Bank Loan Officers' Expectations for Credit Standards: evidence from the European Bank Lending Survey

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Abstract

We employ credit standards data from the Bank Lending Survey, covering 14 EU countries for the period 2003Q1-2016Q1. By linking consecutive surveys and utilizing loan officers' responses regarding actual and expected credit standards, we set out to investigate which expectations formation mechanism best describes loan officers' expectations. According to our findings, bank loan officers' expectations are compatible with the Adaptive Expectations mechanism.

Keywords: Survey-based Expectations; Adaptive Expectations; Credit Standards; Bank Lending Survey.

JEL classification: C33, C53, D84.

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1. Introduction

Monetary Authorities assess banking sector conditions in order to design and implement appropriate policies, not only by relying on 'hard' statistics, but also by complementing them with 'soft' information that reflects supply and demand conditions. For instance, a typical 'soft' information set is provided by the Bank Lending Survey (BLS hereafter) for the euro area, whose integral part are the responses of bank loan officers regarding the future trajectory of loan credit standards (CS hereafter) set by their banks. However, the usefulness of these responses crucially depends on the ability of bank loan officers to 'correctly' predict the further path of bank credit standards.

This is exactly the aim of our analysis. In particular, we will exploit survey responses from consecutive surveys in order to investigate how bank loan officers' expectations of future credit standards perform when confronted with realized outcomes. Essentially, in any given BLS issue bank loan officers are asked to respond on the previous period's credit standards as well as the expected ones. Thus, by linking consecutive survey responses we explore whether loan officers' expectations are formed rationally, and if deviations from rationality exist, we investigate whether they comply with well-known expectations' formation mechanisms.

Muth (1961) was the first who introduced the idea of Rational Expectation Hypothesis (REH hereafter), which has not always been met with empirical success. For instance, Chow (1989, 2011) supported that Adaptive Expectations are better than rational expectations.

An important disadvantage of testing the REH empirically is the fact that the expectation errors are usually formed through ex-post observed data. That is the reason why the recent increasing literature on the mechanisms that form the expectations tests the REH employing survey

data (Pesaran and Weale, 2006; Drakos, 2008 and Miah, Saifur, and Khalid, 2016). The main benefit of using survey data is that by definition correspond to expectations that the respondents stated.

2. Data Issues

For CS we utilize data from the BLS, which is conducted every quarter by the ECB and is a survey-based database containing information about the financing conditions in the Euro-area. ECB dispatches a questionnaire to senior bank loan officers of about 140 Euro-area banks in order to provide information concerning their current and planned decisions. Below we provide the relevant questions from BLS:

Question Q1*: Over the past three months, how have your bank's credit standards as applied to the approval of loans or credit lines to enterprises changed? Please note that we are asking about the change in credit standards, rather than about their level.*

Answer:

- *Tightened considerably*
- *Tightened somewhat*
- *Remained basically unchanged*
- *Eased somewhat*
- *Eased considerably*

Source: Bank Lending Survey Questionnaire, Section 1: Loans or credit lines to enterprises, question Q1.

Question Q8*: Please indicate how you expect your bank's credit standards as applied to the approval of loans or credit lines to enterprises to change over the next three months. Please note that we are asking about the change in credit standards, rather than about their level.*

Answer:

- *Tightened considerably*
- *Tightened somewhat*
- *Remained basically unchanged*
- *Eased somewhat*
- *Eased considerably*

Source: Bank Lending Survey Questionnaire, Section 1: Loans or credit lines to enterprises, question Q8.

We collected quarterly data for CS for the period 2003Q1-2016Q1 for 14 Euro-area countries broken down to SME and Large enterprises. This produces a panel dataset of 558 observations, consisting of quarterly country-firm size dimensions.

The data for CS are expressed as a *diffusion index*[1] and not as the raw responses of the bank loan officers. In table 1 we report the averages of each CS for each country respectively.

*******Insert table 1 here*******

The scatterplot of figure 1 offers a pictorial representation of the expected vs actual *diffusion index*.

*******Insert figure 1 here *******

[1] For a detailed definition of Diffusion Index see the Glossary of the Bank Lending Survey of ECB.

3. Empirical Methodology and Results

3.1 Methodology

We start our analysis by testing the REH, according to which agents are trying to use the past period's information set in an optimal way in order to forecast the future. Following Drakos (2008), we examine the REH by employing the following model:

$$CS_{i,t}^{A} = \beta_0 + \beta_1 CS_{i,t-1}^{E} + u_{i,t} \quad (1)$$

Where *i, t, A,* and *E,* denote country-firm size, time, Actual CS, and Expected CS respectively. The one period lag at the left-hand side of the equation denotes the expectation formed prior to the actual. The associated joint hypotheses test for the above model is:

$$\text{Ho: } \beta_0 = 0,\ \beta_1 = 1$$

Rejecting these hypotheses would imply that REH is not consistent with the data.

According to the Adaptive Expectation formation mechanism, agents modify their expectations in each period depending on the last period's expectation error. It has to be noted that if we had a zero-forecasting error (i.e. a perfect past period's forecast) then this would imply that the previous forecast-expectation would be preserved continually (Lovel, 1986).

The adaptive expectations model can be written as:

$$\Delta CS_{i,t-1}^{E} = \delta\left(CS_{i,t-2}^{E} - CS_{i,t-1}^{A}\right) + u_{i,t} \quad (2)$$

Where δ is the coefficient of adaptation because it shows the pace of adjustment to previous period's expectation-forecasting error. According to Drakos (2008), in order to accept the Adaptive Expectations hypothesis, the only restriction that should hold is that the coefficient of adaptations has to lie in the interval (-1,0).

The Regressive Expectations model suggests that agents modify their expectations with respect to the last period's deviation from the mean of the variable of interest (CS in our study). Namely, agents believe that the under-examination variable will have a tendency to move towards its mean (Drakos 2008). According to Pesaran and Weale (2006), Drakos (2008) and Dave (2011), Regressive Expectations are specified as follows:

$$\Delta CS^{E}_{i,t-1} = \lambda\left(\tilde{g} - CS^{A}_{i,t}\right) + u_{i,t} \quad (3)$$

Where, Δ denotes first differences, $\tilde{g}$ is the sample mean of Actual and λ is an adjustment parameter.

The only restriction that has to be satisfied, in order to accept the Regressive Expectations Hypothesis, is that parameter λ has to be positive and lie in the (0, 1) interval. Furthermore, we examined if the parameter λ (that is the speed of adjustment, (a) is different from zero and thus significant, and (b) is different from its maximum theoretical value (i.e. +1 for Regressive Expectations). Particularly, we tested the following hypotheses:

(a) H_0: $\lambda = 0$

(b) H_0: $\lambda = 1$

3.2 Results

Given the panel structure of the dataset, all models were estimated by Fixed Effects (Wooldridge, 2010). All relevant estimation results and hypotheses tests are presented in Table 2. Starting with the results for REH, we reject the null hypothesis that the coefficient is equal to 1. So, despite the fact that parameter β_1 is significant, the REH is not consistent with our data.

Moving to the adaptive expectations model, we tested whether the parameter δ (a) is different from zero and (b) is different from its maximum theoretical value (i.e. -1 for Adaptive Expectations):

(a) H_0: $\delta = 0$

(b) H_0: $\delta = -1$

According to the estimated probability values, both tests are emphatically rejected, implying that the speed of adjustment δ is statistically significant (namely non-trivial) and different from its maximum theoretical value -1.

The (absolute value) of the point estimate of the adaptation parameter (δ) suggests an adaptation rate of about 56.5 %. In other words, 1.769 periods are needed, on average, in order to cover the distance between the Actual and Expected CS.

The parameter δ carries a negative sign, implying that if bank loan officers had underestimated (overestimated) the actual CS in the previous period, then they will adjust upwards (downwards) their expectations for the current period. Hence, we document that Adaptive Expectations are consistent with our data.

Regarding the Regressive Expectations, we found that the model is trivial and the estimated coefficient found to be negative. Consequently, the Regressive Expectations Hypothesis is not confirmed in our case. With respect to the estimated probability values, only the second hypothesis found to be clearly rejected, implying that λ is different from its maximum theoretical value 1. Also, the speed of adjustment λ found to be trivial, since the probability value of the corresponding test found to be 0.106.

*******Insert table 2 here*******

4. Conclusions

Employing survey data from the BLS we investigated the performance of various competing expectations formation models for bank loan officers' expectations of credit standards in the Eurozone. Our findings support the Adaptive Expectations model as the best description of the data.

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Tables

Table 1: Mean values of CS by Country		
Diffusion Indices		
Countries	$\mathbf{CS^{A}_{i,t}}$	$\mathbf{CS^{E}_{i,t-1}}$
Austria	8.653	6.653
Belgium	-0.283	-0.245
Cyprus	11.169	7.830
Estonia	9.867	6.113
Germany	5.301	3.716
Greece	14.962	10.094
Ireland	6.018	4.867
Italy	11.735	11.358
Latvia	6.850	-0.650
Lithuania	13.805	14.361
Luxembourg	15.071	10.607
Portugal	-1.250	-1.250
Slovenia	-2.500	-2.500
Spain	9.754	8.000
Total	8.947	6.763
Notes: $CS^{A}_{i,t}$ and $CS^{E}_{i,t-1}$ stand for Actual and Expected CS respectively.		

Table 2: Estimation results for each mechanism of Expectations Formation			
	Model 1 Rational	**Model 2 Adaptive**	**Model 3 Regressive**
$\boldsymbol{\beta_1}$	0.862*** (0.0354)	-	-
$\boldsymbol{\delta}$	-	-0.565*** (0.0483)	-
$\boldsymbol{\lambda}$	-	-	-0.041 (0.0241)
Constant	2.636*** (0.248)	-1.376*** (0.0805)	-0.424*** (0.00651)
Diagnostics			
Observations	558		
R^2	0.524	0.338	0.004
F-test (p-value)	0.000	0.000	0.106
Hypothesis Testing (probability values)			
H_0: $\beta_1 = 0$	0.000	-	-
H_0: $\beta_1 = 1$	0.001	-	-
H_0: $\lambda = 0$	-	-	0.106
H_0: $\delta = 0$	-	0.000	-
H_0: $\lambda = +1$	-	-	0.000
H_0: $\delta = -1$	-	0.000	-

Notes: (a) *, **, *** denote statistical significance at the 10, 5, and 1 percent level respectively, (b) numbers in parentheses denote cluster robust standard errors. (c) β_1, δ and λ are the estimated parameters for Rational, Adaptive and Regressive expectations respectively.

Figures

Table 1: Scatterplot of Actual vs Expected CS