Understanding de-anchoring of inflation expectations. Evidence from Chile

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Abstract

Anchoring of inflation expectations is an important factor for central banks to reach an inflation target and, indeed, several scholars have studied the extent to which they are anchored in different economies. Some of them discuss the impact of structural factors, such as the adoption of inflation targeting and central bank transparency, and others if short-term economic news affect long-term inflation expectations. The present paper, on the other hand, applies Chilean survey data to investigate determinants of de-anchored expectations.

Two complementary exercises are conducted with panel estimations. The first one aims at finding idiosyncratic and common shocks that may explain de-anchored expectations. It turns out that different factors explain negative and positive de-anchoring. Particularly, the central bank's published forecasts affect the positively de-anchored ones, while expectations to the future monetary police seem to affects those below the target. The second exercise consists of four illustrative estimations, which are conditional on whether inflation expectations were anchored or not the previous period. The output gap and food prices may trigger a de-anchoring and positively de-anchored expectations may be re-anchored by surprise changes in the policy rate and a negative change in the business sentiment. The results suggest that the central bank may have some effect on reducing de-anchored long-term inflation expectations, while increasing them seems to be more difficult. Hence, when evaluating policy options and communication, a higher weight should be appointed to the risk of negative de-anchoring compared to the positive one.

Keywords: (De-)Anchoring, individual survey responses, inflation expectations.
JEL: C33, E31, E52, E58.

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1. Introduction

The economic agents' expectations play an important role in the monetary transmission mechanism[1] and, particularly, the anchoring of the inflation expectations is fundamental for inflation targeting central banks.[2] A commonly applied definition of anchored inflation expectations is that they are unaffected by short-term economic news[3] and a growing literature is dedicated to document whether inflation expectations are anchored or not. On the other hand, few studies focus on possible determinants of already de-anchored expectation, even though for the conduct of a forward looking monetary policy it is crucial to have some knowledge of the triggering factors and how to bring them back to the target. The present study investigates which factors are influential on de-anchored inflation expectations at the horizon of the inflation target in Chile. This objective is achieved by analyzing the individual answers of the Economic Expectation survey (EES), which is conducted monthly by the Central Bank of Chile (CBC). With panel estimations it is analyzed which factors are important for the de-anchored inflation expectations and the results suggest that negative and positive de-anchoring, i.e. long-term expectations below and above the inflation target, are affected by different variables. Those that include the projections of the central bank only seem to impact positive de-anchoring, while the future path of the monetary policy rate affects negatively de-anchored ones. Analyses that condition on whether expectations were anchored or not the previous period, indicate that surprises in the CBC´s interest rate may re-anchor positively de-anchored expectations, while little can be concluded about what could re-anchored negatively de-anchored ones.

With a growing number of central banks adopting inflation targeting, the literature that analyzes the extent to which inflation expectations are anchored has grown substantially. While some studies suggest that inflation expectations are better anchored in economies that have adopted inflation targeting (e.g. Johnson (2002, 2003), Levin et al. (2004), Gürkaynak et al. (2010), and Davis (2014)), others do not support this evidence (e.g. Castelnuovo et al.

[1] See e.g. Woordford (2003).
[2] Anderson and Maule (2014) argue that well-anchored inflation expectations in the UK are important for the achievement of the inflation target.
[3] See e.g. Bernanke (2007).

(2003), Pierdzioch and Rülke (2013), and Kumar et al. (2015)).[4] Ehrmann (2015) finds that inflation expectations in inflation targeting economies are not well anchored when inflation is persistently low, while Beechey et al. (2011) argue that long-run inflation expectations are reasonably well anchored in the euro area and the United States, more so in the euro area according to Autrup and Grother (2014).[5] In the case of Chile, Gürkaynak et al. (2007) argue that the adoption of the inflation targeting has helped to anchor expectations, De Pooter et al. (2014) that they have been better anchored during the last decade, and Medel (2018) that agents' survey-based expectations are firmly anchored. This may to some extent be because of increased transparency in line with the evidence supplied by van der Cruijsen and Demertzis (2007) and Ascari et al. (2017).[6] While these studies point to some structural factors that affect the extent to which inflation expectations are anchored and how economic variables affect long-run inflation expectations, the one in hand is different as it examines, firstly, what variables affect expectations that are de-anchored and, secondly, which news make agents distrust (or trust) that the central bank will reach its target. In this sense, the objective is to explain the formation of de-anchoring behavior and, thus, investigating which factors explain changes in private forecasters' long-run inflation expectations, when they diverge from the inflation target.

The next section briefly outlines the theoretical setup and presents the data employed. The third section presents the empirical analysis and the final one the conclusions.

2. Theoretical framework and data

The following subsection discusses the theoretical framework, on which the empirical analysis is based, and then the employed data are described.

[4] Łyziak and Paloviita (2017) provide evidence that the role of the target for anchoring inflation expectations in the euro area has diminished, while the central bank´s projections have become more important.
[5] With respect to the US, Dräger and Lamla (2013) find that long-run inflation expectations have become more anchored over time, while Nautz and Strohsal (2015) argue that they have not been re-anchored after the crisis. Pargenhardt et al. (2015) and Fracasso and Probo (2017) find that the inflation expectations in the euro area have been de-anchored in the most recent period.
[6] Brito et al. (2018) argue that disagreement of inflation expectations has reduced due to increased central bank transparency.

2.1 Theoretical setup

To illustrate the theoretical framework, it is assumed that the expectation of the economic agent *j* to the inflation rate (π) at time *T* (the horizon for the monetary policy) initially is equal to the inflation target (π^*), i.e.

$$E_{j0}\left(\pi_T \middle| I_{j0}\right) = \pi^*, \tag{1}$$

where I_{jt} is agent *j*'s information set at time *t*. The expectations can diverge from π^* because of idiosyncratic or common shocks, which are denoted by e_{jt} and e_t, respectively. The impacts of the shocks on the expected inflation are represented by the functions $f_{jt}(\cdot)$ and $g_{jt}(\cdot)$. Finally, the agent´s expectations to the impact of (expected) future monetary policy actions are $h_{jt}(m_{jt}, m_{jt+1},\ldots,m_{jT-1})$. Hence, at time *t*, the expectation to the inflation rate at the monetary policy horizon is:[7]

$$E_{jt}\left(\pi_T \middle| I_{jt}\right) = \pi^* + f_{jt}(e_{jt}) + g_{jt}(e_t) + h_{jt}\left(m_{jt}, m_{jt+1}, \ldots, m_{jT-1}\right). \tag{2}$$

Inflation expectations are anchored only if $f_{jt}(e_{jt}) + g_{jt}(e_t) = -h_{jt}\left(m_{jt}, m_{jt+1}, \ldots, m_{jT-1}\right)$. If this is not the case, then the agent does not believe that the future actions of the central bank will be sufficient to reach the inflation target given the perceived impact of the observed shocks. This de-anchoring can be caused by either a misbelieve that the central bank will do whatever is necessary to reach its target (credibility) or a disagreement about the impacts of the shocks and / or the future policy actions (difference of opinion).

2.2 Data

Possible de-anchoring is measured by the two-years-ahead inflation expectation in the Chilean EES.[8] The question in the survey is formulated as 23 months ahead, which corresponds to two years ahead with respect to the last known monthly inflation rate. This horizon is in accordance with the target of the CBC, which in Central Bank of Chile (2007, p. 17) is formulated as:

[7] In Beechey et al. (2011)´s extension of the imperfect knowledge model with recursive learning of Orphanides and Williams (2004, 2007), the agents´ estimate of the central bank´s inflation objective is affected by supply shocks and exogenous ones that add to variation in inflation.

[8] A description of the survey (in Spanish) is supplied by Pedersen (2010), which also describes the timing of the survey. For this last issue, see also Pedersen (2015).

The practical purpose or operating objective behind monetary policy is to keep projected inflation around 3% annually over a policy horizon of about two years. The policy horizon is the maximum period during which the Central Bank normally attempts to take inflation back to 3%.

The observations consist of individual responses during the period September 2001 (the first survey) to December 2017, i.e. $T = 196$. The data base consist of $N = 208$ institutions,[9] but not all of them have participated in the survey for the entire period and not all of the included ones reply to each survey.[10] The unbalanced panel consists of a total of 6,666 observations.[11] Figure 1 shows the minimum and maximum of the replies each month as well as the median, which is the measure published by the CBC. As the median has few deviations from the inflation target, knowledge of possible determinants of de-anchoring has to be obtained from the micro observations. As shown in figure 1, there are some extreme deviations, and it cannot be discarded that some of them are due to measurement errors. To limit the possible effects of these observations, robustness analyses are made with a sample that only includes answers between 2% and 4%.[12]

[9] Since the issue investigated is inflation expectations, it was chosen to make the analysis with institutional answers, rather than personal ones, based on an assumption that the answers are consistent across different units of the same company.

[10] As a general caveat for using this survey it should be mentioned that there is no obligation for the respondents to answer the survey even though they have agreed to participate. Nor is there any incentive to supply accurate forecasts.

[11] The original data base contains more observations, but for consistency it was necessary to clean the base and delete observations. This was done the following way: (i) Replies that were registered as being from the same person the same month were deleted based on a comparison with earlier replies. (ii) Observations of persons that appeared to be affiliated with more than one institutions were eliminated. (iii) When institutions appeared to have more than one reply in a given month, all the replies of the person who have the lowest number of replies for that institution were deleted.

[12] This is the CBC´s tolerance range for inflation rate for the horizon up till two years. See Central Bank of Chile (2007).

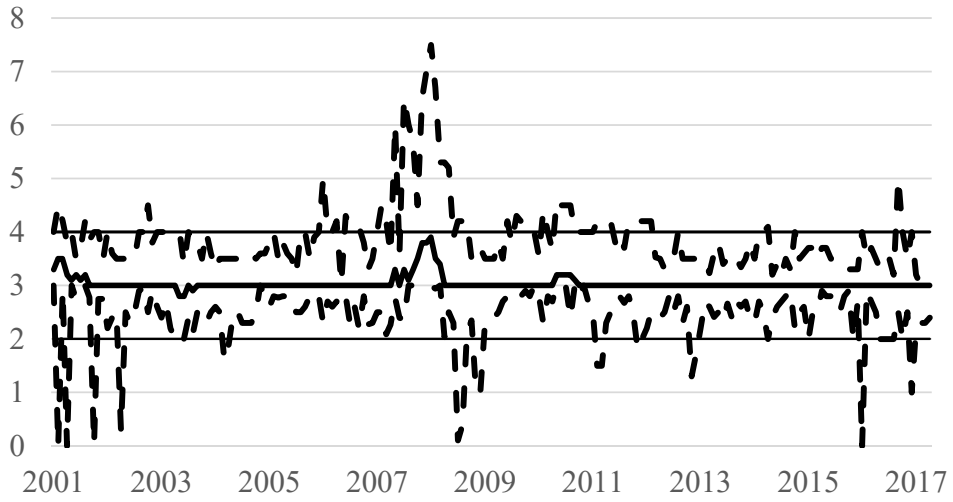

Figure 1. Inflation expectations two years ahead (%)

Notes: Thick solid line is the median of the replies, while the punctuated lines are the minimum and maximum of the individual replies. The two thin horizontal lines indicate the trim used to exclude extreme observations.

Table 1 reports the number of replies by financial and non-financial institutions. For the analysis of de-anchoring, there are a total of 2,354 observations available, which is reduced to 2,262 for the trimmed sample. The distribution between financial and non-financial institutions is almost the same, but financial institutions seem to be more inclined towards negative de-anchoring, i.e. expectations below 3%, while non-financial have more observations with positive de-anchoring.

[Table 1]

To gain further insight into which factors may trigger agents to change their expectation away from the target of the CBC, conditional estimations are included in the empirical analysis. This part also includes an investigation of what brings the expectations back to the target. As shown in table 2, the number of observations for these exercises are much more limited and a small sample caveat is in place. The trims hardly affect the samples in these experiments.

[Table 2]

As shown in the previous subsection, three kinds of factors may affect the agents' long-term inflation expectations: idiosyncratic factors, common factors, and expectations to the future monetary policy. Five kinds of idiosyncratic factors are included in the analysis, of which

three concern surprises to monthly observations: inflation, monetary policy rate (MPR)[13] and the monthly output growth rate. To measure the surprises, the monthly predictions in the EEE are compared to the realized values. The inflation and policy rates are extracted from the data base available at the web page of the CBC, while the first vintage values of the monthly output growth rates are from Pedersen (2013, updated). The two last idiosyncratic factors are differences with respect to the CBC forecasts, extracted from the monetary policy reports,[14] of end of year inflation rate and of current year GDP growth rate.

The common shocks[15] included in the analysis are monthly percentage changes in two commodity prices,[16] food (FAO) and oil (WTI), the unit labor cost, exchange rate (USD/CLP), output gap (HP filter), and business sentiments.[17] Food prices are extracted from the web page of FAO, while observations of the other variables are from the CBC web page. Business survey data are available from December 2003 and turns out to be statistically significant in only one of the regressions. In the remaining this variable is left out. Finally, future monetary policy actions are measured by the individual MPR expectations one year ahead, which is compared to the median of the same EES survey as a proxy for the CBC´s expectations.[18] Table 3 resumes the variables which are employed in the empirical estimations presented in the next section.

[Table 3]

3. Empirical analysis

This section presents the results of the panel estimations. Firstly the econometric model is presented and, secondly, the results of the de-anchoring exercises are presented. The third subsection presents the results of the conditional regressions, i.e. those that aim at finding

[13] During the period analyzed the monetary policy meetings in Chile were held each month. From 2018 the frequency is eight times a year.
[14] See Pedersen (2015) table A.1 for publication dates up till 2013.
[15] The common variables included in the regressions are standard in the inflation anchoring literature. See e.g. Beechey et al. (2011) and Autrup and Grothe (2014).
[16] Celasun et al. (2012) argue that commodity prices have some impact on long-term inflation expectations.
[17] Initial regressions also included, consumer expectations, VIX, EMBI and the copper price. Except for the latter, none of them turned out to be statistically significant in any of the regressions. The copper price was excluded because of its relatively high correlation with the exchange rate (see e.g. Cowan et al. (2007)).
[18] The CBC does not publish the expected future path of the MPR, but does make comments about it in the monetary policy reports. In most occasions it is reported that the assumed MPR path is in line with that of market expectations.

factors that make agents change their expectations about the long-term inflation rate to and from the target. Detailed estimation results are shown in tables in Appendix A, while the tables included in this section summarize them.

3.1. Econometric model

The general unbalanced panel regression model takes into account fixed individual effects (δ_j) and seasonal dummies ($\boldsymbol{S_t}$):

$$E_{jt}(\pi_{t+23}) - 3 = \alpha + \delta_j + \boldsymbol{\beta'} \boldsymbol{x_{jt-1}} + \boldsymbol{\gamma'} \boldsymbol{z_{t-1}} + \boldsymbol{\delta'} \boldsymbol{S_t} + \varepsilon_{jt}, \quad (3)$$

where the dependent variable is the deviation of the individual expectation from the inflation target of the CBC. Greek letters denote coefficients to be estimated with α being the intercept and ε_{jt} the error term. Bold indicates that it is a vector of coefficients. The idiosyncratic factors are collected in the vector $\boldsymbol{x_{jt-1}}$, while $\boldsymbol{z_{t-1}}$ includes the variables common to all agents. Hence, with the notation in table 3:

$$\boldsymbol{x_{jt-1}} = \begin{bmatrix} E_{jt-1}(\pi_{t-1}) - \pi_{t-1} \\ E_{jt-1}(r_{t-1}) - r_{t-1} \\ E_{jt-1}(y_{t-2}) - y_{t-2} \\ E_{jt-1}(\pi_T) - \tilde{E}_{t-1}(\pi_T) \\ E_{jt-1}(Y_T) - \tilde{E}_{t-1}(Y_T) \\ E_{jt-1}(r_{t+10}) - E_t(r_{t+10}) \end{bmatrix}, \boldsymbol{z_{t-1}} = \begin{bmatrix} \Delta p_{t-1}^{food} \\ \Delta p_{t-1}^{oil} \\ \Delta w_{t-1} \\ \Delta f x_{t-1} \\ gap_{t-1} \\ \Delta bs_{t-1} \end{bmatrix},$$

where the time notation in $\boldsymbol{x_{jt-1}}$ and $\boldsymbol{z_{t-1}}$ reflects the information available at the time of the survey. Due to the relatively small sample and to take into account possible effects of individual survey replies, standard errors are estimated with leave-one-out jackknife replications.[19]

3.2. De-anchored expectations

Three exercises are presented in this subsection. The first one considers the situations where agents have de-anchored expectations, i.e. (3) is estimated for all $E_{jt}(\pi_{t+23}) - 3 \neq 0$.[20] The second and the third ones are with respect to negative and positive de-anchoring, i.e. (3) is

[19] It should be noted, however, that jackknife variance estimates tend to be upward biased (Efron and Stein, 1981) and, hence, reject less frequently the null hypothesis.
[20] The Hausman (1978) specification test supports a model specification with fixed effects.

estimated for all $E_{jt}(\pi_{t+23}) - 3 < 0$ and $E_{jt}(\pi_{t+23}) - 3 > 0$, respectively. The results of the estimations are reported in tables A1 and A2 in Appendix A, while table 4 presents an overview of the statistically significant coefficients.

[Table 4]

With respect to general de-anchoring, several of the variables included in the analysis seem to matter for agents' expectations. Concerning the idiosyncratic factors, surprises in published growth observations seem to have a positive effect on, particularly positively de-anchored expectations. The sign, however, seems contra intuitive since a higher than expected growth rate leads to lower inflation expectations. This may be a small sample issue, but it could also imply that the agents expect a contractive monetary policy reaction and, hence, lower long-term inflation. The same is the case for medium-term growth expectations. If they are higher that the central bank's forecast, then already positively de-anchored expectations are increased. The sign of the coefficient indicates that the agent does not believe the output scenario of the CBC and, hence, doubt if the inflation rate will converge towards the target, i.e. there is a difference of opinion. While not significant in the trimmed sample, the CBC's inflation forecast may drive down positively de-anchored expectations when it is lower than that of the agent. The results with respect to the CBC forecasts are in line with those found by Pedersen (2015) for medium-term expectations.

The information common for all agents seems to mainly affect the positively de-anchored expectations. The coefficient of the oil price is negative, which suggests that the short-term positive inflationary effect will not last according to the agents, whereas the effect on the economic activity will dominate in the long run. The effects on positively de-anchored expectations of the last three variables in table 4 are not statistically significant when employing the trimmed sample. With respect to negatively de-anchored expectations, an increase in the output gap may help to anchor them again. The positive coefficient of the last variable indicates that when the agent´s expectation to the future MPR path is higher than that of the CBC (the median expectation), then the long-term inflation forecast increases. This indicates that the forecaster believes that the relatively expansive monetary policy will help convergence towards the target and suggests that the questions about medium-term MPR

expectations in the EES is answered as what the CBC *will* do in contrast to what agent thinks it *should (but will not)* do.

While not all of the coefficients are statistically significant in the trimmed sample, the results presented in this subsection indicate that positively de-anchored expectations are affected by more factors that negatively de-anchored ones. One reason may be because of differences in the sample sizes, but another may be that positively de-anchored expectations are more easily influenced. The economic activity seems to be important for the formation of agent´s long-term inflation expectations when they are positively de-anchored, while the output gap and future expected monetary actions appear to affect negatively de-anchored ones.

3.3. Estimations conditioned on last month reply

Table A3 in Appendix A reports the results of the estimations, which are presented in a more condensed way in table 5. As mentioned earlier, there are few observations available for these analyses and this small sample caveat should be taken into account when interpreting the results. Anchored expectation may become negatively de-anchored because of changes in the output gap, such that a too small growth could be the triggering factor. The other variable, the exchange rate, which can also trigger a negative de-anchoring is not statistically significant when applying jackknife replications. Food price changes may cause a positive de-anchoring and the size of the coefficient indicates that a 5% food price shock may change anchored long-term inflation expectations by 0.1 percentage points.

[Table 5]

The analysis does not tell much about which factors may bring negative anchored expectations back to the target. The only variable that turns out to be significant, and this is not when standard errors are calculated with jackknife replications, is inflation surprises. The sign of the coefficient implies that the expectations fall if the surprise is negative, which is contra intuitive. Positively de-anchored ones, on the other hand, may be brought back by a negative business sentiment or a monetary policy more contractive than expected.

While, as mentioned earlier, the results presented in this subsection are merely illustrative due to the limited sample sizes, they do indicate that different factors may cause negative and positive de-anchoring, and none of them are related to information from the central bank.

With the variables included in the analysis, it is not possible to say much about which factors are triggering for re-anchoring of negatively de-anchored expectations. On the other hand, it appears that the central bank may re-anchor positively ones with the policy actions, which again suggest that respondents answer the survey as what they think the CBC *will do* and not what they think it *should do*. The re-anchoring can also be trigged by negative change in the business sentiment.

4. Conclusions

For the conduction of forward monetary policy in an inflation targeting economy, it is crucial to have some understanding of how the agents form their long-run inflation expectations since the anchoring of these expectations is important for reaching the inflation target. With a simple theoretical illustration it was argued that agents' long-run expectations are only anchored if the perceived effect of the expected future monetary policy actions can reverse the inflationary effects of other shocks. For the individual agent these include idiosyncratic ones as well as those that are common for all agents.

Micro data from the Chilean Economic Expectation Survey were employed to make seven exercises. The first three were concerned with factors that affect de-anchored long-term inflation expectations, in general, negatively (i.e. expectations below the inflation target), and positively. The general result was, that different factors affect negatively and positively de-anchored expectations, respectively. It appeared to be possible to affect mainly negatively de-anchored inflation expectations with the expected future monetary policy and the sign of the coefficient suggested that agents reply the survey as what they think the Central Bank of Chile *will* do in the future.

In four illustrative (because of the relative small samples) conditional estimation exercises, the triggering factors of de-anchoring and the return from de-anchoring were investigated. The output gap seemed to be a triggering factor for negative de-anchoring, while food prices might cause a positive one. Little could be said about how negatively de-anchored expectation might be re-anchored, but monetary policy actions may anchor positively de-anchored expectations. The latter could also be triggered by a fall in the business sentiment.

Generally, the results of the present study suggest that de-anchored inflation expectations are easier to affect when they are above the target. The central bank may affect negatively de-

anchored expectations with the announcement of future policy actions and positively de-anchored ones with the growth (and inflation) forecasts. None of these, however, seem to be triggering factors for re-anchoring expectations. If the de-anchoring is positive, surprise changes of the monetary policy rate may be a triggering factor, while no variable which can be influenced by the central bank can re-anchor negatively de-anchored expectations. As a consequence, an inflation targeting central bank should pay particular attention to situations where the agents' inflation expectations are in risk of being negatively de-anchored. This advocates for, in line with other studies, the effort of the central bank in communicating well its decisions and, in general, being transparent with the economic agents.

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Appendix A: Estimation results

[Table A1]

[Table A2]

[Table A3]

Tables

Table 1. Number of replies

Full sample	$E_{jt}(\pi_{t+23})$		$E_{jt}(\pi_{t+23})=3$		$E_{jt}(\pi_{t+23})<3$		$E_{jt}(\pi_{t+23})>3$	
	#	%	#	%	#	%	#	%
Number of replies	6,666		4,310	65	883	13	1,473	22
Financial sector	3,502	53	2,358	55	515	58	629	43
Non-financial sector	3,164	47	1,952	45	368	42	844	57
Trimmed sample								
Number of replies	6,572	99	4,310	66	864	13	1,398	21
Financial sector	3,473	53	2,358	55	507	59	608	43
Non-financial sector	3,099	47	1,952	45	357	41	790	57

Table 2. Number of observations

	# obs	Trim
$E_{jt}(\pi_{t+23})<3$ and $E_{jt-1}(\pi_{t+23})=3$	246	244
$E_{jt}(\pi_{t+23})>3$ and $E_{jt-1}(\pi_{t+23})=3$	297	294
$E_{jt}(\pi_{t+23})=3$ and $E_{jt-1}(\pi_{t+23})<3$	226	226
$E_{jt}(\pi_{t+23})=3$ and $E_{jt-1}(\pi_{t+23})>3$	327	327

Table 3. Variables used in the empirical analysis

Variable	Description	Source
$E_{jt}(\pi_{t+23})$	Inflation expectation two-years-ahead	EES
$E_{jt-1}(\pi_{t-1})$	Monthly inflation expectation	EES
π_{t-1}	Monthly inflation	CBC
$E_{jt-1}(r_{t-1})$	MPR expectation	EES
r_{t-1}	MPR	CBC
$E_{jt-1}(y_{t-2})$	Monthly output growth expectation	EES
y_{t-2}	Monthly output growth, 1st vintage	Pedersen (2013, updated)
$E_{jt-1}(\pi_T)$	Inflation expectation end of current year	EES
$\tilde{E}_{t-1}(\pi_T)$	CBC´s inflation expectation end of current year	Monetary policy report
$E_{jt-1}(Y_T)$	Growth expectation current year	EES
$\tilde{E}_{t-1}(Y_T)$	CBC´s growth expectation current year	Monetary policy report
p_{t-1}^{food}	Food prices	FAO
p_{t-1}^{oil}	Oil price (WTI)	CBC
w_{t-1}	Unit labor cost	CBC
fx_{t-1}	Exchange rate CLP / USD	CBC
gap_{t-1}	Output gap	CBC and own calculations
bs_{t-1}	Business survey (IMCE)	CBC
$E_{jt-1}(r_{t+10})$	MPR expectation one year ahead	EES
$E_{t-1}(r_{t+10})$	Median MPR expectation one year ahead	EES

Notes: EES: Data from the Economic Expectation Survey supplied by the Central Bank of Chile. CBC: Extracted from the web page of the Central Bank of Chile: https://si3.bcentral.cl/Siete/secure/cuadros/home.aspx?Idioma=en-US. FAO: Extracted from the web page of the food and agriculture organization of the United Nations: http://www.fao.org/home/en/.

Table 4. Statistically significant variables in the de-anchoring estimations

	(I) $E_{jt}(\pi_{t+23}) \neq 3$	(II) $E_{jt}(\pi_{t+23}) < 3$	(III) $E_{jt}(\pi_{t+23}) > 3$
$E_{jt-1}(y_{t-2})$ - y_{t-2}		((+))	+
$E_{jt-1}(\pi_T)$ - $\tilde{E}_{t-1}(\pi_T)$			(-)
$E_{jt-1}(Y_T)$ - $\tilde{E}_{t-1}(Y_T)$	(+)		+
Δp_{t-1}^{oil}	-		-
Δw_{t-1}	(+)		
Δfx_{t-1}			(+)
gap_{t-1}	+	+	(+)
$E_{jt-1}(r_{t+10})$ - $E_{t-1}(r_{t+10})$	+	+	(+)

Notes: + / - denotes that the coefficient for the variable stated in the first row is positively (negatively) statistically significant when applying a 10% significance level. ( ) indicates that the coefficient is only statistically significant in full sample. (( )) means that the coefficients are statistically significant when applying robust standard errors, but not when employing jackknife replications. Detailed results are reported in tables A1 and A2 in Appendix A.

Table 5. Statistically significant variables in the conditional estimations

	(IV)	(V)	(VI)	(VII)
	$E_{jt\text{-}1}(\pi_{t+22}) = 3$		$E_{jt\text{-}1}(\pi_{t+22}) < 3$	$E_{jt\text{-}1}(\pi_{t+22}) > 3$
	$E_{jt}(\pi_{t+23}) < 3$	$E_{jt}(\pi_{t+23}) > 3$	$E_{jt}(\pi_{t+23}) = 3$	
$E_{jt\text{-}1}(\pi_{t\text{-}1}) - \pi_{t\text{-}1}$			((+))	((-))
$E_{jt\text{-}1}(r_{t\text{-}1}) - r_{t\text{-}1}$				-
Δp_{t-1}^{food}		+		
Δp_{t-1}^{oil}		((-))		
$\Delta fx_{t\text{-}1}$	((+))			
$gap_{t\text{-}1}$	+			
$\Delta bs_{t\text{-}1}$				+

Notes: See table 4. Detailed results are reported in table A3 in Appendix A.

Table A1. Estimation results. Dependent variable: 2-years-ahead inflation expectations different from 3%

	(I)	
$E_{jt\text{-}1}(\pi_{t\text{-}1}) - \pi_{t\text{-}1}$	-0.043	-0.017
	(0.043)	(0.032)
$E_{jt\text{-}1}(r_{t\text{-}1}) - r_{t\text{-}1}$	-0.016	-0.003
	(0.091)	(0.054)
$E_{jt\text{-}1}(y_{t\text{-}2}) - y_{t\text{-}2}$	0.010	0.003
	(0.008)	(0.006)
$E_{jt\text{-}1}(\pi_T) - \tilde{E}_{t\text{-}1}(\pi_T)$	-0.059	-0.031
	(0.048)	(0.033)
$E_{jt\text{-}1}(Y_T) - \tilde{E}_{t\text{-}1}(Y_T)$	0.141**	0.076
	(0.067)	(0.050)
Δp_{t-1}^{food}	-0.009	-0.003
	(0.006)	(0.004)
Δp_{t-1}^{oil}	**-0.004*****	**-0.003*****
	(0.001)	(0.001)
$\Delta w_{t\text{-}1}$	**0.102*****	**0.052**
	(0.043)	(0.034)
$\Delta fx_{t\text{-}1}$	0.006	0.001
	(0.006)	(0.001)
$gap_{t\text{-}1}$	**0.092*****	**0.057*****
	(0.015)	(0.01)
$E_{jt\text{-}1}(r_{t+10}) - \tilde{E}_{t\text{-}1}(r_{t+10})$	**0.208*****	**0.130*****
	(0.029)	(0.010)
# obs	1,933	1,860
# respondents	105	104
R^2	0.111	0.071
Trim	No	Yes

Notes: Fixed-effects estimates with seasonal dummies. Numbers in parentheses are standard errors estimated with leave-one-observation-out replications. */**/***: p > 10% / 5% / 1%. Bold numbers indicate that the coefficients are statistically significantly different from zero when applying 10% significance level and White (1980) robust standard errors.

Table A2. Estimation results. Dependent variables: 2-years-ahead inflation expectations smaller and greater than 3%

	(II)		(III)	
	Smaller than 3%		Greater than 3%	
$E_{jt-1}(\pi_{t-1}) - \pi_{t-1}$	-0.022	0.024	-0.041	-0.021
	(0.048)	(0.030)	(0.047)	(0.028)
$E_{jt-1}(r_{t-1}) - r_{t-1}$	-0.094	0.081	0.064	-0.005
	(0.198)	(0.061)	(0.076)	(0.045)
$E_{jt-1}(y_{t-2}) - y_{t-2}$	0.003	**0.010**	**0.017****	**0.008***
	(0.008)	(0.007)	(0.008)	(0.004)
$E_{jt-1}(\pi_T) - \tilde{E}_{t-1}(\pi_T)$	-0.008	-0.008	**-0.067***	**-0.027**
	(0.039)	(0.031)	(0.037)	(0.026)
$E_{jt-1}(Y_T) - \tilde{E}_{t-1}(Y_T)$	-0.075	-0.038	**0.110****	**0.082****
	(0.071)	(0.050)	(0.055)	(0.033)
Δp_{t-1}^{food}	0.003	-0.001	-0.005	0.005
	(0.007)	(0.005)	(0.006)	(0.004)
Δp_{t-1}^{oil}	-0.002	-0.001	**-0.003****	**-0.002*****
	(0.002)	(0.001)	(0.001)	(0.001)
Δw_{t-1}	0.0160	0.009	0.056	0.016
	(0.044)	(0.037)	(0.042)	(0.026)
Δfx_{t-1}	0.003	0.004	**0.010****	0.003
	(0.006)	(0.004)	(0.006)	(0.003)
gap_{t-1}	**0.042*****	**0.033*****	**0.049****	0.011
	(0.013)	(0.009)	(0.017)	(0.009)
$E_{jt-1}(r_{t+10}) - \tilde{E}_{t-1}(r_{t+10})$	**0.059***	**0.060****	**0.086*****	0.016
	(0.033)	(0.025)	(0.027)	(0.019)
# obs	744	730	1,189	1,130
# respondents	74	74	96	95
R^2	0.067	0.069	0.092	0.035
Trim	No	Yes	No	Yes

Note: See table A1.

Table A3. Estimation results. Conditional regressions

	(IV)	(V)	(VI)	(VII)
$E_{jt\text{-}1}(\pi_{t\text{-}1}) - \pi_{t\text{-}1}$	0.105	0.028	**0.073**	**-0.083**
	(0.131)	(0.078)	(0.073)	(0.070)
$E_{jt\text{-}1}(r_{t\text{-}1}) - r_{t\text{-}1}$	0.039	0.035	-0.014	**-0.270***
	(0.200)	(0.144)	(0.121)	(0.163)
$E_{jt\text{-}1}(y_{t\text{-}2}) - y_{t\text{-}2}$	0.005	0.014	0.006	-0.007
	(0.015)	(0.011)	(0.011)	(0.016)
$E_{jt\text{-}1}(\pi_T) - \tilde{E}_{t\text{-}1}(\pi_T)$	0.047	-0.020	0.093	0.025
	(0.089)	(0.058)	(0.081)	(0.074)
$E_{jt\text{-}1}(Y_T) - \tilde{E}_{t\text{-}1}(Y_T)$	0.126	0.068	-0.029	-0.083
	(0.112)	(0.092)	(0.083)	(0.109)
Δp_{t-1}^{food}	0.011	**0.018****	-0.008	-0.001
	(0.015)	(0.007)	(0.012)	(0.015)
Δp_{t-1}^{oil}	-0.002	**-0.003**	0.002	-0.001
	(0.003)	(0.002)	(0.002)	(0.003)
$\Delta w_{t\text{-}1}$	0.006	-0.090	0.088	-0.034
	(0.068)	(0.083)	(0.080)	(0.071)
$\Delta fx_{t\text{-}1}$	**0.012**	0.005	-0.013	-0.002
	(0.011)	(0.00853)	(0.011)	(0.016)
$gap_{t\text{-}1}$	**0.062***	-0.014	-0.017	0.005
	(0.032)	(0.019)	(0.020)	(0.034)
$E_{jt\text{-}1}(r_{t+10}) - \tilde{E}_{t\text{-}1}(r_{t+10})$	0.019	0.002	-0.006	0.024
	(0.075)	(0.035)	(0.057)	(0.057)
$\Delta bs_{t\text{-}1}$				**0.010****
				(0.004)
# obs	246	297	226	290
# respondents	67	73	65	77
R^2	0.207	0.091	0.126	0.109
Trim	No	No	No	No

Notes: See table A1. (IV) Estimations made for all $E_{jt}(\pi_{t+23}) < 3$ and $E_{jt\text{-}1}(\pi_{t+23}) = 3$. (V) Estimations made for all $E_{jt}(\pi_{t+23}) > 3$ and $E_{jt\text{-}1}(\pi_{t+23}) = 3$. (VI) Estimations made for all $E_{jt}(\pi_{t+23}) = 3$ and $E_{jt\text{-}1}(\pi_{t+23}) < 3$. (VII) Estimations made for all $E_{jt}(\pi_{t+23}) = 3$ and $E_{jt\text{-}1}(\pi_{t+23}) > 3$.