Credibility of a New Monetary Regime: The Currency Board in Bulgaria

by John A. Carlson and Neven T. Valev*

Purdue University and Georgia State University

Abstract

Low credibility, reflected in persistent expectations of high inflation, is the usual suspect in costly disinflation efforts. A currency board is a monetary regime that attempts to establish credibility by reducing uncertainty regarding the inflation preferences of the policymaker and the environment in which the policymaker operates. This paper uses unique survey data from Bulgaria and finds that expected inflation is indeed lowered by the prospect of a currency board but to a different degree for different agents. Priors of the “type” of the policymaker and familiarity with the operation of the currency board contribute to explaining the differences.

Key Words: Currency board, Bulgaria, Disinflation, Credibility

JEL Classification: E65; E58

*Corresponding author: Neven T. Valev, Department of Economics, Georgia State University, Atlanta, GA 30303. Email: nvalev@gsu.edu; Fax: 404-651-4985; Telephone: 404-651-0418.

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1. Introduction.

A stylized fact of exchange-rate-based stabilization programs is the slow decline in inflation from moderate to low levels.\(^1\) The usual explanation is that the new monetary regime is not fully credible and therefore expectations of devaluation and high inflation persist. Lack of credibility is attributed to two factors. First, agents are uncertain of the true intentions (“type”) of the policy-maker (Barro and Gordon, 1983; Backus and Driffill, 1985a, 1985b). Second, even if the type of policymaker is not in doubt, an environment may arise where the policymaker has no choice but to abandon the policy (Drazen and Masson, 1994; Obstfeld, 1997). With rational expectations, addressing those factors should provide credibility and therefore immediate convergence of expected inflation. A currency board is a strong effort in that direction.

Orthodox currency boards are institutions that replace central banks and, through full convertibility and sufficient foreign exchange reserves, ensure that domestic currency can be purchased on demand at a fixed exchange rate.\(^2\) The level of the peg can be altered only at a high political cost. An orthodox currency board has no responsibilities

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\(^1\) Studies of exchange-rate-based stabilization have revealed a number of stylized facts such as rapid convergence of inflation from high to moderate levels but slow convergence from moderate to low levels. See Sargent (1982), Bruno (1993), Calvo and Vegh (1994a, b), Calvo (1986), Fischer (1986), Pazos (1972), Roldos (1995).

regarding the provision of liquidity to the banking system, financing the budget deficit or reacting to unemployment.

In other words, to reduce uncertainty as to the preferences of the policy-maker, a currency board regime removes discretion over monetary policy. To address the second factor for low credibility, sufficient foreign exchange reserves, political consensus and international support are secured to ensure that the currency board will remain in place for the foreseeable future.

As reported by Ghosh, et al. (1998), currency boards indeed deliver low long-term inflation. However, as evidenced by the recent experiences with the currency boards in Argentina, Estonia, and Lithuania, the convergence of inflation to lower levels has not been immediate. Clearly, some questions arise. Are currency boards successful in bringing down inflationary expectations on impact? If not, can we identify factors for slow convergence in expectations?

These and related questions are addressed using survey data on expected inflation from Bulgaria. The data are unique since the survey was conducted in the last days before a currency board was introduced in that country.

The results reveal that the mere introduction of the currency board was not sufficient to bring expected inflation to low levels. That evidence supports Roberts’ (1997) notion of “not-quite-rational-expectations.” However, despite the high level of expected inflation at the time the currency board was introduced, inflation in Bulgaria declined rapidly without a noticeable slowdown in economic activity during the first year. It therefore appears that learning about the new environment took place quite rapidly. That is similar to the US experience with the establishment of the Federal
Our results also suggest that there is heterogeneity between agents in the formation of their expectations. In particular, some agents appear to form more informed ("more rational") expectations than others and confidence in the effectiveness of the new policy is related to political affiliation. In this sense our results offer support for recent macroeconomic models that assume heterogeneity.\(^3\)

The rest of the paper is structured as follows. Section 2 describes the situation in Bulgaria when a currency board was introduced in 1997. Section 3 provides information about the survey taken just prior to the introduction of the currency board, and section 4 develops empirical hypotheses. Section 5 presents the results, and section 6 concludes.

2. **The introduction of the currency board in Bulgaria.**

Bulgaria is one of the transition countries in Southeast Europe. As in most countries in the former East bloc, the process has had ups and downs. The most dramatic crisis came in late 1996 and the first half of 1997 when the local currency depreciated by close to 3000 percent and price increases touched hyperinflation levels. Several major banks failed. In reaction to these developments, IMF suggestions for a currency board first started to appear in the media in late 1996. The political opposition to the then current government embraced the notion. With the acceleration of price increases and further devaluation, public unrest and mass acts of civil disobedience grew to a point where the government stepped down and new parliamentary elections were held. The

\(^3\) Haltiwanger and Waldman (1989) develop a model that highlights some macroeconomic implications of such heterogeneity; Sethi and Franke (1995) and Crettez and Michel (1992) endogenize the decision of agents to form rational versus adaptive expectations.
opposition which formed the new government in late Spring introduced the currency board on July 1st, 1997. Financial stabilization, along with structural reform, was a major issue on the agenda.

In the last few months before July 1st, a considerable debate about the nature of a currency board and whether it is appropriate in Bulgaria occupied the media. The opinions were very politicized and conflicting. Nevertheless, the amount of information appeared sufficient for a person with some knowledge of how the economy works to understand what a currency board is, in what ways it constrains the government, and what it implies about inflation and the exchange rate. Argentina and Estonia, two countries with recent currency boards were often discussed in the media. Argentina started its currency board on April 1, 1991, and monthly inflation fell to around 2 percent per month in the course of the first year. Estonia introduced its currency board on June 20, 1992, and its inflation rate fell from 23.8 to 1.1 percent per month in the first year.

There were some concerns regarding the currency board. First, the local currency was fixed to the German mark even though a major part of Bulgarian trade, such as oil and natural gas, is in US dollars. It was also the dollar to which savers ran during the financial crisis. The country however is a candidate to join the European Union and that aspiration seemed to dominate the choice. Second, the level of the peg, 1000 lev = 1 German mark, was considered inappropriate by some influential analysts including research economists at the central bank. They argued that the lev should be fixed at a more devalued level. Third, it was broadly discussed that the currency board might impose significant strain on the banking system, which had just undergone a major crisis and was considered vulnerable. Fourth, much uncertainty remained regarding
privatization and structural reforms in general. Many expressed the view that the real reason for the financial crisis lay in this arena. Fifth, the Bulgarian currency board, like those in Argentina, Lithuania and Hong Kong, is not Orthodox by design. In Bulgaria the central bank as an institution did not cease to exist. In fact, the balance sheet of the currency board is part of an expanded balance sheet of the central bank, which also includes items such as lender of last resort facility and deposits of the government.\(^4\) Therefore, monetary discretion is limited rather than eliminated.

Average monthly inflation for the year leading to the introduction of the currency board was 40 percent. Monthly inflation had reached hyperinflation levels in February four months before the currency board was introduced but was in single digits in the two months before July 1, 1997.

There were clearly many factors that would make a confident forecast of inflation difficult. Yet the currency board was supposed to deliver low expected inflation immediately. Was it successful? Did agents who understand better what is a currency board expect lower inflation? Did the currency board alleviate concerns about who controls monetary policy? Such questions prompted the survey that is described in the next section.

\(^4\) The presence of government deposits on the expanded balance sheet of the central bank adds the very peculiar feature that increases in government spending automatically lead to increases in the money supply. It was decided that the government would operate its finances through the central bank because at the introduction of the currency board there was no other bank in the country that was considered stable enough. See Bulgarian National Bank (1997).
3. Description of the survey.

A national polling organization conducted a survey in Bulgaria during the last two weeks of June 1997 immediately before the introduction of a currency board on July 1st. By mid June, the fixed level of the exchange rate and the members of the currency board were announced. The survey (with 1022 respondents) is considered representative for the country. Two of the questions from the survey relate to expected inflation. In the first, each respondent was asked about her/his expectation of the average monthly inflation over the following year if a currency board is introduced and, in the second, about her/his expectation of the average monthly inflation over the following year if a currency board were not introduced. Monthly rather than annual rates of inflation were chosen because at that time, after a period of high and unstable inflation, price movements were generally discussed and quoted in the media in terms of monthly rather than yearly changes.

Two other questions aimed to determine general attitudes toward the currency board. The first asked: “Do you expect that the currency board will be beneficial for the banking system?” The question is interesting because for many people the crisis was caused by lax supervision of the banking system. In this sense, many people identified the currency crisis with a banking crisis and viewed the currency board as a system designed to prevent future banking problems. Such views are in contrast with an orthodox currency board, which has little control of the banking system. The answer to the above question is not clear-cut, however, because the currency board was introduced along with major reforms in banks and, in addition, the currency board in Bulgaria does not have a fully orthodox design.
The second question asked: “Do you think that the fixed exchange rate can be preserved if a currency board is not introduced but the central bank is given full independence from the government and a single clear objective: to preserve the internal and external stability of the currency?” In other words, does the currency board bring more credibility to maintain exchange-rate stability than a well-defined independent central bank would have?

Our study is unique in the sense that it captures a very specific moment. First, the introduction of a currency board is an event with very low frequency. Second, the survey was carried out immediately before the introduction of the currency board but after the legislation and all parameters of the board were publicly announced. In that sense, there was no uncertainty about the level at which the nominal exchange rate was to be fixed or about the members of the board.

Respondents also indicated their age, education level, gender, and political attitudes. Income data were provided by too few respondents to be usable in the estimations.

4. **Empirical hypotheses.**

In this section we discuss factors that may contribute to differences in expected inflation across agents.

Previous literature suggests that some agents form more informed (rational) expectations and others form less informed (adaptive) expectation. The level of education is a variable that may convincingly proxy for such differences across agents. More educated agents have greater contact with the media where discussions of the currency board took place, and they occupy positions which offer them better resources to form
more-informed expectations. Therefore, we predict that more educated agents (those who form more rational forecasts) will expect lower inflation than those who have less education (those who form more adaptive forecasts).

Would all informed agents expect the same level of inflation with a currency board? In principle, they should. An Orthodox currency board eliminates discretion over monetary policy and, therefore, beliefs about the “type” of the policymaker become irrelevant. However, the Bulgarian currency board is not Orthodox and allows some discretion. In addition, the currency board may be abandoned if a policymaker perceives a high benefit from abandoning the regime relative to the potential cost of higher inflation. Therefore, beliefs about the “type” of the policymaker (whether policymakers are sincere in their disinflation rhetoric) may be of significance. A good indicator for such differential beliefs across respondents is their political affiliation. Do they vote for the party in office? In other words, within the group of more informed agents, political supporters of the government can be predicted to expect lower inflation than the political opponents of the government.

A similar argument applies to the less informed agents as well. Given the dramatic events and the hot electoral debate just a few months before the survey, even the less-informed people were likely to be aware that a currency board may have an impact. However, since they are not well-versed in the technical operation of that regime, political attitudes would likely play a role. Among the less informed, supporters of the government would be more inclined to believe that the new regime will deliver lower inflation and will thus expect lower inflation compared to the political opponents of the government.
To summarize our hypotheses, let $\pi_{RS}$ denote the expectation of those who form more-rational expectations and politically support the government; $\pi_{NS}$ the expectations of those who form more naïve expectations and support the government; $\pi_{RO}$ those who form more rational expectations and oppose the government; and $\pi_{NO}$ those who form more naïve expectations and oppose the government. Given that a currency board is introduced we predict:

$$\pi_{NO} > \pi_{RO} > \pi_{RS} \text{ and } \pi_{NO} > \pi_{NS} > \pi_{RS}$$

(1)

In other words, the lowest expected inflation will be exhibited in the group of respondents who have more education and politically support the government. Those who oppose the government and are also not well-versed in currency boards would expect the highest inflation compared to all other groups. The “rational opponents” and the “naïve supporters” will fall in-between in terms of expected inflation. How those two groups rank relative to each other is uncertain, \textit{a priori}.

If a currency board is not introduced, the policies that lead to high inflation continue. Therefore, those who form more-informed expectations have no reason to expect lower inflation than those who form more adaptive expectations. An interesting question is whether political affiliation would play a role. To a large extent, the answer depends on the announced objectives of the government. If there is no reason to believe that the government will pursue a disinflation policy in the absence of a currency board, then political affiliation is unlikely to influence expected inflation.
5. Results.

5.1 Expected inflation.

Table 1 shows mean and median expected inflation with and without a currency board for the overall sample and for subsamples defined by education, political affiliation, gender and age. Average expected monthly inflation with a currency board is 25 percent, and without a currency board, 50 percent. Note however that median expected inflation is 10 percent if a currency board is introduced and 25 percent if it is not. Because of the positive skewness of the answers, the median may be a better measure of central tendency. Clearly, the introduction of a currency board is consistent with lower expected inflation but does not by itself lower expectations to desired levels (the inflation of the German mark). Note also that the coefficient of variation of expected inflation is quite large, indicating a substantial disagreement among respondents. Such disagreement has often been used in the literature to measure subjective uncertainty.  

Table 1 also reports the mean and the median of expected inflation in subsamples. Again, the mean may not be an appropriate measure for differences in expected inflation because of different skewness across subsamples. Less obviously, differences in medians across subsamples may not serve that purpose well either. The reason is that most answers are clustered around certain numbers with fairly large jumps between different answers. Hence the median values of two subsamples could differ greatly while the difference results from just a few observations. Similarly, two subsample medians could be the same despite significant differences in the distribution of answers.

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5 Batchelor and Dua (1996) provide a list of papers that have used disagreement as a proxy for uncertainty in macroeconomics.
To resolve the problem, we take the following path. First, we divide the overall samples (with and without a currency board) into high and low expected inflation groups relative to the respective median.\textsuperscript{6} Second, we test if there is a significant difference in the proportion of political supporters or more educated agents across the two groups. The results are reported in Table 2.1 for expected inflation with a currency board and in Table 2.2 for expected inflation without a currency board.

In Table 2.1 we find that more educated agents and political supporters of the government represent a significantly greater proportion in the group of agents with lower inflation expectations than in the group with higher inflation expectations given that a currency board is introduced. Gender and age do not appear to be associated with high or low expected inflation. In Table 2.2, if a currency board is not introduced, none of the variables have significantly different representations in the two groups. The lack of effect of political affiliation on expected inflation if a currency board is not introduced coupled with the significant effect with a currency board suggests that the credibility of the government to reduce inflation is related to a specific policy, in this case the introduction of a currency board.

Approximately 30 percent of the respondents did not provide a forecast. With few exceptions, they provided either both forecasts, with and without a currency board, or none at all. It is likely that the selection process is not random and that respondents self-selected on the basis of observable factors. Hence, estimation of the joint effect of political affiliation and education may produce biased results.

\textsuperscript{6} In the overall sample, for expected inflation both with and without a currency board, the median expected inflation separates the sample at points which are natural cuts in the data.
We employ Heckman’s (1979) procedure to correct for self-selection bias. It involves the maximum likelihood estimation of a participation equation which explains the decision to provide a forecast and a regression equation relating expected inflation to education and political affiliation. The procedure produces consistent and asymptotically efficient estimates by taking into account the correlation of the error terms in the two equations. The estimations were performed using different definitions of the dependent variable: the actual point estimates; a dummy variable that equals 1 if expected inflation is above the median and 0 otherwise; and a constructed variable which equals 1 if the point estimate is less than 10, 2 if 10-19, … 12 if >109. The purpose is to provide robustness checks for the possible effect of skewness and outliers. The results using the three definitions of the dependent variable are qualitatively similar. In Table 3 we report the estimates using the second definition.

The results in the lower part of Table 3 indicate that those with more education were more likely to provide an answer and that women and older respondents were less likely to give an answer. These results coupled with actual response patterns give rise to significant selection bias for expected inflation with a currency board, reflected in the value for $\lambda$ reported in the top part of Table 3.\(^7\)

Also in the top part of Table 3, the significant negative coefficients on both education and political affiliation given that a currency board is introduced support the hypothesis that they have separate and distinct influences on expected inflation, as

\(^7\) For information on the procedure see Heckman (1979), Greene (1991), and Stata Corporation (1997).
implied by the inequalities in (1). The magnitudes of the effects of education and political affiliation are very similar. Understanding the operation of the currency board may have contributed as much to lowering expected inflation as beliefs about the intentions of the policymaker to follow through on its announced policy.

If a currency board is not introduced, education and political affiliation are not significant in explaining differences in expected inflation among agents. That result is particularly interesting with regards to political affiliation because it suggests that perceptions of the type of policymaker were conditional on the introduction of the currency board.

Finally, note that the overall explanatory power of the equation is relatively weak. Such noise may indicate a high degree of subjective uncertainty associated with the point estimates of respondents.

5.2 The effect of the currency board on the banking system.

The survey also asks respondents about the likely effect of the currency board on the domestic banking system. As we discussed in section 3, many people associated the currency crisis with banking problems. Therefore, for them a stabilization policy would make a difference only if it addresses problems in the banking system.

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8 A significant value for $\lambda = \rho \sigma$, where $\sigma$ is the estimated standard error of the residuals of the regression equation and $\rho$ is the estimated correlation of the residuals from the participation and the regression equations, indicates evidence of self-selection bias.

9 We estimated specifications including age and gender in the regression equation and did not find evidence of significant relationships between these variables and expected inflation. On average women reported lower expected inflation than men but this did not show up after correcting for selection bias in a multiple regression specification.
Fifty-six percent of the respondents provided an answer different from “uncertain.” More educated, male, younger respondents and political supporters of the government were more likely to give an opinion. Of those who provided an answer, the large majority, 84 percent believe that a currency board will help solve problems in the banking system. Controlling for selection bias, those who support the government were more likely to believe that the currency board would have a beneficial effect on banks. Education, however, does not have an identifiable effect. The lack of explanatory power for education is understandable given the clearly unpredictable effect on the banking system of a non-orthodox currency board coupled with reforms in bank supervision.

5.3. *Currency board versus an independent central bank.*

A fourth question in the survey asks if the fixed exchange rate will be preserved if instead of introducing a currency board, the central bank is given full independence of the government and a well-defined objective to preserve the stability of the domestic currency.

Less than half (47 percent) of the respondents provided an answer. That is to be expected given the complexity of the question and the potential ambiguities (what does independence mean, for example). Of those who answered, 60 percent said that unless a currency board is introduced the peg would not be maintained. The remaining 40 percent however answered that an independent central bank would do the job. After correcting for selection bias, we could not attribute differences in opinion to any of the respondents’ characteristics.10

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10 The empirical estimations reported in sections 5.2 and 5.3 are available from the authors upon request.
6. **Discussion and conclusion.**

We use data from a survey conducted in Bulgaria immediately before the introduction of a currency board in that country to examine influences on expected inflation. Agents do hold different expectations and these differences can be partially attributed to factors that proxy for the degree to which agents are informed of the workings of monetary policy as well as to their prior belief in the low inflation preferences of the government. Therefore low expected inflation at the introduction of a new monetary regime is a function of rationality as well as beliefs about the “type” of the policymaker.

The results are interesting in one additional aspect. Despite the very high average expected inflation across agents at the time the currency board was introduced in Bulgaria, actual inflation declined very rapidly, from around 3 to around 1 percent per month within the first four months, without a detectable cost in terms of slowdown in economic activity in the first year. In fact, in 1998 output grew by close to 4 percent, the highest growth rate since transition. That may be viewed as a rebound from the economic collapse a year earlier but it indicates that agents did not take actions that would have made their expectations of high inflation reality. A possible reason is that despite high mean expected inflation, most agents were aware that the monetary environment would change. To the extent that the outcome of that change was uncertain agents took a wait-and-see approach.

A follow-up survey 10 months later, when inflation had stabilized at around 10 percent annually, reveals that expectations were very much in line with the new
environment of low inflation.\textsuperscript{11} Expectations had responded to the decline in actual inflation. Interestingly, at that time, education played no role in explaining differences in expected inflation across agents.

As we pointed out in section 2, the design of the Bulgarian currency board is not orthodox. As a result, changes in the monetary base have not followed closely the balance of payments over time. If understood by the public, the peculiar features of the currency board are bound to raise concerns. Hence the central bank, which had made significant efforts to advertise and explain the currency board at the time it was introduced, started instead to refer to its track record with low inflation, once inflation had declined.

Recently, the possibility for activist policy became an issue when the government announced a program for a ten percent \textit{nominal} growth rate. The program was a response to the rising rate of unemployment since 1998, and the goal was to be achieved by a fiscal boost. The unspecified real and inflation components of that 10 percent nominal growth suggested to the public that the government may have an implied inflation objective and therefore changes in the money stock are not completely beyond its control. The media was saturated with sharp objections and the notion of a nominal income target was soon abandoned.

\textsuperscript{11} See Carlson and Valev (2000).
References


Carlson, John and Neven Valev, 2000, Sources of dispersion in inflation forecasts, Working paper.


Table 1
Summary statistics of expected inflation.
Survey results. June 1997, Bulgaria

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Coeff. of Variation (a)</th>
<th>Observations</th>
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</thead>
<tbody>
<tr>
<td>Whole Sample</td>
<td></td>
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<tr>
<td>Inflation with currency board</td>
<td>24.96</td>
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<td>1.75</td>
<td>691</td>
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<td>25</td>
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<td>10</td>
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<td>25</td>
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<td>Less education</td>
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<tr>
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<tr>
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<td>28.1</td>
<td>15</td>
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<tr>
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<tr>
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<td>53.7</td>
<td>30</td>
<td>1.49</td>
<td>441</td>
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</table>

Note: Each respondent was asked to provide a forecast of the average monthly inflation rate over the following year conditional on introducing or not introducing a currency board. Education: more educated if respondent has high school or higher education. Political affiliation: supporter if today would vote for the party currently in office. Age older if respondent is more than 50 years old.
Table 2.1
Agents are divided into two groups -- with high and with low inflation expectations relative to the median given that a currency board is introduced. The table gives the proportion of political supporters, educated, female and older agents in the two groups.

<table>
<thead>
<tr>
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<th>Agents with lower than the median expected inflation</th>
<th>Agents with higher than the median expected inflation</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(1) - (2)</td>
<td></td>
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<tr>
<td>Proportion of more educated respondents</td>
<td>.71</td>
<td>.62</td>
<td>.09**</td>
</tr>
<tr>
<td>Proportion of supporters of the government</td>
<td>.55</td>
<td>.42</td>
<td>.13**</td>
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<tr>
<td>Proportion of female respondents</td>
<td>.49</td>
<td>.49</td>
<td>.00</td>
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<tr>
<td>Proportion of older respondents</td>
<td>.37</td>
<td>.37</td>
<td>.00</td>
</tr>
</tbody>
</table>

Note: Education: more educated if respondent has high school or higher education. Political affiliation: supporter if today would vote for the party currently in office. Age: older if respondent is more than 50 years old. **(*) indicates significance at the 1(5) percent level.

Table 2.2
Agents are divided into two groups -- with high and with low inflation expectations relative to the median given that a currency board is not introduced. The table gives the proportion of political supporters, educated, female and older agents in the two groups.

<table>
<thead>
<tr>
<th></th>
<th>Agents with higher than the median expected inflation</th>
<th>Agents with lower than the median expected inflation</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(1) - (2)</td>
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<tr>
<td>Proportion of more educated agents</td>
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<td>-.01</td>
</tr>
<tr>
<td>Proportion of supporters of the government</td>
<td>.51</td>
<td>.46</td>
<td>.05</td>
</tr>
<tr>
<td>Proportion of female respondents</td>
<td>.48</td>
<td>.49</td>
<td>-.01</td>
</tr>
<tr>
<td>Proportion of older respondents</td>
<td>.39</td>
<td>.35</td>
<td>.04</td>
</tr>
</tbody>
</table>

Note: Education: more educated if respondent has high school or higher education. Political affiliation: supporter if today would vote for the party currently in office. Age: older if respondent is more than 50 years old. **(*) indicates significance at the 1(5) percent level.
Table 3
The effect of political affiliation and education on expected inflation.
Survey data. June 1997, Bulgaria

<table>
<thead>
<tr>
<th></th>
<th>If a currency board is introduced</th>
<th>If a currency board is not introduced</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Education</strong></td>
<td>-0.10** (0.04)</td>
<td>-0.006 (0.05)</td>
</tr>
<tr>
<td><strong>Political affiliation</strong></td>
<td>-0.12*** (0.04)</td>
<td>-0.06 (0.04)</td>
</tr>
<tr>
<td><strong>Constant</strong></td>
<td>0.73 (0.06)</td>
<td>0.59 (0.08)</td>
</tr>
<tr>
<td><strong>λ</strong></td>
<td>-0.21** (0.08)</td>
<td>-0.14 (0.11)</td>
</tr>
</tbody>
</table>

Participation equation
Dependent variable: 1 if respondent provided an answer, 0 otherwise

| **Education**            | 0.17* (0.09)                     | 0.31** (0.09)                        |
| **Political affiliation**| 0.13 (0.08)                      | 0.06 (0.08)                          |
| **Gender**               | -0.15* (0.08)                    | -0.20** (0.08)                       |
| **Age**                  | -0.29** (0.09)                   | -0.25** (0.09)                       |
| **Constant**             | 0.50 (0.10)                      | 0.49 (0.10)                          |

Model Chi2(7)  Number of observations
31.22  1022
42.41  1022

Note: MLE. Mill’s ratio estimates used as starting values. Standard errors in parentheses. ***, ** indicates significance at the 1(5, 10) percent level. Expected inflation: = 1 if greater than median, 0 otherwise. Education: 1 if respondent has high school or higher education. Political affiliation: 1 if today would vote for the party currently in office. Gender: 1 if female. Age: 1 if respondent is more than 50 years old.