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Abstract

We use unique survey data from Bulgaria's currency board to examine the reasons for persistent incomplete credibility of a financial stabilization regime. Although it produced remarkably positive effects in terms of sustained low inflation since 1997, the currency board has not achieved full credibility. This is not uncommon in other less-developed countries with fixed exchange rate regimes. Our results reveal that incomplete credibility is explained primarily by concerns about external economic shocks and the persistent high unemployment in the country. Past experiences with high inflation do not rank among the top reasons to expect financial instability in the future.

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I. Introduction.

Fixed exchange rate regimes often fail to achieve full credibility even after years of financial stability. If a country has a national currency in circulation, it has the option to devalue at some point in the future. Aware of that possibility, investors demand a premium on assets in local currency, which raises the cost of capital and leads to lower investment and lower economic growth, which may in turn contribute to the collapse of the fixed exchange rate regime. As Dornbusch (2001) points out, "it is sometimes argued that a stabilization failed because it was not credible." A number of factors may contribute to incomplete credibility. Financial instability may be a chronic problem and it may take a long time to convince agents that the current effort will be sustained. Negative economic shocks may generate new concerns. There could be doubts about the intentions of potential policymakers around election times. Although these and other factors are often brought up to explain incomplete credibility, direct evidence is difficult to obtain. This paper presents such evidence using unique survey data from Bulgaria.

Bulgaria introduced a currency board in 1997 after a severe financial crisis. Along with other reforms, the currency board contributed to a remarkable economic recovery and to restoring some confidence in the local currency, which had plummeted during the crisis. Yet, confidence in the local currency remains incomplete. Data from the Bulgarian National Bank (various years) show that about 60 percent of deposits in the banking system are in foreign currencies. During the 2000 to 2003 period, the average spread between interest rates on one-year local-currency bank deposits and euro deposits was 284 basis points.[1] Consistent with the currency risk premium on bank deposits, a sequence of four national surveys from 2000 to 2003 show that a non-negligible part of the population persistently believed that the currency board

[1] This situation is not unique to Bulgaria. According to Schmukler and Serven (2002), the spread between interest rates on peso and dollar bank deposits in Argentina, another country with a currency board until recently, averaged 211 basis points from 1993 to 2001. In June 2000, 63.3 percent of bank deposits in Argentina were in foreign currency, similar to previous years. In 2002 in Estonia, after ten years under a currency board system, the spread between 1 year time deposits in local currency and euro was 69 basis points. In Lithuania, another country with a currency board, the spread between 1 year local currency and dollar deposits was 115 basis points. Lithuania fixed its currency to the dollar in 1994.

would collapse with a sharp devaluation in the near future. Only about a fifth of the respondents believed that the likelihood of devaluation was zero. These percentages were fairly stable over time with no apparent trend of growth in confidence in the currency board after 2000.

There are a number of results in the paper, which identify various reasons for these expectations. In general terms, the surveys show that incomplete credibility is explained primarily by concerns about external economic shocks and by the perception that austerity under the currency board contributes to high unemployment. Past experiences with high inflation in Bulgaria did not rank among the top reasons to expect financial instability in the future. As we argue later in the paper, the weak effect of past instability on expectations is explained by the ongoing market reforms during that period. Overall, expectations of devaluation are evidently driven primarily by forward-looking considerations regarding economic growth and the ability of the economy to withstand external influences.

The results presented here complement earlier literature, which has used interest rate spreads and forward exchange rate contracts to study credibility. Rose and Svensson (1995), and Bekaert and Gray (1998) analyze the credibility of exchange rate target zones in the European Monetary System. Related to the analysis here are studies on currency board credibility in Argentina, Hong Kong, and Bulgaria by Schmukler and Serven (1992), Rzepkowski (2003), Carlson and Valev (2001), and Slavova (2003).

There are several advantages to using survey data. First, survey data can reveal concerns that cannot be detected using available financial data. Schmukler and Serven (2002) explain expected devaluation in Argentina by various economic and political shocks. They also find, however, that confidence in the peso remained incomplete even in periods of “tranquility”. The same is observed in Bulgaria. The survey data show that, as in Obstfeld (1997), expectations are affected by the possibility for future shocks even if shocks do not occur.

Second, the surveys allow us to test the effect of beliefs about the monetary regime on expectations. In Bulgaria, about a third of the population was aware that the currency board eliminates monetary discretion, prevents the central bank from making loans to the government, and requires large exchange rate reserves. Interestingly, agents who were familiar with those restrictions had lower confidence in the long-term sustainability of the currency board. The surveys also show that a third of the population believed that the currency board contributed to high unemployment in the country. These views were associated with lower credibility.

A third advantage of survey data in that context is that they reveal short-term and long-term credibility. When credibility is low, financial assets have short-term maturity, so interest rates or forward contracts cannot be used to measure longer-term expectations. This is the case in Bulgaria. The surveys ask about expected devaluation over a 6 month, 1 year, and a 5 years horizon. The results show lower credibility over longer horizons. Finally, the demographic data of the surveys make it possible to study heterogeneity in expectations in the population.

Household survey data on expectations have been used extensively in the literature. Mankiw, Reis, and Wolfers (2003) and Carroll (2003) are recent examples of analyses using the University of Michigan data on consumer inflation forecasts. Batchelor and Orr (1991) use UK consumer expectations data and Jonung and Laidler (1988) use Swedish survey data. Frankel and Flood (1987) and Kaminsky (1993) among others have used survey data on experts' expectations of the exchange rates of major currencies. The Bulgarian data used here are unique because the surveys target directly the question of credibility. The surveys ask respondents why they hold certain expectations after asking them to make a forecast. The next section provides a brief background on relevant economic developments in Bulgaria. We then present the survey data and empirical results in sections III through VI. Section VII concludes with final remarks.

II. Financial stabilization under the Bulgarian currency board.

According to Schwartz (1993) and Williamson (1995), a currency board is a fixed exchange rate regime similar to a gold standard regime. The authorities forego discretionary control over the money supply and replace it with an automatic mechanism that links money supply changes to the balance of payments. The amount of foreign exchange reserves that the currency board stands ready to exchange for domestic money is sufficient to cover the monetary base. The currency board has no responsibilities to react to unemployment or to finance the budget.[2] In Bulgaria these operating rules are written into the Law of the Bulgarian National Bank. The legal framework makes it difficult to change the rules of the monetary regime and also serves as an important "information device" (Ho, 2002) since the objectives and tools of

[2] See Miller (2002), Gulde (1999), and Nenovsky and Hristov (2002) for analyses of the Bulgarian currency board and Desquilbet and Nenovsky (2004) for differences between currency boards and gold standard regimes with respect to credibility. Desquilbet and Nenovsky (2004) argue that currency boards are often implemented as a stabilization tool after financial crises and can achieve credibility less successfully than gold standard regimes,

monetary operations are spelled out in black and white. Although the law can be changed, it deters ad hoc changes in policy. The legal framework is an important difference between currency boards and standard fixed exchange rate regimes.

The design of the Bulgarian currency board is not completely orthodox as described above. The central bank, which was preserved as an institution, can provide liquidity to the banking system and its balance sheet contains a large deposit by the government. Each of these features can lead to changes in money supply irrespective of changes in the level of foreign exchange reserves. Hanke (2002), Hanke and Sekerke (2003), and Nenovsky and Hristov (2002) show that, although they have generally not been deliberate efforts to conduct monetary policy, such changes have occurred over the last six years. This is not uncommon of currency boards or historical gold standard regimes as Desquilbet and Nenovsky (2004) point out. Nevertheless, one wonders whether confidence in the currency board is reduced because of its deviations from orthodoxy. We discuss this further later in the paper.

The currency board was introduced on July 1st 1997 after a financial crisis in late 1996 and early 1997. During the crisis, the exchange rate depreciated more than 25 times, many banks failed, and prices increased at a hyperinflation rate. The collapse of the currency and the banking system wiped out the savings of a large part of the population. The currency board faced the task of restoring confidence in the local currency from near zero levels as almost the entire economy was dollarized. At the core of the crisis was a slow process in market reform. For several years since the beginning of transition in 1990, loss-making state firms operated on soft budget constraints and managed to accumulate large debts to banks which were in turn implicitly guaranteed by the state. Restructuring and privatization were advancing at a very slow pace as Dobrinsky (2000) describes. By 1996, it started to become clear that the government lacked the resources to back the credit guarantees, and bank deposits began to leave the financial system. The process accelerated and by the end of 1996, the currency was depreciating rapidly, the central bank was extending large credits to keep banks afloat, and price increases escalated into hyperinflation in the first months of 1997.

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which, as they argue, have historically originated endogenously to facilitate exchange.

The introduction of the currency board was part of an overall effort to restructure the economy. The government which came to power in 1997 cut subsidies, closed down large numbers of loss-making state firms, and accelerated privatization. In 1998 alone, it privatized as many state firms as were privatized since the beginning of transition. The government also tightened welfare and unemployment benefits and sold off many banks. As a result, the private sector share of Bulgaria's GDP increased from 45 percent in 1996 to around 75 percent in 2002, which put Bulgaria in line with the private sector shares in advanced transition economies (EBRD, 2003). The currency board provided an incentive for those efforts because it prevented the use of money creation for debt financing. The government had to introduce harder budget constraints to ensure fiscal sustainability. The low inflation delivered by the currency board was also important in facilitating credit expansion in the economy and in encouraging investment. Inflation and other statistics about the performance of the Bulgarian economy are presented in Table 1.

With the introduction of the currency board, inflation declined and has remained low and output growth has increased. The hyperinflation in 1997 also helped reduce the domestic debt of the government. Interest payments on domestic debt declined from 17 percent of GDP in 1996 to 1.2 percent of GDP in 1998. Privatization generated revenues and contributed to growing foreign exchange reserves as much of it was done by selling firms to foreign companies. On those counts, the short-term outlook for the currency board looked very positive. In fact, the currency board and other reforms produced a remarkable turnaround in the economy from the early years of ad hoc transition. Internationally, the country was praised for rapid reforms and macroeconomic stability. For example, the Standard & Poor's sovereign credit rating for Bulgaria was raised from B in 1998 to BBB- in 2003.

There were several reasons for longer-term concerns. First, despite positive growth, unemployment remained high. It increased with the reforms and peaked at 19.5 percent in 2001 before declining in 2002 and 2003. By 2003 the unemployment rate had declined to 12.7 percent but remained high nonetheless. The prolonged stagnation put pressure on the government to engage in more activist policy. To some extent the discontent with policy was directed against the currency board as it was associated with restrictions on the governments' ability to increase spending or to lower taxes. Many people viewed the currency board as a constraint on the economy imposed by international institutions, namely the IMF. Second, Bulgaria had a large

and growing current account deficit, and large foreign debt of about 70 percent of GDP. In 2003, the current account deficit was 8.7 percent of GDP. Much of the capital that financed the current account deficits was in the form of foreign direct investment linked to privatization. With the end of privatization these inflows will decline, which can put pressure on the external balances of the country unless other funds are forthcoming, such as pre-accession assistance from the European Union or green-field investment. International developments may contribute to those pressures. The war in neighboring Yugoslavia, which cut trade routes to Western Europe, depressed exports substantially. The international financial crises in Russia, neighboring Turkey, and elsewhere in the late 1990's may have depressed both exports and the inflow of foreign capital. Bulgaria is a small and very open economy where exports equaled 53 percent of GDP in 2002 and external shocks have potentially strong effects.

The financial crisis that led to the introduction of the currency board was the third high inflation episode since transition began. The price liberalization in 1991 and the correction of an overvalued exchange rate in 1994 produced sharp increases in prices and the exchange rate. The prior episodes of high inflation are important because the surveys ask whether past inflation conditioned expectations of future instability. Research has used the idea that chronic instability creates expectations of "temporary stabilization" (Calvo, 1986). In the context of a transition economy, these experiences may weigh less on expectations to the extent that the root causes of earlier instability, i.e., slow reform, were a thing of the past. In addition, the experience has not been one of repeated failures of stabilization programs over several decades as in Latin America. Prices were stable under communism before 1990. Looking forward, Bulgaria is expected to join the European Union in 2007 and the European Monetary Union a few years thereafter, replacing the local currency with the euro. Thus, a neat exit from the currency board is foreseeable on the horizon. The next sections investigate the extent to which Bulgarians expect a less orderly exit from the currency board regime.

III. Presenting the survey data.

We use data from four national household surveys, which were conducted by a national polling organization in Bulgaria in August 2000, October 2001, June 2002, and August 2003. The sample of about 1000 respondents and its demographic structure are standard for national surveys taken in Bulgaria and are considered representative of the population of 8 million.[3] The surveys are part of a long-term project on the economic transition in Bulgaria and the level of confidence in its currency board. The surveys were conducted by personal interviews by certified professionals. The question of central interest in this paper is on confidence in the sustainability of the currency board. The surveys asked respondents the following question:

Question 1: *In your opinion, what is the likelihood that the currency board will collapse with a sharp devaluation of the local currency in the next 6 months/12 months/5 years?*

Respondents could choose an answer ranging from "very big" to "none", i.e., zero probability of devaluation, or choose to say that they could not provide an answer. Next, the surveys inquire about respondents' views on the effect of the currency board on economic activity and about their beliefs regarding currency board operations. In Question 2, the surveys ask whether respondents strongly agreed, agreed, disagreed, or strongly disagreed with the statement that the currency board contributes to high unemployment. We are interested in whether respondents who perceive a negative effect of the currency board on unemployment have less confidence in its sustainability. In Question 3, the surveys ask whether respondents strongly agreed, agreed, disagreed or strongly disagreed with each of the following three statements:

Statement 1: Under the currency board, the authorities cannot issue currency at their discretion.

Statement 2: Under the currency board, the executive branch of the government cannot borrow funds from the central bank.

Statement 3: Under the currency board, the leva (domestic money) in circulation have full coverage by the foreign exchange reserves of the central bank.

[3] The 2002 survey had fewer respondents (850) than the remaining three surveys. The survey questionnaires, the

The three statements are correct and describe the main features of the currency board: the elimination of monetary discretion, the separation of the government from the printing press, and the backing of local money using foreign exchange reserves, although, as we pointed out earlier, Statement 1 may not describe the currency board well in practice. There are two opposing effects, which determine the effect of such knowledge on credibility. On one hand, understanding the features of the monetary regime should raise credibility because the currency board limits the monetizing of budget deficits and ensures large reserves. On the other hand, as Irwin (2004) argues, a currency board may be abandoned in the presence of high and persistent unemployment. A policy that does not allow the government to react to negative economic shocks may be less sustainable than one which allows discretion. Our empirical tests later in the paper reveal which of the two beliefs has been stronger in Bulgaria. All surveys also ask about respondents' gender, education level, age, income, and which political party they vote for.

The 2003 survey included several additional questions on the currency board, which address even more directly the reasons for expected end of the currency board regime. First, the survey asked respondents the following question:

Question 4: *In your opinion, will Bulgaria have a currency board in the next 5 years?*

This question is broader than Question 1 on the possible collapse of the currency board; respondents might expect an end to the currency board without a crisis. The most likely cause of such a change would be entry into the European Monetary Union. The survey then inquired about the reasons for an end to the currency board regime if a respondent believed that the currency board will not be in place in 5 years:

Question 5: *In your opinion, what are the most important reasons why the currency board will not be in place in 5 years?*

Respondents could choose from the following list of answers:

A1*: External economic factors, which will have a negative effect on the Bulgarian economy*.

A2: *Pressure from international institutions.*

A3: *The current government intends to remove the currency board*.

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data, information on funding sources and on the implementation of the surveys are available from the authors.

A4: *The need to raise incomes in the country will make it necessary to remove the currency board*.

A5: *Financial instability is a chronic problem in Bulgaria and the currency board cannot remedy that problem*.

A6: *Within five years, the Bulgarian economy will be strong enough and will not need a currency board*.

A7: *Within five years, Bulgaria will enter the European Union and the economy will use the euro instead of the lev*.

A8. *Other. Specify*.

Respondents were given the opportunity to provide up to three answers. For example, a respondent could choose A4 in the first round, A2 in the second round, and A1 in the third round. The first round of answers represents the most important reasons provided by each respondent.[4] Answers A1 through A7 provide an opportunity to test several hypotheses. A1 captures the importance of negative external economic shocks. Bulgaria is a small open economy, which is strongly affected by external events. A2 is perhaps strange at first glance as the IMF and the European Union have consistently supported the currency board. The answer was included because policies in Bulgaria often change under the directive of international institutions; the idea is that if a major policy shift occurs, such as removing the currency board, it will likely be the result of influence from international institutions.

A3 captures uncertainty about the "type" of policymaker which is a frequent feature in models of monetary credibility, e.g., Backus and Driffill (1985). Expectations of devaluation may be higher for a respondent who does not believe that the policymaker is committed to the currency board. None of the major political parties in Bulgaria has advocated removing the currency board. Yet, political partisanship may fuel distrust of the current government, which

[4] A small pilot survey conducted before the national survey suggested that providing possible answers was superior to open-ended questions. Responses to open-ended questions were sometimes vague and difficult to classify into groups. Nevertheless, the answers from the pilot survey guided the design of the multiple choice answers to Question 5 in the national survey. The answer A8 (Other; Specify) was included to capture factors that were not included in A1-A7. Only 5 percent of respondents chose A8 which suggests that the alternatives provided in the question were sufficient to capture a wide range of views on the future of the currency board.

was different from the one that introduced the currency board in 1997. A4 reflects the view that the currency board constrains economic growth by requiring fiscal and monetary austerity. The need to raise incomes may call for looser policies. A5 examines the role of past inflation in forming expectations. A6 captures the idea that the currency board is made necessary by weaknesses in the economy. As reforms advance and the economy develops, the need for the currency board will dissipate. Finally, A7 refers to replacing the currency board with entry into the EMU and adopting the euro as official currency.

In the next section, we present summary statistics on expected devaluation (Questions 1), views on the currency board and unemployment (Question 2), and beliefs about its operations (Question 3) from the four surveys. Then, we use those questions along with demographics to study expectations in the four surveys. Following that we use Questions 4 and 5 from the 2003 survey to provide further analysis of why many people are dubious about the viability of the currency board.

IV. Expected devaluation and views on the currency board: summary statistics.

Expected devaluation.

A currency board is fully credible when there is little or no doubt that it will continue to exist. Table 2 shows respondents' expectations of devaluation in each of the four surveys. It is immediately clear that the currency board is not fully credible. In 2000, a substantial fraction of the respondents, 31.3 percent believed that the currency board was likely or very likely to collapse in the next six months. This percentage was higher over longer horizons: 36.4 percent for 12 months and 39.0 percent for 5 years. There was a corresponding decline in certainty about the sustainability of the currency board over longer periods; the percent of respondents who were certain that the currency board would be maintained was 20.6 for 6 months, 15.3 for 12 months, and 12.9 for 5 years.

In 2001, 2002, and 2003, the confidence in the currency board was somewhat higher compared to 2000. In those years, the percent of respondents who expected devaluation in six months was around 14 – 16 percent, half of the 2000 number (31.3). With a 5 year horizon, the percent of respondents who expected devaluation was around 27 - 30 percent, well below the 2000 number (39 percent). The higher expected devaluation in 2000 can be explained by

political uncertainty preceding the 2001 elections. The movement that won the elections was organized only a few months before. Its economic team was put together hastily and the economic plan was not presented until a month before the elections. The increase in credibility in the 2001 survey, which was done after the elections, reflects a resolution of the uncertainty about the commitment of the new government to keep the currency board. An alternative explanation for the increase in credibility could be a gradual upward trend in confidence in the currency board. However, that interpretation is not supported by the steady level of expectations in 2001, 2002, and 2003.

There is one more intriguing result in this relatively short time series. The 2002 survey was done a few months after the collapse of the Argentine currency board. Expectations at that time, in combination with expectations from the 2001 survey before the collapse, can be used to observe the effects of that event on the credibility of the currency board in Bulgaria. Aside from an increase in the percent of respondents who could not form a forecast on the currency board (15.1 percent in 2002 compared to 2.6 percent in 2001), which may reflect an increase in uncertainty, the distribution of responses was similar. Bulgarians apparently did not draw close parallels between the collapse of the Argentine currency board, which was well covered in the media, and the sustainability of the Bulgarian currency board.

The results from the surveys suggest that the perceived likelihood of devaluation has been stable for the last three years. This is consistent with the stable proportion of foreign to local money in savings portfolios. In light of the success of the currency board in holding down inflation, we may infer that long-term issues have persistent influences on credibility.

The currency board and high unemployment

Table 3 shows respondents' answers regarding the effect of the currency board on unemployment (Question 2). In 2000, 47.6 percent of respondents either agreed or strongly agreed that the currency board contributed to high unemployment. By 2003, that percent was cut in about half to 22.5 percent. Over time, fewer agents associated the currency board with high unemployment. The decline in the number of respondents who attributed high unemployment to the currency board was associated with an increase of the "I don't know" answers rather than with an increase in the "disagree" and "strongly disagree" answers. Bulgarians are apparently becoming increasingly uncertain about the reasons for high unemployment in the country or at least about the role of the currency board in the process. Furthermore, the declining

unemployment rate since 2001 may contribute to a decline in opposition to the currency board on these grounds.

Beliefs about the operations of the currency board

Table 4 reports agents' answers on the three statements regarding currency board operations. A fairly large proportion of the population believed that monetary discretion is not possible. In 2001, for example, 54.7 percent of agents either agreed or strongly agreed that discretionary money creation is not possible. The percent of informed answers was somewhat smaller on Statements 2 and 3, which is not surprising given that these statements refer to more technical features of the currency board. In 2001, 36.4 percent either agreed or strongly agreed that the executive branch cannot borrow funds from the central bank and 45.5 percent either agreed or strongly agreed that the amount of foreign exchange reserves is sufficient to cover all local currency in circulation. Overall, judging from the answers to the three statements, the evidence suggests that about 35 to 55 percent of the population has knowledge of the operations of the currency board.[5] It also appears that the deviations from the orthodox rules discussed in section 2 have not influenced the perceptions regarding the Bulgarian currency board. Few respondents believe that the government has discretion over the money supply. The media has very seldom discussed the deviations of the currency board from the theoretical rules because the deviations have not produced detectable negative effects on the economy so far.

Observe that the percent of "I don't know" answers has tended to increase over time. A few papers have endogenized the distribution of agents into naïve or sophisticated and have drawn conclusions about the steady state proportion of naïve agents. In Crettez and Michel (1992), all agents ultimately choose not to form rational expectations. In Sethi and Franke (1995), the steady state is characterized by the presence of both sophisticated and naïve agents. The data from Bulgaria show a mix of agents as in Sethi and Franke (1995) as well as a tendency for declining proportion of informed agents as in Crettez and Michel (1992). The gradual loss of interest in the operations of the currency board may be explained by the continued financial stability in Bulgaria.

[5] These numbers provide a benchmark estimate for numerical calibration exercises, which are based on models with a mix of sophisticated and naïve agents (for example, Akerlof and Yellen, 1985, Bomfim, 2001, and Carlson and Valev, 2002).

V. Explaining cross-sectional differences in expectations.

This section reports the estimation results of a probit model where expected devaluation is explained by respondents' views on the currency board and demographic characteristics. The dependent variable *Expected Devaluation* based on Question 1 ranges from 1 to 5 where 1 stands for high probability of devaluation and 5 stands for a zero probability of devaluation. We ignore the don't know responses. The models are estimated using six months and five years expectations from the four surveys and include the explanatory variables in the following equation: [6]

$$\begin{aligned} Expected\ Devaluation_i = {} & \alpha + \beta_1 Unemployment + \beta_2 Informed + \beta_3 High\ School + \\ & + \beta_4 Higher\ Education + \beta_5 Vote + \beta_6 Age + \beta_7 Female + u_i \end{aligned} \tag{1}$$

where *Unemployment* equals 1 if a respondent agreed or strongly agreed with the statement that the currency board contributes to high unemployment, 0 otherwise. The variable *Informed* was constructed in the following way. Three dummy variables were created equal to 1 if a respondent agreed or strongly agreed with the three statements on currency board operations, zero otherwise. The three variables were then combined into a first principal component called *Informed*. Thus, a higher value of *Informed* reflects better understanding of the rules of the currency board by a respondent. *High School* equals 1 if a respondent had high school education, 0 otherwise, and *Higher Education* equals 1 if a respondent had higher education, 0 otherwise. Political affiliation is measured by a dummy variable *Vote* which equals 1 if an agent votes for the Union of Democratic Forces (UDF), the party that introduced the currency board in 1997. The hypothesis is that political affiliation with UDF was associated with greater currency-board credibility. *Age* is measured in number of years and *Female* equals 1 for a female respondent, 0 for a male respondent.[7]

The results in Table 5 show that agents who believed that the currency board contributes to high unemployment consistently had lower confidence in its sustainability. This result holds

[6] The ordered probit produces maximum likelihood estimates of the coefficients on the right-hand side variables and four additional "cut-point" parameters. The estimated coefficients indicate whether a certain characteristic of respondents influences their perceived risk of devaluation upward or downward. These coefficients along with the cut-points (not reported for brevity but available on request) can be used to calculate the probability that an agent with particular characteristics would be in any one of the groups assigned by the values of the dependent variable.

[7] Using personal income, the number of observations decreased significantly as many respondents declined to give income data. As income did not come out statistically significant using the smaller sample, we opted to report equations which do not include income. The results using that sample are available on request.

for short and long-term horizons and for all surveys, except 2003 where the coefficients indicate the same effect but are not statistically significant at accepted significance levels. The 2001 and 2002 surveys reveal an intriguing effect of knowledge of the rules of the currency board on credibility. The negative and statistically significant coefficient on *Informed* using a five year forecasting horizon indicates that the restrictive rules of the currency board lowered long-term credibility in those two years.

Education also has an interesting effect. In 2000 and 2002 it has a negative effect on confidence in the currency board over the long-term. This suggests that more educated agents may be more aware of the various risks for the currency board over the longer term. The negative effect of education on credibility in the 2002 survey, which was completed after the crash of the Argentine currency board, may also indicate heightened concerns among the more educated agents who were probably more familiar with international developments. By 2003, the differences along education lines subsided. The political affiliation variable is positive and statistically significant in the 2000 survey, which was done before the 2001 elections. These were the first parliamentary elections since the introduction of the currency board in 1997 and economic policy proposals had not been formulated by various parties. By the 2001 elections, UDF had lost political support because of its inability to fight corruption and crime, and the high unemployment produced by market reforms. Once it became clear that none of the major political parties in Bulgaria advocated removing the currency board, the effect of politics died out and *Vote* was not statistically significant in later years. Overall, the results in Table 5 suggest that it is primarily high unemployment that generates a persistent concern about the viability of the currency board. Over time, with the decline in unemployment, these concerns may gradually dissipate, as the non-significant effect of *Unemployment* on expectations in the 2003 survey suggest. Next, we use Questions 4 and 5 from the 2003 survey to revisit some of the effects reported in this section and to identify additional factors for incomplete credibility.

VI. Reasons for expected end to the currency board in the 2003 survey.

We begin this section by reporting the distribution of answers to Question 5 on the various reasons for removing the currency board over the next 5 years. We then use multinomial logit model to investigate how these beliefs are related to personal characteristics of the respondents. The three columns in Table 6 represent first, second, and third round of choices. The number of respondents who answered that the currency board would not be in place in 5 years was 446. Almost all of these respondents (433) provided at least one justification for their forecast. The second and third rounds of answers had fewer respondents as some gave only one reason. The number one reason for removing the currency board was entry into the European Union. This was the answer of 27.0 percent of respondents in the first round. Of the less benign reasons for a perceived end to the currency board, three stand out: 1) the possibility of external economic shocks; 2) the need to raise incomes; and 3) pressure from international institutions. The second concern, i.e., the need to raise incomes in the country, supports our earlier results in section 5, which showed that agents who believed that the currency board contributed to high unemployment had lower confidence in its sustainability. Notice that chronic financial instability was the lowest ranked reason for expecting financial instability in the future in the first round of choices. However, it ranked higher in the second and third round of answers, suggesting what while not of utmost importance, prior instability is still a concern.

Overall the results suggest that the backward-looking component in expectations is less important compared to forward-looking concerns about the economy. This may be specific to the context of a transition economy where the reasons for prior instability rooted in delayed reforms are gradually resolved. Similarly to the results reported in Table 5, concerns about the economy, and particularly its ability to withstand external shocks, seem to be a primary reason for concern about the currency board.

Next we investigate the effect of personal characteristics on the choice of various answers to Question 5 by estimating a multinomial logit model where the dependent variable takes seven values for the seven possible answers on the first round. The marginal effects from this estimation are reported in Table 7. The interpretation of results is as follows. The 0.09 coefficient on high school education in the first column means that, controlling for other characteristics, the probability that a respondent with high school education chooses answer A1

(external shocks) is 9 percentage points higher compared to a respondent without high school education. The coefficients in each row of the table sum to zero to reflect the fact that a respondent could choose only one of the alternative answers. The results in Table 7 show that high-school education was associated with heightened concerns about negative external influences on the currency board reflected in a greater likelihood of choosing A1 (external shocks) and A2 (pressure from international organizations). The positive and statistically significant coefficient on Age in the first two columns of the table suggests that older agents share those same concerns. Because of more information for the more educated respondents or longer life experience for older respondents, those two groups are more likely to view Bulgaria as a small open economy vulnerable to external influences and shocks. Both older and more educated agents expressed less concern about the intentions of the current government. Notice also that older agents were less likely to bring up prior financial instability as a reason to expect future instability. A possible reason for this result is that older respondents have spent a longer part of their lives under financial stability during communism. Thus, life experiences over an extended period of time condition expectations about the success of current policies.

VII. Final remarks.

We use survey data from Bulgaria to examine whether expectations of devaluation persisted after that country achieved low inflation under a currency board system and to examine the various influences on these expectations. The data show that expected devaluation persists for a non-negligible part of the population. This fits observations from financial data that show a relatively small but persistent spread between interest rates on domestic currency and euro bank deposits. Although the currency board had a very positive effect on the economy and on regaining confidence in the local currency after the financial crisis in 1996-97, full credibility remains elusive. This is not uncommon in other countries, which have used fixed exchange rates to reduce inflation.

Theoretically, there are two main reasons for such persistent concerns. One is a history of high inflation in the past, which contributes to expectations of financial instability in the future. The other reason is the awareness that economic shocks may destabilize the economy and result in a financial crisis. Bulgarians have reasons to voice both concerns. Bulgaria is a small open

economy that is influenced strongly by international developments and, also, it has experienced high inflation since the start of transition. The surveys make it possible to weigh the relative importance of those concerns. The results suggest that forward-looking concerns about the economy are more important than the history of high inflation. This has two important implications. First, it explains why full confidence in a local currency is difficult to achieve. Complete confidence or close to compete confidence would require that the economy sustains rapid growth rates and that it can withstand external shocks, which is unreasonable to expect in an open, less-developed, economy. The second and perhaps more optimistic implication is that structural reforms can help increase confidence in a macroeconomic stabilization regime. Expected devaluation under the currency board in Bulgaria is not tied strongly to past inflation because the economy undergoes structural change as a result of market reforms. These reforms gradually eliminate the fundamental reasons for prior instability and therefore reduce concerns over renewed instability. In short, expectations respond to structural changes in the economic environment.

The persistence of incomplete credibility does not mean that the currency board is in any danger at this point or that policy changes must be implemented. The surveys reveal that expectations are stable over time, which lowers the risk of large swings in money demand. The persistence in concerns will mean that domestic currency credit will continue to carry a higher price compared to euro credit. If, as some authors have forecasted, the Bulgarian economy increasingly uses the euro as medium of exchange with increased integration with EMU countries, this economic cost will become less of a problem. There is also an orderly exit from the currency board on the near horizon with the approaching entry into the EMU. Unilateral adoption of the euro ahead of such entry would eliminate the risk premium on local currency assets but that policy raises a host of new economic and political issues, the potential cost of which is difficult to measure.

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Table 1
Macroeconomic developments, Bulgaria 1992–2003.

Year	CPI inflation (percentage change in the CPI)	Budget balance as percent of GDP (- deficit)	Percentage change in M2	Gross fixed capital formation as percent of GDP	Real GDP growth (percentage change)	Unemploy-ment rate	Current account as percent of GDP (- deficit)
1992	79.2	-2.9	53.7		-7.3	15.3	
1993	63.9	-8.7	54.5		-1.5	16.4	
1994	121.9	-3.9	76.8	9.3	1.8	12.8	-0.3
1995	32.9	-5.7	39.3	14.6	2.9	11.1	-0.2
1996	310.8	-10.4	117.8	8.9	-9.4	12.5	0.2
1997	578.6	-2.1	345.0	12.2	-5.6	13.7	4.1
1998	0.9	0.9	11.5	11.6	4.0	12.2	-0.5
1999	6.2	-0.9	11.8	15.9	2.3	16.0	-5.3
2000	11.4	-1.0	28.8	16.3	5.4	17.9	-5.6
2001	4.8	-0.9	26.1	19.9	4.0	19.5	-6.5
2002	4.4	-0.8	12.2	9.3	4.0	16.8	-4.4
2003	5.6	-0.7	18.4	18.0[a]	4.1[a]	12.7	-8.7

Sources: European Bank for Reconstruction and Development, *Transition Report*, various years; Bulgarian National Bank, *Annual Report*, various years, and data from the National Statistical Institute of Bulgaria.

[a] Based on the first six months of 2003.

Table 2
What is the likelihood that the currency board will collapse in the next 6 months,
12 months, or 5 years with a sharp devaluation of the local currency?
National surveys, Bulgaria, August 2000, October 2001, June 2002, and August 2003.
Percent of respondents by type of response.

	6 months horizon				12 months horizon				5 years horizon			
	2000	2001	2002	2003	2000	2001	2002	2003	2000	2001	2002	2003
Very big	12.3	5.5	4.6	3.5	12.4	4.7	6.7	3.8	13.3	7.4	9.9	8.9
Big	19.0	9.7	10.9	9.3	24.0	14.4	11.9	12.9	25.7	22.3	16.3	18.9
Small	29.7	28.3	28.5	31.1	28.7	31.6	29.9	31.5	30.4	29.3	27.6	25.7
Very small	13.5	23.2	14.2	17.1	15.2	24.6	15.5	17.0	12.0	20.4	11.6	13.9
None	20.6	30.7	26.7	26.6	15.3	21.7	20.5	21.8	12.9	16.8	17.7	18.2
I don’t know	4.8	2.6	15.1	12.4	4.5	3.0	15.5	13.0	5.7	3.8	16.9	14.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 3
The perceived effect of the Bulgarian currency board and unemployment.
National surveys, Bulgaria, August 2000, October 2001, June 2002, and August 2003.
Percent of respondents by type of response.

	Statement: The currency board contributes to high unemployment			
	2000	2001	2002	2003
Strongly agree	25.0	14.3	26.2	10.7
Agree	22.6	14.3	16.8	11.8
Disagree	19.7	20.6	6.4	14.9
Strongly disagree	9.2	21.6	6.9	20.8
I don’t know	23.5	29.2	43.8	41.7

Table 4
Knowledge about the operations of the Bulgarian currency board.
Survey data, August 2000, October 2001, June 2002, and August 2003.
Summary statistics.

	Statement 1 (monetary discretion)				Statement 2 (government debt)				Statement 3 (forex reserves)			
	2000	2001	2002	2003	2000	2001	2002	2003	2000	2001	2002	2003
Strongly agree	38.5	35.7	38.4	36.6	20.6	19.9	-	16.8	19.3	21.2	-	16.2
Agree	18.2	19.0	13.3	13.0	13.5	16.5	-	13.9	17.2	24.3	-	13.3
Disagree	8.8	6.5	8.1	3.2	10.5	8.1	-	5.2	12.2	6.4	-	3.8
Strongly disagree	4.8	4.9	1.9	4.0	4.6	5.7	-	6.8	7.2	5.1	-	6.1
I don't know	29.7	33.9	38.3	43.2	50.8	49.8	-	57.3	43.9	43.0	-	60.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Notes: The numbers of the table are percent of the total by type of response.
Statement 1: Under the currency board, the authorities cannot issue currency at their discretion.
Statement 2: Under the currency board, the government cannot borrow funds from the central bank.
Statement 3: Under the currency board, the leva (domestic money) in circulation have full coverage by the foreign exchange reserves of the central bank.

Table 5
Perceived risk of devaluation, views on the currency board and respondent demographics.
Dependent variable ranges from 1 (high probability of devaluation) to 5 (zero probability of devaluation)
over the next 6 months or 5 years.

	2000 survey		2001 survey		2002 survey		2003 survey	
	6 months	5 years	6 months	5 years	6 months	5 years	6 months	5 years
Unemployment	-0.26*** (0.06)	-0.26*** (0.07)	-0.42*** (0.07)	-0.29*** (0.07)	-0.30*** (0.08)	-0.20** (0.09)	-0.11 (0.08)	-0.12 (0.08)
Informed	-0.006 (0.05)	0.04 (0.05)	0.13** (0.05)	-0.12** (0.05)	-0.02 (0.09)	-0.28*** (0.09)	-0.01 (0.05)	-0.05 (0.04)
High school education	-0.12 (0.09)	-0.22** (0.09)	0.003 (0.09)	0.13 (0.09)	-0.13 (0.09)	-0.19** (0.09)	0.04 (0.09)	-0.10 (0.09)
Higher education	-0.07 (0.11)	-0.30*** (0.11)	0.18* (0.11)	0.11 (0.11)	-0.07 (0.11)	-0.28** (0.11)	0.20* (0.11)	0.02 (0.11)
Female	-0.03 (0.06)	0.05 (0.07)	-0.07 (0.07)	0.09 (0.07)	0.10 (0.08)	0.11 (0.08)	-0.08 (0.07)	-0.09 (0.07)
Age	0.002 (0.002)	0.001 (0.002)	-0.001 (0.002)	-0.002 (0.002)	0.003 (0.002)	0.006** (0.002)	0.001 (0.002)	0.001 (0.002)
Voting for UDF	0.27*** (0.09)	0.36*** (0.09)	-0.11 (0.10)	0.02 (0.11)	-0.07 (0.13)	0.04 (0.13)	-0.16 (0.12)	-0.06 (0.12)
LR chi2(7)	29.99	39.77	41.55	34.06	21.74	43.95	8.77	19.85
Number of observation	951	943	962	949	707	694	846	828

Notes: Ordered probit. Standard errors in parentheses. ***(**,*) significant at the 1(5, 10) percent level.

Table 6
What, in your opinion, are the most important reasons why Bulgaria will not have a currency board in 5 years?
National survey, Bulgaria, August 2003.
Percent of respondents by type of response.

	First round of answers	Second round of answers	Third round of answers
External economic factors, which will have a negative effect on the Bulgarian economy	19.6	6.1	8.3
Pressure from international institutions	17.3	17.3	8.3
The current government intends to remove the currency board	8.6	13.3	6.3
The need to raise incomes in the country	13.2	20.5	18.2
Financial instability is a chronic problem in Bulgaria and the currency board cannot remedy that	6.5	10.8	15.3
Within five years, the Bulgarian economy will be strong enough and will not need a currency board	7.9	10.8	12.5
Within five years, Bulgaria will enter the European Union and the lev will be replaced by the euro	27.0	21.2	31.3
Number of responses	433	278	144

Notes: The question about why the currency board will not be in pace in five years was asked after the following question: " In your opinion, will Bulgaria have a currency board in five years" to which respondents could answer "it will" (382 respondents), "it will not" (446 respondents) or "I don't know" (152 respondents) .

Survey respondents were asked to provide three answers choosing from the list of reasons above. The percentages in the first column show the distribution of first round of answers, the second column the distribution of the second round of answers., and the third column the distribution of the third round of answers.

Table 7
Demographic characteristics and reasons to expect an end to the currency board n Bulgaria.
Marginal effects form a multinomial logit model.
National survey, Bulgaria, August 2003.

	External shocks	Pressure form international organizations	Intention of the current government	The need to raise incomes	Chronic financial instability	Improving economy	EMU entry
High school education	0.09* (0.04)	0.09* (0.05)	-0.09*** (0.03)	-0.02 (0.04)	-0.03 (0.03)	0.01 (0.03)	-0.04 (0.05)
Higher education	-0.05 (0.05)	0.07 (0.06)	-0.02 (0.03)	0.07 (0.05)	-0.01 (0.02)	0.02 (0.04)	-0.07 (0.06)
Age	0.003*** (0.001)	0.002** (0.001)	-0.001* (0.0007)	0.001 (0.001)	-0.001** (0.0006)	-0.001 (0.001)	-0.001 (0.001)
Female	-0.05 (0.04)	0.01 (0.03)	0.02 (0.02)	0.06* (0.03)	0.01 (0.02)	-0.03 (0.02)	-0.03 (0.04)
Log Likelihood Number of obs.	45.33 424						

Notes: Standard errors in parentheses. ***(**,*) significant at the 1(5, 10) percent level.

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