



European Bank
for Reconstruction and Development

Euroisation in Serbia

Alexandre Chailloux, Franziska Ohnsorge and David Vavra

Summary

Euroisation in Serbia is rooted in a long history of macroeconomic instability. Extreme inflation volatility has undermined trust in the dinar and discouraged dinar savings. At the same time, an abundant supply of foreign capital inflows has provided easy access to foreign currency lending at low interest rates in an environment of perceived exchange rate stability – a perception reinforced by the choice of exchange rate regime. As a result, both the asset and the liability side of banks' balance sheets, and even those of the non-bank sector, is heavily foreign currency-denominated. This paper documents the forces that promote euroisation in Serbia. The paper argues that, in the wake of the global crisis, a window of opportunity has emerged that could foster a process of de-euroisation. The lack of foreign funding and recent exchange rate volatility has tilted borrower incentives towards local currency borrowing. If disinflationary macroeconomic policies gain credibility, with the possible support of regulatory options, euroisation could drop sharply.

Keywords: Currency mismatches, dollarisation, regulation, capital markets, emerging Europe

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Contact details: Franziska Ohnsorge, One Exchange Square, London EC2A 2JN, United Kingdom.

Phone: +44 20 7338 6575; Fax: +44 20 7338 6110; email: ohnsorgf@ebrd.com.

Alexandre Chailloux is Senior Economist at the International Monetary Fund's Money and Capital Markets Department; Franziska Ohnsorge is Senior Economist at the EBRD's Office of the Chief Economist; David Vavra is Senior Partner at OGREsearch.

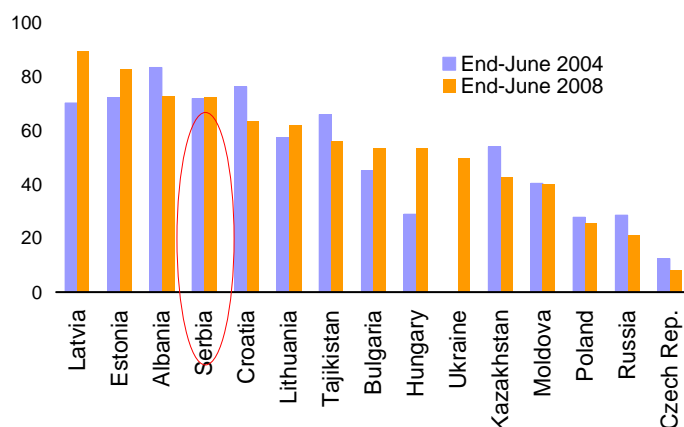
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1 Background

Serbia is one of the most euroised economies in eastern Europe and on the banks' balance sheets. At 72 per cent, loan euroisation in Serbia is higher than in most eastern European countries, be they fixed exchange rate regimes or inflation-targeting regimes where loan euroisation is no more than 60 per cent and typically less (see Chart 1).¹ Deposit euroisation was similarly high at 68 per cent at end-June 2008 (see Chart 2). In addition, the median household respondent to the OeNB's EuroSurvey reported that they held about €3,500 – suggesting an amount in the order of 30 per cent of GDP in aggregate – in euro cash as a general reserve (Dvorsky et al., 2008). The median household euro cash holdings exceed those in any other central or south-eastern European country.² The relatively large euro savings of households partly reflect a long history of migrants working in western Europe. Although respondents in the OeNB's survey report that payments are made in dinar in compliance with the law, anecdotal evidence suggests a practice of setting prices and wages in foreign exchange (FX) and denominating them in dinars only for legal purposes ("real" euroisation). Payments for large consumer durables and household investment goods such as cars and houses can legally be made and are, in practice, virtually exclusively made in foreign currency. While financial and real euroisation runs high, banks themselves do not maintain net foreign currency open positions.

Chart 1: Foreign currency lending

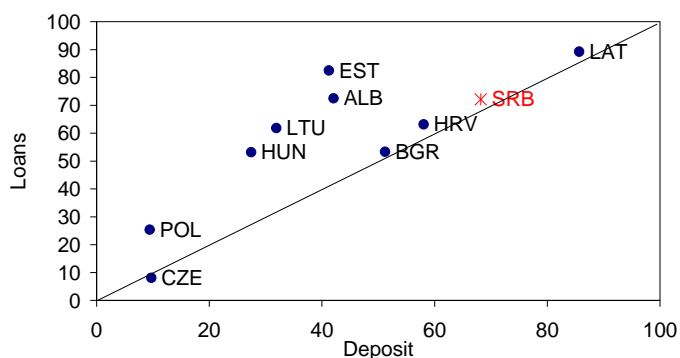


Source: ISI Emerging Markets, CEIC Data Company Ltd.

1 The figure uses the following assumptions on exchange rate-indexed lending: Serbia: 57 per cent of total local currency lending in 2004, 70 per cent in 2008. Croatia: 74 per cent in 2004 and 61 per cent in 2008. FYR Macedonia: 43 per cent in 2004 and 2008 based on the reported composition in March 2009. Sources underlying these assumptions are annual reports and information directly provided by the respective central banks. For all other countries, exchange rate-indexed lending is assumed to be insubstantial. Foreign currency lending is not adjusted for valuation effects.

2 Applying the median euro cash holdings of €3,500 to the total number of Serbian households of some 2,521,190 (an average household size of three people), suggests total euro cash holdings in the order of 30 per cent of 2009 nominal GDP.

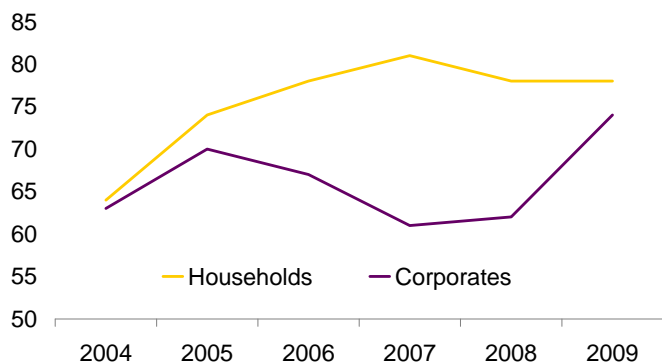
Chart 2: Share of FX deposits and loans



Source: ISI Emerging Markets, CEIC Data Company Ltd.

The share of foreign currency loans peaked in 2007, but has since fallen (see Chart 3). In the corporate sector, the share of foreign currency loans (evaluated at current exchange rates) peaked in 2005-06, declined substantially in the period of higher exchange rate volatility and inflation targeting in 2007-08, and rose again in 2009 as a result of the financial crisis. In the household sector, the share of foreign currency loans has remained around 80 per cent throughout the period. Valuation effects dampen somewhat the movements. Evaluating foreign currency loans at constant 2006 exchange rates, especially the decline in the share of FX loans to households in 2008 and 2009 is significantly pronounced, with the share falling to around 75 per cent in 2009.

Chart 3: Share of foreign currency loans (per cent total)



Source: National Bank of Serbia.

Serbia's high degree of euroisation raises policy challenges, both during tranquil times as well as during episodes of turbulence.

- Euroisation weakens the monetary transmission channel and reduces the effectiveness of monetary policy (Aleksić at al. 2008). Monetary policy rates may be reflected in lending rates for local currency-denominated loans, but the sheer volume of these loans is much less than foreign-currency-denominated loans with little response to monetary policy rates.
- Euroisation limits the use of the exchange rate as a crisis management tool because of

- Euroisation restricts the central bank's ability to act as lender-of-last resort in the case of depositor loss of confidence in its foreign exchange reserves.

For policy-makers, a shift away from loan euroisation would therefore have important benefits but, to be successful, would need to address its root causes. A successful de-euroisation strategy has to alter the motivation of agents leading to euroisation, however in a way that possible negative side effects are minimised. For instance, imposing a ban on FX credits to unhedged borrowers may have fast positive results in terms of reducing euroisation, but may reduce lending overall and delay the economic recovery.

A dinarisation strategy would not necessarily weaken the goal of eventual euro adoption in the long term. On the contrary, greater monetary policy control would facilitate the process of achieving the macroeconomic stability that is the precondition for euro adoption. Serbia applied for EU membership in December 2009.

The next section surveys some of the root causes of euroisation identified in the literature. These include macroeconomic instability, the choice of monetary policy regime, underpricing of exchange rate risk, and the regulatory and institutional environment. Section III assesses how these various root causes apply to Serbia. Section IV concludes.

2 Root causes of euroisation — literature survey

Dollarisation or euroisation is generally analysed as the legacy of monetary and economic turbulence and weak institutions, and as a rational self-insurance of economic agents against hyper-inflation (“an optimal (prudential) response to a suboptimal policy environment”, Ize, 2003). Recent explanations have focused on the risk posed not only by the level of inflation but also by its second moment, that is, the uncertainties relating to real returns due to the volatility of inflation. Besides, other factors, such as institutional bias towards foreign currency, market environment or currency blind prudential regulation can provide additional causes of euroisation. For an extensive survey of the relevant literature, see Zettelmeyer, Nagy and Jeffrey (2010). Here, we only focus on a few key elements that we apply to Serbia below.

2.1 Macroeconomic environment

Ize and Levy-Yeyati (2003) model foreign currency-denominated borrowing based on the portfolio choice approach. In acknowledging that expected returns from investing (borrowing) in alternative currencies have to yield equal returns under the interest rate parity assumption, the portfolio choice approach explains euroisation as a response to second moments of expected returns.

Under a capital asset pricing model (CAPM) model, risk-averse agents choose the currency composition that optimises the risk-return profile of their portfolio, measured in units of the local consumption basket. In the simplest form of this approach, the balance of the supply and demand of loanable funds leads to uncovered interest rate parity and a share of foreign currency lending that minimises the variance of returns on the portfolio (minimum variance portfolio allocation or MVP):³

- r_l : nominal rate of return on local currency deposits
- r_d : nominal rate of return on foreign currency deposits
- r : average nominal rate of return on all deposits
- π : inflation rate
- n : rate of nominal depreciation
- σ_π : standard deviation of inflation rate
- σ_n : standard deviation of nominal depreciation rate
- $\rho_{\pi,n}$: correlation coefficient between inflation rate and nominal depreciation rate
- α : euroisation ratio.

³ For Serbia, interest rate parity does not necessarily hold in its crude form used here.

From the standpoint of depositors, the return of placing a share α of the portfolio in foreign currency and $(1-\alpha)$ in domestic currency can be written as follows:

$$\begin{aligned}
 r &= (1-\alpha)(r_f - \pi) + \alpha(r_d + n - \pi) = (\alpha n - \pi) + (1-\alpha)r_f + \alpha r_d \\
 \text{Var}(r) &= \text{Var}(\alpha n - \pi) = \sigma_n^2 \alpha^2 - 2\sigma_n \sigma_\pi \rho_{n,\pi} \alpha + \sigma_\pi^2 \\
 \min_\alpha \text{Var}(r) &\Rightarrow \alpha^* = \frac{\rho_{n,\pi} \sigma_\pi}{\sigma_n}
 \end{aligned} \tag{1}$$

This formula gives a simple analytical benchmark of how changes in the macro environment can have an impact on agents' optimal level of euroisation under the portfolio choice paradigm. The optimal level of euroisation stems from the interplay between three observable variables: the correlation between inflation and the depreciation rate of the domestic currency ("pass-through"), the standard deviation of inflation and the standard deviation of the rate of depreciation. For instance, high volatility of inflation is a cause of euroisation only if it is high relative to that of the nominal depreciation. Another mechanical consequence of the formula is that euroisation should *ceteris paribus* increase with the degree of openness of the economy as reflected in the pass-through, and with the level of "real euroisation" (pricing of goods in euros) that generally results in higher pass-through effects.

Formula (1) highlights how different policy actions aimed at reducing inflation can generate similar MVP outcomes. For instance, a monetary policy that reduces volatility in nominal depreciation faster ("fear of floating") than inflation volatility may fail to reduce euroisation (Chamon and Hausmann, 2003). At the extreme, in a credible currency board regime, the volatility of depreciation is zero and, hence, the MVP undetermined. The anchor and local currency are indistinguishable and the calculated MVP becomes irrelevant.

An important caveat to the portfolio approach is the importance of expectations and institutional credibility. In its simplest approach the MVP calculations are backward-looking and reflect only past macroeconomic performances. At times, however, the observed *ex post* volatilities do not necessarily reflect the *ex ante* expectations agents held over that period – and expectations are what agents base their currency choice on. This measurement problem is especially acute in emerging market environments where short time series are a poor guide to agents' true expectations.

The measured MVP in formula (1) based on observed volatility may therefore deviate significantly from the true MVP based on expectations about volatility. Agents' portfolio choices can be dictated by purely backward-looking considerations. Expectations may, for instance, remain purely backward-looking when agents do not believe that a recent change in macroeconomic policies will be sustained – a case of a credibility deficit. In this case, euroisation hysteresis can result, with the actual foreign currency share of deposits exceeding the calculated MVP, if macro policies have changed fundamentally but expectations have not.⁴ Alternatively, agents' expectations can be more forward-looking than based on past performances, for instance when far-reaching changes in the institutional environment (like central bank independence) and recent delivery of a more stable macro environment reduce

⁴ Also observed in Latin America (Rennhack and Nozaki, 2005).

the weight given to past observations — a case of a credibility boost.

Another way of computing the MVP, is therefore to use *ex ante* volatilities implied by a macroeconomic model calibrated to the particular policy regime and period of history. The model approach can also be used for inferring changes in the optimal euroisation levels in the future as a function of changes in monetary and exchange rate policies. However, this approach assumes that agents credibly believe the policy regime embedded in the model – a strong assumption.

For our calculations below for Serbia specifically we use a combination of the *ex post* (that is, data-based) and *ex ante* (that is, model-based) approaches in gauging the expected volatilities of macroeconomic variables and deriving a ballpark range of the euroisation levels implied by macroeconomic fundamentals.

2.2 Monetary policy regime, supervisory and institutional environment

Other factors play a contributing role in cementing euroisation. These highlight that euroisation is a “market response to a suboptimal market, legal or regulatory asymmetries that favour the [foreign currency]” (Ize and Levy-Yeyati, 2003). They are as follows:

- fear of floating in monetary policy caused by balance sheet mismatches
- under-pricing of foreign currency risk implicit in credit risk
- institutional factors such as the supervisory environment or the market environment (the shortage of domestic currency-denominated investment vehicles).

Monetary policy endogeneity—“fear of exchange rate floating” caused by balance sheet mismatches — is another element of euroisation hysteresis. In a highly dollarised environment, the central bank may be tempted to peg or tightly control the exchange rate to protect the economy from the balance sheet effect of depreciations: monetary policy becomes hostage to the “fear of floating”. The implicit socialisation of the risks attached to currency mismatches via the exchange rate policy may generate moral hazard and hence reinforce dollarisation. Calvo and Reinhart (2002) summarise the authorities’ revealed “fear of floating” into one index, defined as the ratio of the standard deviation of the exchange rate to the sum of the standard deviation of the FX reserves and local interest rates. The index is close to zero for countries dampening exchange rate movements by systematic FX intervention or by systematic adjustment of domestic interest rates.

Jeanne (2002) describes how under-pricing of credit risk can lead to euroisation hysteresis. Borrowers and lenders may under-price indirect credit risk induced by foreign currency lending to unhedged borrowers. By embedding a negative risk premium into interest rates, this may increase the myopic incentive to borrow in foreign currency. The often higher recovery value of FX-denominated claims in the case of joint devaluation and bankruptcy also strengthens lenders’ incentives for foreign currency lending. The interest wedge in favour of the euro can also, via an adverse selection process, result in a greater concentration of more risky projects to less creditworthy borrowers that will in the case of bankruptcy, generate a lower recovery value of domestic currency-denominated claims.

The regulatory and institutional environment may also be conducive to under-pricing of foreign currency-related credit risk and euroisation hysteresis. “Currency-blind” supervisory frameworks failing to account for risks from indirect currency mismatches may let “negative

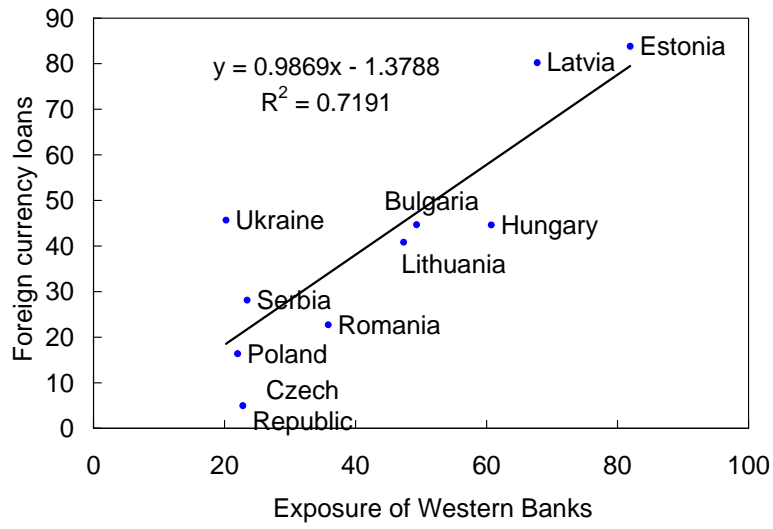
risk premia” widen the interest rate wedge in favour of foreign currency lending. Likewise, the existence of a “currency blind” safety net, with for example, a deposit insurance framework not discriminating between local and foreign currency deposits, or the existence of a lender of last resort facility in foreign currency *de facto* reinforces the attractiveness of foreign currency lending (Broda and Levy-Yeyati, 2006).

Public policy choices also often distort incentives in favour of foreign currency. Interest rate subsidies given to FX loans will strengthen euroisation. Many countries provide some kind of interest rate subsidies on deposits or loans – often for special purpose vehicles (such as building society programmes) or special interest groups (small and medium-sized enterprises, start-ups). In euroised countries such subsidies are often also provided for FX deposits and loans, thus contributing to the euroisation bias. Furthermore, some countries allow public companies to run unhedged open FX positions, reducing the supply of local currency deposits as well as demand for long-term local currency instruments.

Lastly, underdeveloped local currency and hedging markets combined with abundant and easy access to foreign funding may reduce the relative price of foreign currency loans. A lack of trust in local currency savings instruments often combines with a lack of high-credit quality investment vehicles in local currency. The result is a dearth of long-term savings in local currency. Easy access to abundant foreign currency liquidity from abroad (through parent banks or remittances) may therefore result in high interest rate differentials between local currency-denominated and foreign currency-denominated financial services. In addition, the lack of a liquid government bonds and bill market in local currency beyond the shortest maturities means that pricing benchmarks for financial instruments denominated in local currency and hedging products are missing. In the absence of developed hedging instruments the best hedge for importers is to set prices in foreign currency.

The dominant role of foreign-owned banks in capital flows can also be a euroisation factor (Luca and Petrova, 2008). Chart 4 shows a clear correlation between Western (mostly parent) bank exposures to emerging Europe and the share of foreign currency lending in these economies. In a context of market failure (in particular, an absence of instruments to hedge the foreign currency risk on banks’ balance sheets) and of strong prudential constraints on net foreign currency open positions, banks might prefer to transfer the foreign currency risks to customers and to maximise the asset expansion potential stemming from their privileged access to parent bank funding in foreign currency.

Chart 4: Exposure of Western banks and foreign currency loans (as a per cent of GDP)



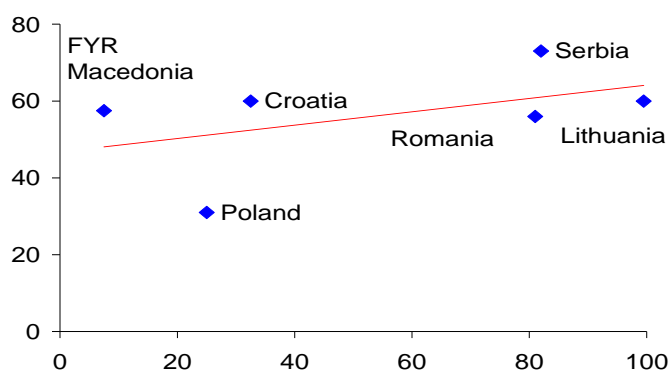
Source: BIS, CEIC, National Authorities, and International Monetary Fund WEO.

3 Root causes of euroisation in Serbia

3.1 Macroeconomic environment and monetary policy regime

Serbia's euroisation is consistent with *backward*-looking MVP calculations that yield a level of 75 per cent (see Chart 5). The MVP calculations suggest that euroisation is primarily an issue of macroeconomic policy credibility. Economic agents do not seem to give credit to policy-makers for recent achievements in disinflation and continue to manage their risks based on inflation, exchange rate volatility and pass-through expectations very much denominated by past performance over a long time span. This hypothesis is supported by the inertia in inflation expectations, and by anecdotal reports that interpret the most recent inflation gains as driven by cyclical factors (for example, the large output gap in 2009) rather than by more effective policies.⁵

Chart 5: MVP and actual share of FX loans (per cent)



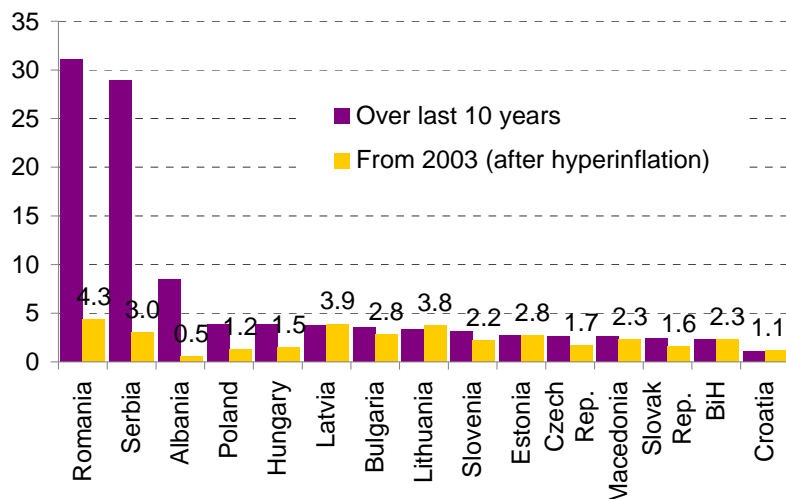
Source: Authors' calculations.

This finding reflects the turbulent economic and monetary history of Serbia over the last two decades (see Chart 6). The Yugoslav dinar denomination was changed four times between 1990 and 1994, a period of hyperinflation. In 1994, it was finally pegged to the Deutsche mark. With the gap between the official and the black market exchange rate widening, the dinar was eventually officially devalued (by 400 per cent) against the Deutschmark in 2000, producing high inflation. Inflation was over 100 per cent annually in Serbia in 2000 at a time when many other economies in the region were enjoying inflation rates below 10 per cent or were fast disinflating.

⁵ In the chart, the MVP was derived using the expression contained in the appendix of Ize and Levy-Yeyati

(2003) based on different assumptions about interest rates:
$$\alpha^* = \frac{\text{Var}(\eta) - \text{Cov}(\eta, r_f)}{\text{Var}(\eta - r_f)}$$
. Equation (1) is based on the assumption that interest rates are fixed over the portfolio period and based on an assumed relationship between the foreign currency interest rate and the REER as well as between the domestic lending rate and inflation which do not seem to hold well in Serbia. *Ex post*, the relationships between FX interest rates and REER and LC interest rates and inflation appear not to hold. Here, our calculation is based on monthly data but results are very similar if the calculation is based on quarterly data.

Chart 6: Standard deviation of inflation

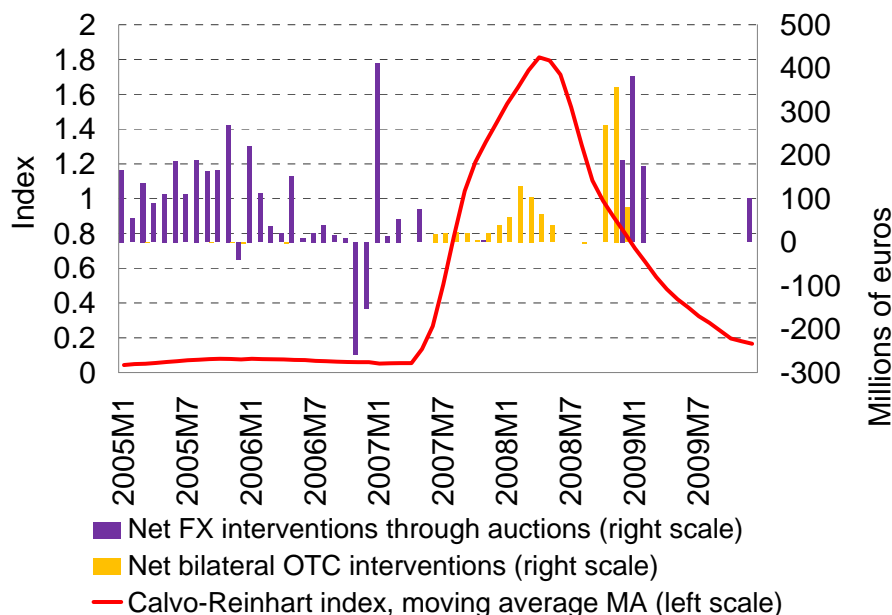


Source: IMF International Financial Statistics.

More recently, the NBS has made considerable progress in disinflation. Nevertheless, inflation, while considerably less volatile and generally lower over the last seven years than during the 1990s, has remained one of the most volatile in the region. The standard deviation of inflation measured post-hyper inflation (from 2003 onwards) is still above the regional average (three for Serbia, against a regional average of two). Also, disinflation has at times taken place in “favourable” circumstances, making it difficult for economic agents to disentangle monetary policy performance from good luck in assessing inflation trends. During 2006-07, speculative pressures led to a short-lived appreciation and in 2009-10 a deep recession caused a wide output gap.

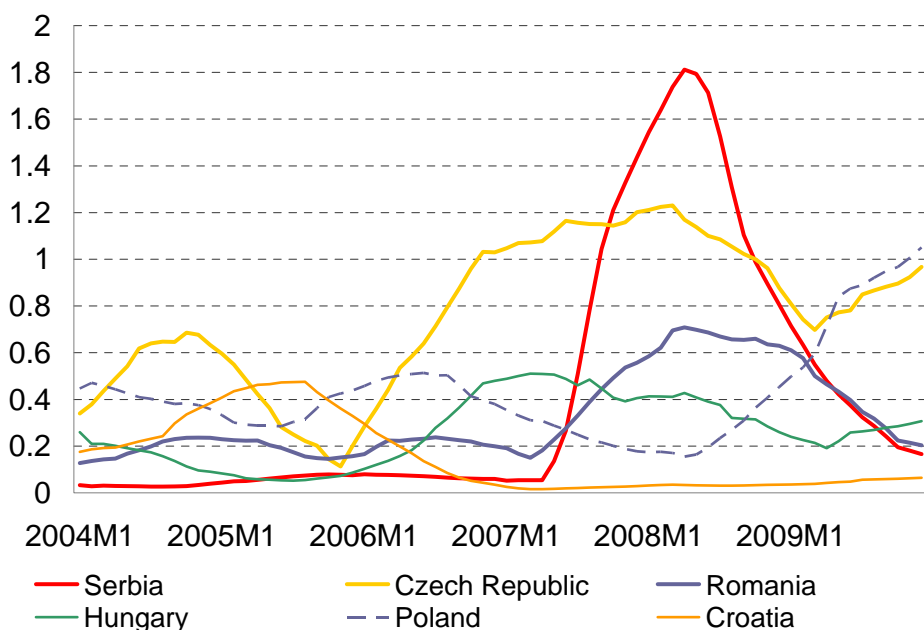
Nevertheless, the data suggest a degree of “fear of floating”. During 2001-06, the authorities’ tight management of the exchange, despite the official classification as a managed floating exchange rate regime, created asymmetric incentives for economic agents. The NBS intervened frequently, heavily, and asymmetrically in the foreign exchange rate market, overwhelmingly with foreign exchange sales and very few purchases until about 2006 (see Chart 7). The Calvo-Reinhart “fear of floating index” shows Serbia from 2004-07 as the country steering its exchange rate most tightly in the region (see Chart 8). The launch of inflation targeting was accompanied by a willingness to let the exchange rate appreciate in 2007-09. While this was a significant change, it coincided with a period when the observed volatility was only one-sided, with appreciation pressures predominating and distorting the perception of two-way risk that is key for low euroisation (Equation (1)).

Chart 7: Calvo-Reinhart “fear of floating” index and intervention volumes



Source: Author's calculations based on IMF IFS database.

Chart 8: Calvo-Reinhart index for selected countries in central and south-eastern Europe



Source: Author's calculations based on IMF IFS database.

Although the NBS allowed a substantial depreciation at the onset of the crisis in late 2008, it later intervened systematically, from a strong reserve position, to prevent what it regarded as excessive depreciation. The intervention *de facto* acknowledged the potential impact of depreciation on private and public balance sheets (fear of floating). Although the intervention volumes in 2009 were limited, the exchange rate remained broadly stable from the beginning of 2009 to April 2010, thus contributing to a perception of low risk of FX-denominated loans (but also reducing somewhat the attractiveness of FX-denominated deposits).

Of course, in Serbia's case, “fear of floating” may not only have been the reflection of

policy-makers' concern over liability euroisation that Calvo and Reinhart highlight. Serbia's policy goal remains EU accession, European Exchange Rate Mechanism (ERM) entry, and eventual euro adoption. The pre-requisite for ERM participation and euro adoption remains macroeconomic stability including avoiding excessive exchange rate fluctuations.

What will happen to the MVP if expectations adjust to a new monetary policy regime? We calculate the *forward*-looking MVP that models a path of changing expectations as monetary policy becomes more credible. We use the NBS macroeconomic projection model that supports monetary policy decisions of the NBS since 2007. The model is a standard small New-Keynesian model of monetary policy transmission in flows (gaps), as in Berg et al. (2006a, b). It is summarised in the Appendix. Although the model has been modified and recalibrated several times since 2007, most of these changes were minor and we take its current version as successfully fitting the transmission mechanism in the period from 2007 until the end of 2008, when the NBS resumed heavier exchange rate management in the wake of the crisis. For MVP computations we use the second order unconditional moments (that is, variances and covariances) of model variables. These moments are given by the model dynamics and the variances of the model's structural shocks. The variances of the structural shocks are computed as actual variances of the shocks realised when simulating the model on history from 2004.⁶

We employ the model in two ways. First, we compute the MVP on the basis of the current model calibrated to the period 2007-08. This allows us to gauge the optimal level of euroisation implied by the IT regime introduced in late 2006 under the assumption that the public correctly understood the regime's implication for the macroeconomic volatility as described by the model. Second, we modify the model's uncovered interest rate parity to account for various degrees of exchange rate management – indexed from 0 (tightly managed) to 1 (fully flexible) and compute the MVPs for various degrees of the exchange rate control and periods in history.⁷

The model suggests that the currently observed degree of euroisation reflects a lack of monetary policy credibility (see Table 1). The current degree of euroisation is close to that predicted by the model, assuming a tightly managed exchange rate (above 70 per cent). The transition to a more flexible exchange rate regime that occurred in late 2006, if credible, should have led to a substantial reduction in MVP by more than half. The more flexible exchange rate regime as practised by the NBS at least until the crisis in late 2008 was therefore a good basis for reducing euroisation. Its main problem was that it was (i) not sufficiently credible, and (ii) it lasted only a very brief period – in 2009 the NBS reverted to managing the exchange rate, which is consistent with higher euroisation ratios.

6 The simulation fixes all endogenous model variables on the observed historical values and computes the shocks (residuals) consistent with such a behaviour of model variables. We compute the variances of the time series of these simulated shocks and use them as values of model shock variances in computing the second order unconditional moments of model variables.

7 The modification to the uncovered interest rate parity follows Berg et al. (2009) and Benes et al. (2008).

Table 1: MVPs under different assumptions about exchange rate expectations

MVP (per cent)\Period	2004q1:2010q1
Modified model with a highly managed exchange rate	74
Modified model with a moderately managed exchange rate*	22.8
Modified model with a fully flexible exchange rate	13.1

Source: Author's calculations.

3.2 Supervisory and institutional environment

The supervisory framework in Serbia has “currency-blind” and “currency-conscious” elements, but on balance the “currency-blind” elements predominate. In the spirit of transitioning towards Basel II, the NBS has aimed at strengthening banks’ risk management capacities rather than imposing restrictions on intermediation in foreign currency, with for example, the obligation for banks to document the methodology used to evaluate borrowers’ FX risk. To ensure that banks’ risk management took into account indirect foreign currency risk, risk weights were substantially higher for foreign-currency denominated or foreign-currency indexed loans to unhedged borrowers (Box 1). The classification of a borrower as hedged or unhedged, however, remained at the discretion of banks and is only ascertained at the occasion of onsite visits.

Concerns about fast credit growth led to the imposition of gradually increasing reserve requirements on foreign currency liabilities. The reserve requirement peaked at 45 per cent on the eve of the crisis but its effectiveness is still open for debate. Mirzoev (2008) concluded that the reserve requirement mainly led to disintermediation — with local credit growth slowing only temporarily but direct cross-border lending rising rapidly — but had only a modest impact on financial vulnerabilities.

Some elements of the regulatory safety net are “currency blind”, others are not. For example, the deposit insurance scheme reimburses deposits in their original currency of denomination and thus, given the mistrust of the local currency, tilts incentives towards deposit euroisation. As a result of this deposit insurance arrangement, in 2002 the government eventually repaid deposits frozen in 1991 *in their currency of denomination*. Foreign currency deposits were repaid in full while local currency deposits had lost their value during the period of hyperinflation. In contrast, high reserve requirements and capital surcharges on FX-induced credit risk may have helped to reduce the overall expansion of credit in euros and thus prevented further excess credit growth and loan euroisation.

Government policy has also been ambiguous. A crisis-related loan interest subsidy was introduced in 2009 which initially only applied to foreign currency loans. Later it was extended to local currency loans but, compared with the interest rate differential on local currency loans, the subsidy remains stronger for foreign currency loans. In addition, until 2009, government borrowing at all levels of government, including state-owned enterprises,

has been predominantly in foreign currency. Sovereign debt policy has also only recently shifted towards local currency Treasury bills (T-bills) issuance. Four-fifths of the sovereign stock of debt remains foreign currency-denominated.

Box 1: Regulation of the FX-induced credit risk in the NBS supervisory framework

Debt service-to-income ratios: A debt service-to-income ratio of 30 per cent for loans that do not match the currency of borrower income and 40 per cent for loans that do.

Net open FX position: The foreign exchange risk ratio represents the ratio between the bank's total net open foreign currency position (including the absolute value of net open position in gold) and banks' capital. FX assets and liabilities include assets and liabilities denominated in dinars indexed to foreign currency. The foreign exchange risk ratio at the end of any business day may not exceed 20 per cent of its capital.

Capital adequacy: The risk weight for claims in foreign currency or foreign currency indexed for borrowers with matched foreign currency position and secured by a mortgage is 50 per cent. The risk weight for a similar loan to a borrower without an unmatched foreign currency position is 75 per cent. The risk weight for a similar loan to a borrower without an unmatched foreign currency position but not secured by cash collateral is 125 per cent.

Identification of FX unhedged borrowers: Banks have to report the methodology used to classify borrowers with matched and/or unmatched foreign currency position, and shall present such documents when compiling the prescribed supervisory reports. Banks are obliged to define the methodology used for the identification and measure of credit risk arising from exchange rate movements on the borrower's financial position, as well as the manner of managing such risk. Analysis of the borrower's exposure to the exchange rate risk and of its ability to meet its payment obligations is mandatory for loan classification.

Documentation of the FX exposure: The credit file has to contain an appraisal of financial standing and creditworthiness of the borrower, including an analysis of the borrower's exposure to foreign exchange rate risk.

Loan classification: FX loans and indexed loans to retail clients with a loan-to-value ratio above 70 per cent are placed in category E unless at the time of loan approval (the most recent update of the credit file) the debt-service-to-income ratio was below 30 per cent (50 per cent).

4 A window of opportunity

The current environment provides a window of opportunity. The crisis has made both the policy-makers and private sector alike acutely aware of the euroisation dangers. Private and public sectors recognised the fragility of their unhedged open positions. The central bank, in particular, recognised the vulnerability of its inflation targeting policies to financial stability concerns arising from unhedged private sector balance sheets.

As a result, policy-makers' support for disinflation and de-euroisation has strengthened and they are launching a coordinated effort. The NBS is fully committed to reducing inflation below 4 per cent over the next two years. In addition, it has recently taken measures to support the development of hedging markets by offering FX swaps. The Ministry of Finance is committed to maintain a vibrant T-bill market that can be a pricing benchmark for local currency financial instruments and extending its maturity. The Treasury bill market has developed successfully since interest rates began to be more market-based in early 2009. The maturity has lengthened from 3 months to 24 months; the yield has dropped from above 16 per cent to below 10 per cent; and most auctions have been heavily oversubscribed. Banks have begun benchmarking the pricing of their dinar-denominated loans against T-bill yields. The next challenge is to extend the yield curve to 24 months and to encourage a secondary market in T-bills, which could possibly be encouraged by facilitating access of small savers to the T-bill market. Another possibility is to supplement the Treasury bill market with a municipal bond market in local currency, provided strong restrictions exist to safeguard fiscal sustainability.

A key bottleneck to reducing incentives for euroisation is macroeconomic policy and the external environment. The external environment will likely become more conducive to de-euroisation over the next few years. The sources of foreign currency that fuelled high euroisation in bank liabilities during the past decade are likely to shrink. Access of foreign banks to low-priced parent bank funding will decline as parent banks rebalance their portfolios in home and host markets and euro area interest rates rise post-crisis. Remittances, a source of foreign currency deposit growth, may start a secular decline with the Schengen visa reform. The likely increase in Serbians who travel, together with fewer visits from overseas workers, may reduce these flows. As a result of less bank funding in foreign currency, its relative cost—the interest rate differential with local currency funding — may be less supportive to euro lending. Nevertheless, while the external environment may benefit narrowing euroisation incentives, the process has to be supported with appropriate policy choice — including reducing policy-makers' fear of floating.

While macroeconomic credibility is being built, many supporting measures should be implemented in the short to medium term. Some of these are summarised in Table 2 below. These include policies to develop local currency markets, beginning with government debt markets; remove market failures in the derivatives market; and tilt supervisory incentives towards local currency lending. International financial institutions (IFIs) play a special role in the development of local currency capital markets since they can issue local currency-denominated bonds and, in the process, reveal any legal and regulatory restrictions to capital market development. A host of supervisory measures has been considered in other countries.

- Limits could be introduced on net open foreign currency positions of borrowers to the extent that they can be enforced.
- Many countries provide fiscal subsidies to long-term local currency savings vehicles,

- To raise awareness of exchange rate risk, disclosure requirement of foreign currency risk could be strengthened to include realistic simulations of debt service ratios. Awareness of foreign currency risk could be supported by banning euro-based price advertisements.
- More aggressive measures include restrictions on retail and short-term lending in foreign currency to unhedged borrowers, mostly lower-income households and the public sector. Facilitating conversion into local currency once the exchange rate depreciation surpasses a threshold has been considered in other countries, combined with a lengthening of loan maturities without quality impairment for regulatory purposes.

The focus of any short-term measures will likely be on positive incentives for local currency lending rather than on repressing foreign currency lending. Many borrowers are still distressed as a result of the crisis and credit standards have tightened. Active restrictions on foreign currency lending therefore would need to be timed to coincide with a more entrenched economic upswing. In principle, measures to reduce FX lending could address either the stock or the flow of new FX loans. If measures to reduce the flow of FX loans succeed, the stock of FX loans will start adjusting in two to three years, given the duration of an average bank portfolio.

Any attempt to reduce euroisation in Serbia will require the buy-in of all stakeholders: the authorities, local banks and parent banks, home supervisors and IFIs. In the context of the Vienna Initiative (European Bank Coordination Initiative), the NBS launched such a broad-based effort in 2010.

In conclusion, loan euroisation in Serbia is deep-rooted. Even in the ideal policy environment, it will, therefore, only decline gradually over time. However, in the meantime, several regulatory and policy steps, as outlined above, can and are being put in place that make the environment more conducive to loan dinarisation.

Table 2: Serbia: root causes of euroisation

Causes Identified in the Literature	Relevance for Serbia	Policy options for Serbia
Macroeconomic instability	A history of severe volatility since the 1990s	Press ahead with macroeconomic policy targeted at disinflation
Fear of Floating	With the exception of the period 2007-2009, intervention has been systematically biased towards one direction.	Under the inflation-targeting framework, avoid exchange rate interventions biased systematically in one direction
Underpricing of foreign currency-related credit risk	Higher reserve requirement on FX liabilities than on LC liabilities (despite recent cut); Differentiated debt service-to-income ratios by currency.	Amend regulation to restrict the FX exposure of the most vulnerable segments of unhedged borrowers, in particular short-term unsecured consumer loans; enhance disclosure of FX risk with debt service scenarios under depreciation; remunerate reserve requirements on local currency liabilities only; consider amending provisioning rules to facilitate currency conversion of loans.
Supervisory and institutional environment	Deposit insurance that repays deposits in the currency of denomination; government subsidies that are available for FX and LC loans.	Eliminate loan interest subsidies on FX loans; reduce access of public companies to FX loans unless for hedging purposes; consider subsidy for longterm savings vehicles, fiscal resources permitting.
Underdeveloped hedging and funding markets	Government bond market has been deepening rapidly since 2009; nascent secondary trading; central bank initiative to encourage development of FX swaps.	Increase LC share of government borrowing; increase liquidity and maturities in government bond and bill market; broaden access to government bond and bill market for smaller savers; consider market-based FX hedging of government FX transactions.

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Appendix

This appendix gives background information on the macroeconomic model used in the *ex-ante* model based calculations of the MVP euroisation levels. In our experiments we employ the NBS macroeconomic projection model and its modifications for different degrees of the exchange rate flexibility.

The NBS macroeconomic projection model (Djukic et al., 2010) is a semi-structural “gap” model of the monetary transmission based on the New Keynesian theory. It follows a long tradition of using small gap models in supporting policy in inflation targeting (IT) central banks, as in Berg et al. (2006a,b) or Benes et al. (2003).

Such small gap models have both nominal and real rigidities, and the main mechanism driving inflation over the business cycle are the fluctuations of real variables (such as output and real exchange rate) around their long-term trends. These models embody the main principles of monetary policy-making in IT central banks, such as the long-term monetary neutrality, a flexible exchange rate and the main interest rate transmission channel.

The advantage of the semi-structural approach is the flexibility in calibrating the small models to account for many empirical phenomena that are important for interest-rate setting – especially in the emerging market context.

These models typically consist of six behavioural equations that represent aggregate demand (IS curve), aggregate supply (Phillips curve), imported goods inflation, the uncovered interest rate parity condition, the term structure and the policy-reaction function (Taylor rule). In addition, there are several identities.

The NBS model differs from a standard gap model in the following main ways.

- Core, oil and other non-core inflation rates are modelled by separate equations.
- In addition to output, real exchange rate fluctuations are an inflation-driving force in the aggregate supply (Phillips curve) equation of core inflation reflecting the high import dependence of the Serbian economy.
- Foreign real interest rate enters the aggregate demand equation reflecting the high euroisation in Serbia.
- The expectations of inflation and exchange rate have both a backward and forward-looking component. The backward-looking element of the exchange rate expectations also reflects a policy preference towards smoothing the exchange rate fluctuations through interventions.
- All relative prices in the model are stochastic stationary.

In computing the *ex-ante* MVP euroisation levels we used the model and its calibration as of April 2010. We consider the calibration to be representative of the behaviour of the economy and policy since the end of 2006 until the end of 2008, when the NBS resorted to heavy interventions in the wake of the crisis. The model’s structure, the parameter values and the estimated shock standard errors from this period imply a variance-covariance matrix of the model variables that enter in computing the MVP euroisation level. This is the euroisation level we should expect, if the model successfully captures the actual dynamics of the economy and, crucially, if the agents perceive monetary policy and a relatively flexible exchange rate regime the same way as implied by the model.

Furthermore, we modify the process of forming exchange rate expectations in the model to allow for different degrees of exchange rate flexibility. This allows us to investigate the possibility that the agents actually do not perceive the exchange rate the same way as captured by the NBS projection model.

In particular, the NBS projection model has the following process for the exchange rate expectations (Djukic et al., 2010):

$$E_t l_{s_{t+1}} = a_{\gamma_1} \cdot l_{s_{t+1}} + (1 - a_{\gamma_1}) \cdot [l_{s_{t-1}} + 2/4 \cdot (\pi_t - \pi_t^{EU} + \Delta l_{z_t}^{eq})], \quad (A1)$$

where $E_t l_{s_{t+1}}$ refers to the expected next period exchange rate formed as a weighted average of the model implied expected exchange rate next period $l_{s_{t+1}}$ (the forward-looking component) and the previous period level of the exchange rate $l_{s_{t-1}}$ adjusted for the trend in the real exchange rate $\Delta l_{z_t}^{eq}$ and the inflation differential in Serbia and the European Union $\pi_t - \pi_t^{EU}$ (together the backward-looking component).

Although the backward-looking component reflects to some extent the fact that monetary policy smoothes the exchange rate movements through interventions, varying the coefficient a_{γ_1} does not allow for capturing various degrees of exchange rate flexibility (Benes et al. 2008).

Following Benes et al. (2008) and Berg et al. (2009) we therefore modify the exchange rate expectation equations in the following way:

$$E_t l_{s_{t+1}} = l_{s_{t+1}} + \frac{1 - \gamma}{\gamma} \cdot [l_{s_{t-1}} + 1/4 \cdot (\pi_t - \pi_t^{EU} + \Delta l_{z_t}^{eq}) - l_{s_t}] \quad (A2)$$

The coefficient γ now represents an index of the exchange rate regime flexibility. For γ close to zero, the exchange rate will be fully backward-looking – that is, tightly managed. For γ close to unity the exchange rate expectations will be fully rational – that is, full exchange rate flexibility. As discussed by Benes et al. (2008) γ can also be chosen so as to replicate very closely the dynamics of the original model with A1.

We calculate the MVP euroisation levels implied by different degrees of the exchange rate flexibility by replacing the equation A1 by A2 in the NBS projection model and re-estimating the volatilities of the model structural shocks for different values of γ .

This procedure allows us to:

- a) gauge the actual degree of the exchange rate flexibility perceived by the agents in Serbia (assuming the observed euroisation levels are purely driven by perceived macroeconomic volatilities)
- b) assess the extent of possible de-euroisation that could occur as a result of strengthening the functioning of the flexible exchange rate IT regime and its credibility among the Serbian public.