unemployment. The assumption that there is no cyclical variation in expenditures is based on the fact that social insurance programs are limited for countries in the South-East Europe region.

Results for Macedonia

35. **Fiscal policy was highly procyclical in Macedonia in 2008, as the primary balance fell by some 2 percent of GDP simultaneously with an absorption boom**. In 2009, the fiscal balance worsened, due largely to revenue declines associated with the economic slowdown. The 2009 cyclically adjusted fiscal stance is moderately contractionary, allowing almost full accommodation of automatic stabilizers. In the near-term (2010 and 2011), automatic stabilizers decline as the economy returns to potential, and the discretionary fiscal stance based on announced fiscal targets remains moderately contractionary. The chart below shows the overlap of automatic stabilizers and structural fiscal impulses with the economic cycle in Macedonia over the period 2006 to 2011.



FYR Macedonia: Cyclically-adjusted Fiscal Balances

	2006	2007	2008	2009	2010	2010
Primary fiscal balance	0.5	1.5	-0.4	-2.2	-1.6	-0.8
Overall fiscal balance	-0.5	0.7	-1.1	-2.8	-2.5	-2.0
Output gap	-1.2	-0.2	4.6	-0.4	-1.8	-0.6
Absorption gap	-3.2	3.9	14.8	5.9	3.2	3.7
Cyclical balance	-0.7	0.5	2.8	0.7	0.1	0.4
Cyclically-adjusted primary balance	1.2	1.0	-3.2	-2.9	-1.8	-1.2
Cyclically-adjusted overall balace	0.2	0.2	-3.9	-3.5	-2.7	-2.4
Automatic stabilizers	-0.5	1.2	2.3	-2.1	-0.6	0.3
Fiscal impulse (primary balance)	-0.2	-0.2	-4.2	0.3	1.1	0.5
Fiscal impulse (overall balance)	-0.3	0.0	-4.1	0.4	0.9	0.3

Source: IMF staff estimates.

Note: Automatic stabilizers are the difference in the cyclical balance between the current and the previous year. The fiscal impulse is the difference in the cyclically-adjusted balance between the current and the previous year (a positive fiscal impulse means a cyclically-adjusted contraction). Cyclical adjustment of fiscal balances is done with respect to both output and absorption gaps as described in the Selected Issues Paper, Ch. 3.

Box 1. Methodology for Calculating Cyclical and Cyclically-Adjusted Revenues

We define $ygap = \frac{Y - Y^*}{Y^*}$ and $absgap = \frac{A - A^*}{A^*}$, where * denotes "potential," $A \cong Y - NX$, Y denotes output, A denotes domestic absorption, and NX denotes net exports. Potential output is estimated based on several statistical filters. Potential absorption is estimated based on potential output and a current account norm based on CGER methodology.

Revenue ratios are denoted by $r = \frac{R}{Y^*}$, $r_{ind} = \frac{R_{ind}}{Y}$ and $r_{oth} = \frac{R_{oth}}{Y}$, where $R = R_{ind} + R_{oth}$.

Cyclically-adjusted revenues are generally given by $\frac{R_i^{CA}}{R} = (\frac{TB^*}{TB})^{\varepsilon_{i,R}}$, where R^{CA} represents cyclically-adjusted revenues, $i = ind, oth$, TB represents the respective tax base – absorption A for indirect tax revenues and output Y for other revenues and ε represents the elasticity of revenues with respect to their base.

Cyclical revenues as a share of potential output are given by:

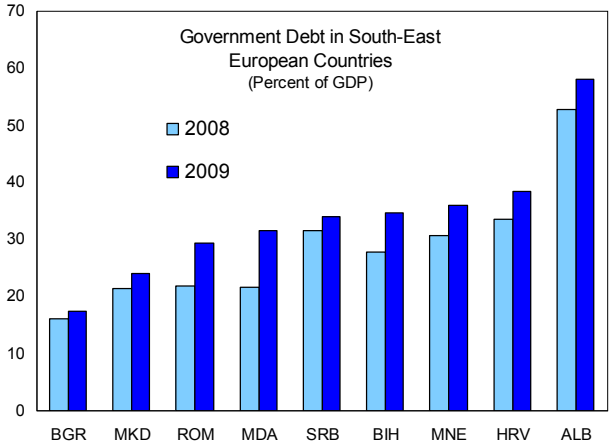
$$\frac{R^{Cycl}}{Y^*} = r_{ind} \cdot \frac{1 + ygap}{1 + absgap} \cdot absgap + r_{oth} \cdot ygap$$

and cyclically-adjusted revenues as a share of potential output are given by:

$$\frac{R_i^{CA}}{Y^*} = r_{ind} \cdot \frac{1 + ygap}{1 + absgap} + r_{oth}$$

B. Medium-Term Fiscal Sustainability

36. **In the medium-term, fiscal policy should be anchored by sustainability.** In particular, debt should be kept at prudent levels and fiscal deficits should be consistent with stabilizing debt at such levels. While there is no exact answer on what level of debt is sustainable, three approaches (cross-country comparisons, empirical studies and model-based methods) suggest public debt of around 25 percent of GDP could be a prudent level for Macedonia. Medium-term primary fiscal deficits of 0.4 percent of GDP (overall deficits of 1.5 percent of GDP) are consistent with such a debt level.

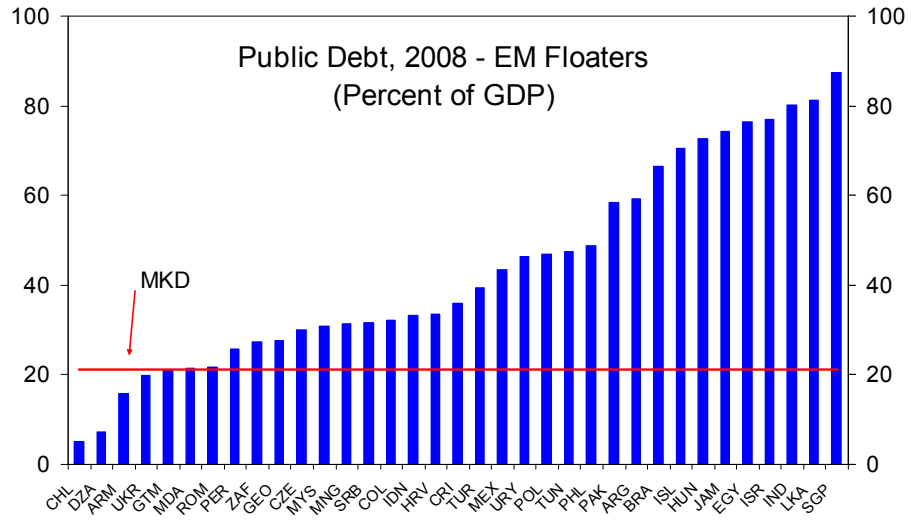


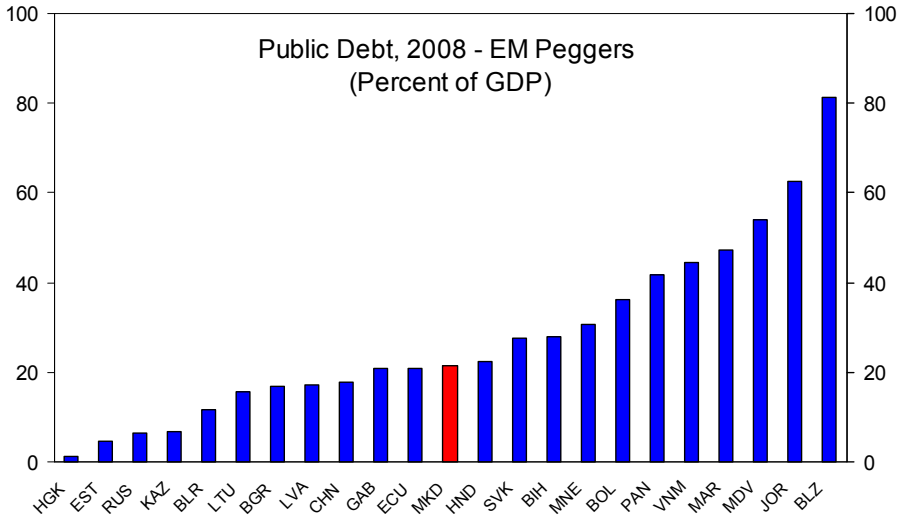
Source: WEO, Oct. 2009

37. **There is no consensus in the academic literature on how to calculate the appropriate debt target for emerging markets**. The one generally-accepted conclusion is that emerging markets can sustain lower levels of debt than advanced economies because economic and institutional features limit both the feasibility and the credibility of these countries' debt-servicing abilities (Reinhart, Rogoff and Savastano (2003), IMF (2002)).

Cross-country comparisons

38. **One yardstick for Macedonia's debt target comes from cross-country comparisons**. Although Macedonia's public debt appears low relative to its neighbors, it is at the median of emerging economies with fixed exchange rates, which have lower public debt ratios than countries with floating exchange rate regimes.





Source: WEO, Oct. 2009

Empirical studies

39. **A second benchmark for the prudent debt target in Macedonia comes from econometric models that establish an empirical link between debt ratios and crisis episodes.** The IMF Vulnerability Study estimates a threshold of 25.6 percent of GDP for public debt in emerging markets, beyond which the probability of a debt crisis increases significantly (see IMF (2007)).[9]

Model-based approaches

40. **A third approach for determining debt limits is through modeling the government's budget constraint**. Sustainability is defined in these models according to whether sufficient future primary surpluses can be feasibly generated to service the respective debt ratio, or whether the government's budget constraint implies unrealistically large future adjustments in the primary fiscal balance (see IMF (2002), IMF (2003)).

41. **One such theoretical model considers an uncertain environment in which the government is committed to servicing debt in all contingencies** (see Mendoza and Oviedo (2003) as applied in IMF WEO (2003); Alvarado, Izquierdo, Panizza (2004); and Mendoza and Oviedo (2007)). This model imposes a stringent requirement that a government does not borrow beyond what it can sustain in a prolonged low revenue outcome. This "natural debt limit" is given by:

$$d = \frac{(t_{\min} - e_{\min}) \cdot (1+g)}{(r-g)},$$

where $t_{\min}$ represents revenues in a negative fiscal shock scenario and $e_{\min}$ represents the credible expenditure adjustment in that case. The model predicts that countries with less volatile revenues and larger credible expenditure adjustments can sustain higher debt ratios. The "natural debt limit" is not necessarily the optimal debt level, but a debt ratio much above this limit could be raise issues of sustainability.

42. **Applying this model to Macedonia's case suggests a natural debt limit on the order of 20 percent of GDP.** This result is based on the historic volatility of revenues over the period 2001−09, and implies that the government would have to be able to credibly commit to an expenditure adjustment of about 4.7 percent of GDP. This expenditure adjustment is roughly equal to two standard deviations of expenditure ratios over the same period (around 14 percent nominal decrease from this year's levels) . Higher debt limits are

Revenue (share of GDP)	30.3
St. dev.	2.2
Primary expenditure (share of GDP)	30.1
Exp. adjustment	4.7
Real growth rate	4.0
Real interest rate	5.0
Natural Debt Limit (percent of GDP)	20.4

Source: IMF Staff estimates.

[9] This threshold is determined by a split in the distribution of each indicator for crisis and non-crisis observations, imposing that the probability of a missed crisis or a false crisis is minimized.

possible only if revenues become less volatile or an even larger expenditure adjustment is feasible and credible.

Financing Costs

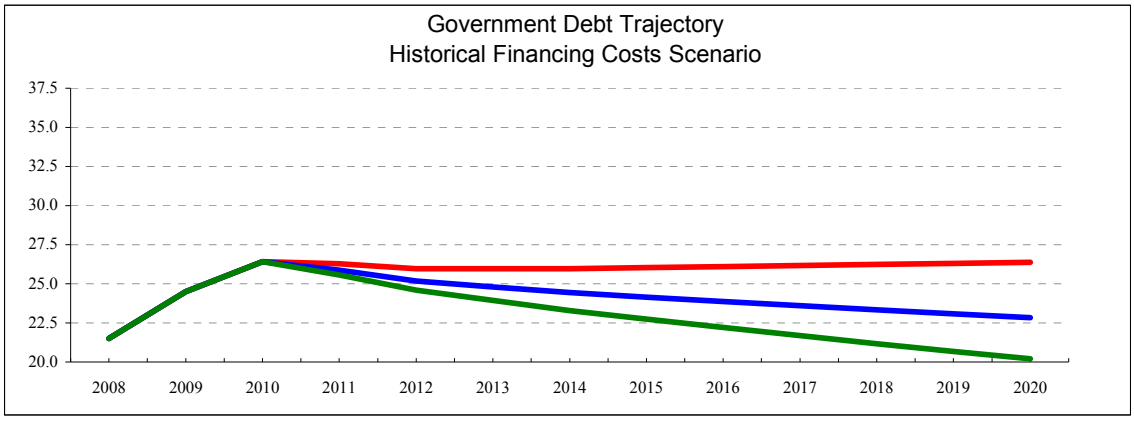
43. **Another reason to contain the level of public debt is the prospect that Macedonia will gradually turn away from official loans and towards more expensive borrowing from private markets**. As this happens, it will be necessary to run larger primary balances in order to maintain the overall balance at the debt stabilizing level, which will place a burden on the budget. The average interest rate on public debt for Macedonia is projected to increase as the share of concessional debt decreases. In order to illustrate this, we project debt trajectories for different primary fiscal balances for the following three scenarios:

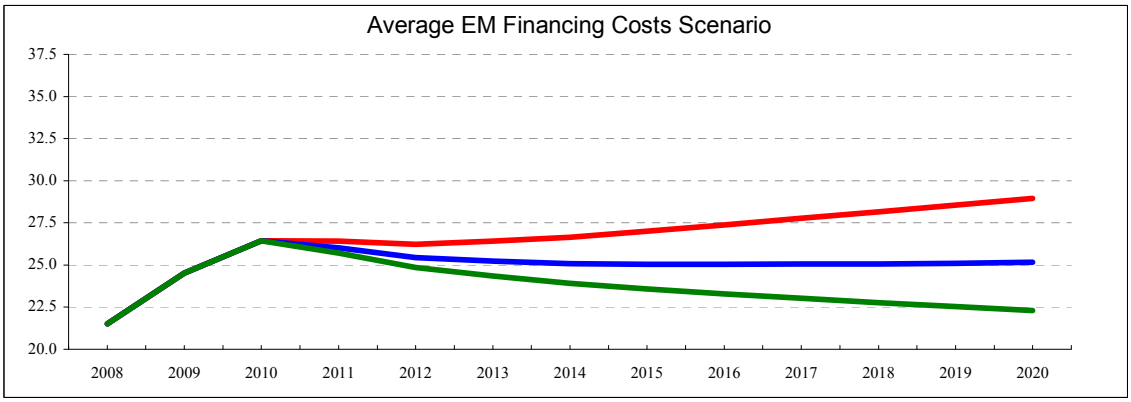
- **Historical scenario:** financing costs equal to 3.4 percent per annum, the historical average nominal rates for Macedonia.

- **Average EM financing costs scenario:** 30 percent of the total financing needs in a given year (budget financing plus debt amortization) is financed at historical costs and the remaining 70 percent is financed at a 4 percent real interest rate (slightly over 7 percent nominal rate), based on the average financing costs for East European emerging markets in the past 10 years.

- **High financing costs:** 30 percent of the total financing needs in a given year (budget financing plus debt amortization) is financed at historical costs and the remaining 70 percent is financed at a 9 percent nominal rate, based on the terms of this year's Eurobond issuance.

44. **For a given primary fiscal balance, higher financing costs imply unsustainable upward-sloping debt trajectories.** Alternatively, higher financing costs require higher (i.e. more positive) primary balances in order to stabilize debt.


Government Debt Trajectory
Historical Financing Costs Scenario
37.5
35.0
32.5
30.0
27.5
25.0
22.5
20.0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020


Average EM Financing Costs Scenario
37.5
35.0
32.5
30.0
27.5
25.0
22.5
20.0
2008
2009
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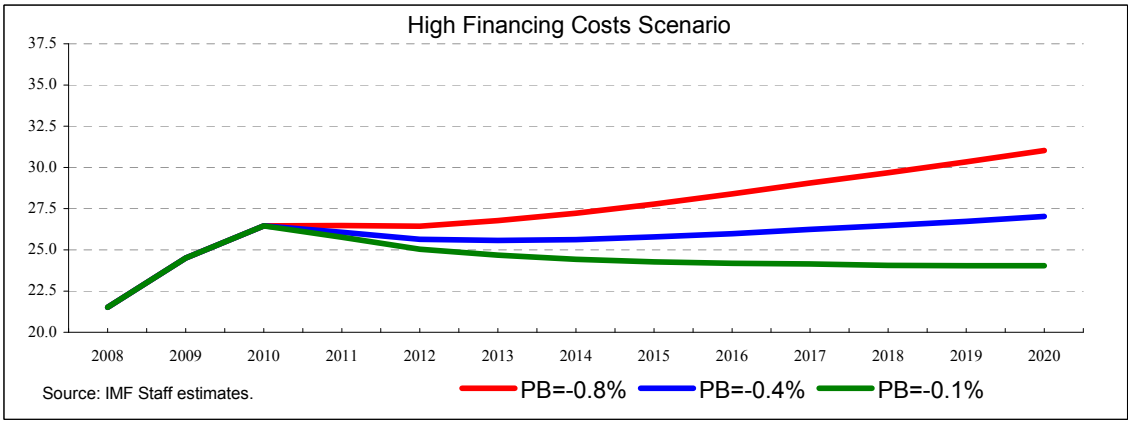
2017
2018
2019
2020


High Financing Costs Scenario
37.5
35.0
32.5
30.0
27.5
25.0
22.5
20.0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Source: IMF Staff estimates.
PB=-0.8%
PB=-0.4%
PB=-0.1%

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