

Public knowledge of monetary regimes: Evidence from the currency board in Bulgaria

Neven T. Valev
Georgia State University

Abstract

Survey data from Bulgaria reveal that about one third of the population has knowledge on the operations of the currency board in that country. That heterogeneity in information is largely associated with differences in education.

JEL Classification: D8; E42.

Keywords: Information heterogeneity; Rational expectations; Currency boards; Bulgaria.

I would like to thank Valentin Zjechev from Fact AD for providing the data. I would also like to acknowledge the financial support of the National Science Foundation grant SEC 0234664. Address: Assistant Professor, Department of Economics, Andrew Young School of Policy Studies, University Plaza, Atlanta, GA 30303-3084. Telephone: 404-651-0418, fax: 404-651-4985, e-mail: nvalev@gsu.edu.

Public knowledge of monetary regimes: Evidence from the currency board in Bulgaria

1. Introduction

This letter uses survey data from Bulgaria to determine how widespread is public knowledge of the operations of the currency board regime in that country. Such evidence is useful for two reasons. First, it provides empirical support for theoretical models which assume heterogeneity among economic agents in terms of knowledge of the structural model of the economy. In Evans and Ramey (1992), Akerlof and Yellen (1985), Haltiwanger and Waldman (1989), Bomfim (2001), and Carlson and Valev (2002), a proportion of all agents are knowledgeable and form more informed (rational) expectations while the rest form less informed (e.g. adaptive) expectations. The heterogeneity has important implications for steady states and for transitional dynamics. The data from Bulgaria offer evidence on such heterogeneity and a benchmark estimate for the proportion of sophisticated agents. Second, the survey data make it possible to test whether information heterogeneity can be explained by demographic characteristics such as income and education that proxy for the cost of becoming informed and the potential cost of making forecast errors.

2. Survey data.

The data were obtained from three national surveys conducted by a national polling organization in Bulgaria in August 2000, October 2001, and June 2002. The number of respondents, 1000, and the demographic structure of the sample are considered representative for the population of 8 million. The surveys were done by personal

interviews. The surveys inquired about agents' knowledge of the currency board by asking whether they 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.

A currency board is a fixed exchange rate regime that operates like a gold standard regime. The local currency is fully convertible and the central bank holds sufficient reserves to cover the monetary base. The currency board has no discretionary monetary powers and cannot finance the state budget. In short, the three statements above are correct.

Bulgaria introduced a currency board on July 1st, 1997 to combat high inflation. Inflation declined very rapidly to single digit levels within one year and has remained low since then. The rules of the currency board are designed to credibly peg the exchange rate and to remove the possibility for inflationary finance, which was used heavily in the past. Therefore, agents who are aware of the restrictions imposed by the currency board on the monetary authorities should generally expect low long-term inflation. Those agents may view spikes in inflation as temporary. For the remaining agents, price level shocks may translate into higher longer-term expected inflation. The mix of informed and uninformed agents may thus lead to the persistence in inflation discussed in the theoretical literature.

3. Knowledge of the operations of the currency board.

Table 1 reports agents' answers on the three statements regarding currency board operations. A fairly large proportion of the population understood that monetary discretion is not possible. In 2001, 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. 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).

One of the advantages of a currency board for credible disinflation in countries with chronic high inflation is its transparency. The central bank does not engage in decision making. This removes uncertainty over the goals and methods of monetary policy. It is therefore likely that, all else equal, knowledge of a currency board is more easily accessible to the public compared to monetary regimes with more intricate nature such as a central bank with inflation and unemployment objectives. With that in mind, the estimate of 0.35 to 0.55 for the proportion of sophisticated agents is probably on the high side for economies with discretionary monetary policies.

Comparing answers over time, observe that the percentage distribution of respondents in each answer category is fairly stable. A few papers have endogenized the distribution of agents into naïve and sophisticated drawing conclusions on the steady state proportion of naïve agents. In Crettez and Michel (1992), all agents ultimately choose to not form rational expectations. In Sethi and Franke (1985), the steady state is characterized by the presence of both sophisticated and naïve agents. The data from Bulgaria lend support to Sethi and Franke (1995).

4. Cross sectional differences in information

This section studies the cross-sectional distribution of answers on the three statements. As the results are similar using data from the three years, the paper proceeds with the 2001 survey. Agents with higher income may find it more advantageous to invest in information as forecast errors are more costly. Agents with more education may find it less costly to acquire information. Agents in the capital, where most of the government institutions, including the central bank, are located may find it easier to obtain information.

To examine these propositions, we estimate a probit model where the likelihood that a respondent agrees or strongly agrees with a statement is explained by education, income, gender, age, and place of residence.¹ Education is measured by two variables: *High School* which equals 1 if a respondent has high school education (53 percent of the sample), and zero otherwise; and *Higher Education*, which equals 1 if a respondent has university education (24 percent of the sample), and zero otherwise. The left out group

¹ Alternatively, one could consider three groups with “correct”, “incorrect” and “I don’t know” answers. However, the results are very similar because the number of agents who disagreed or strongly disagreed with the statements was relatively small.

are agents who have less than high school education (23 percent of the sample). The model includes income and age as well as income and age squared to test for non-linear relationships.²

The results reported in Table 2 show that agents with more education have greater knowledge on the currency board. The coefficient estimates can be interpreted as follows. The coefficient 0.3200 on *High School* in column (1) means that the probability of an informed answer on Statement 1 is 32.00 percentage points higher for an agent with high school education compared to an agent with less than high school education. The coefficient 0.4316 on *Higher Education* means that the probability of an informed answer is 43.16 percentage points higher for an agent with a university degree compared to someone with less than high school education and 11.16 percentage points higher compared to someone with high school education. The difference between the coefficients on *High School* and *Higher Education* is statistically significant. Knowledge on the currency board increases with each additional level of education. Similar effects hold for Statements 2 and 3.

Surprisingly income does not play a role. A possible explanation is that agents did not truthfully report their incomes in the survey.³ Age has an interesting effect. The size of the positive and statistically significant coefficient on the linear term (0.0262) along with the size of the negative and statistically significant coefficient on the squared term

² Average monthly income in the sample is 114 leva which equals about 60 USD. Many agents reported zero income. Average age is 46 years. Female respondents are 51 percent of the sample and residents of the capital are 14 percent of the sample.

³ Dropping the squared term on income from the models produces a positive and marginally statistically significant (at the 5 percent level) effect on the income variable. The size of the effect is very small. For example, a ten percent increase in income is associated with a 1 percentage point increase in the probability of agree or strongly agree answer on Statement 1.

(-0.0003) suggest that knowledge of the currency board increases with age until about 45 years of age (Statement 1) and then starts to decline. The younger and the older segments of the population are less informed compared to the middle-aged. These two groups probably have a greater proportion of agents out of the labor force (retired and students) with less incentive to follow economic developments. Finally, residents of the capital and male agents were more informed on some of the statements.

Overall, education seems to be the most important factor for the heterogeneity in information. Although direct parallels cannot be made, it is interesting to note that according to the U.S. Census Bureau, 25.6 percent of the U.S. population held a higher education degree and 15.9 percent had less than high school education in year 2000, which is similar to the distribution of education in Bulgaria. The evidence presented here suggests that unless the distribution of education changes substantially toward even more education, there is likely to be a non-negligible segment of society who find it too costly to acquire information about monetary policies.

References:

Akerlof, George and Janet Yellen (1985). "Can Small Deviations from Rationality Make Significant Differences to Economic Equilibria?" *American Economic Review*, 75(4), 708-720.

Bomfim, Anulio (2001). "Heterogeneous Forecasts and Aggregate Dynamics." *Journal of Monetary Economics*, 47, 145-161.

Carlson, John and Neven Valev (2002). "A Disinflation Tradeoff: Speed versus Final Destination." *Economic Inquiry*, 40(3), 450-457.

Crettez, B. and Philippe Michel (1992). "Economically Rational Expectations Equilibrium." *Economics Letters*, 40, 203-206.

Evans, George and Garey Ramey (1992). "Expectations Calculation and Macroeconomic Dynamics." *American Economic Review*, 82(1), 207-224.

Haltiwanger, J. and Michael Waldman (1989). "Limited Rationality and Strategic Complements: The Implications for Macroeconomics." *Quarterly Journal of Economics*, 104(3), 463-483.

Sethi, R. and Reiner Franke (1995). "Behavioral Heterogeneity Under Evolutionary Pressure: Macroeconomic Implications of Costly Optimization." *The Economic Journal*, 105(430), 583-600.

Table 1
 Knowledge about the operations of the Bulgarian currency board.
 Survey data, August 2000, October 2001, and June 2002.
 Summary statistics.

	Statement 1 (monetary discretion)			Statement 2 (government debt)			Statement 3 (forex reserves)		
	2000	2001	2002	2000	2001	2002	2000	2001	2002
Strongly agree	38.5	35.7	38.4	20.6	19.9	-	19.3	21.2	-
Agree	18.2	19.0	13.3	13.5	16.5	-	17.2	24.3	-
Disagree	8.8	6.5	8.1	10.5	8.1	-	12.2	6.4	-
Strongly disagree	4.8	4.9	1.9	4.6	5.7	-	7.2	5.1	-
I don't know	29.7	33.9	38.3	50.8	49.8	-	43.9	43.0	-
Total	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 2
 Knowledge about the operations of the Bulgarian currency board.
 Survey data, October 2001.
 Probit analysis.

	Dependent variable: 1 if an agent agrees or strongly agrees with a statement, 0 otherwise.		
	Statement 1 (monetary discr.)	Statement 2 (government debt)	Statement 3 (forex reserves)
	(1)	(2)	(3)
High School (1 if high school education, 0 otherwise)	0.3200*** (0.0421)	0.1994*** (0.0422)	0.1721*** (0.0434)
Higher Education (1 if more than high school, 0 otherwise)	0.4316*** (0.0368)	0.3094*** (0.0541)	0.3223*** (0.0535)
Income (in hundreds of national currency units)	0.0018 (0.0490)	-0.0207 (0.0411)	0.0204 (0.0416)
Income squared	0.0001 (0.001)	0.0001 (0.0001)	0.0001 (0.0001)
Age	0.0262*** (0.0062)	0.0077 (0.0057)	0.0125** (0.0059)
Age squared	-0.0003*** (0.0001)	-0.0001 (0.0001)	-0.0001** (0.0001)
Gender (1 if female, 0 otherwise)	-0.0211 (0.0345)	-0.0586* (0.0316)	-0.1028*** (0.0322)
Capital (1 if resident of the capital, 0 otherwise)	0.0942* (0.0507)	0.0115 (0.0466)	0.1012** (0.0499)
Pseudo R ²	0.134	0.053	0.077
Number of observations	987	987	987

Notes: Probit Procedure. The reported coefficients are marginal effects and can be interpreted as a direct influence on the probability of providing an “agree” or “strongly agree” answer evaluated at the mean of the independent variable. In the case of dummy variables used as independent variables, the reported coefficient estimate equals the probability of an “agree” or “strongly agree” answer if that dummy variable is one minus that probability if it is zero. Standard errors in parentheses. ***(**,*) indicates statistical significance at the 1(5, 10) percent level.

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.