Tightening next door: spatial spillovers of monetary policy on regional unemployment in Chile

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Abstract

This letter asks whether the regional effects of monetary policy depend on the economic structure of neighbouring regions. I combine quarterly unemployment rates for Chile's 16 regions (2012Q1–2026Q2) with market-based monetary policy surprises, measured as the change in the one-year swap rate around 140 scheduled policy meetings, and estimate spatial local projections of the SLX type with region-by-season and time fixed effects. Exposure is the pre-sample manufacturing share of regional output; spillovers are captured by the same share averaged over contiguous regions. A region's own exposure does not change its unemployment response. The exposure of its neighbours does: after a 25 basis point surprise, unemployment rises by 0.8 percentage points more six quarters later in a region whose neighbours are one standard deviation more manufacturing-intensive. The combined effect of higher own and neighbours' exposure is 0.56 percentage points after four quarters (wild bootstrap $p = 0.06$) and 0.64 after six. For a typical surprise of 4.5 basis points this is about 0.1 percentage points. The pattern holds with inverse-distance weights, without the pandemic years, without the Santiago region and with a broader interest-sensitive exposure, but not with 90-day swap surprises. Studies that rely on a region's own structure may miss part of how monetary policy spreads across space.

JEL Codes: E52, R11, R12, C23

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1 Introduction

Monetary policy is set for the whole country, but its effects are not the same everywhere. Since Carlino and DeFina (1998), a large literature has documented that regions with more interest-sensitive industries, especially manufacturing, respond more strongly to policy shocks (Dominguez-Torres and Hierro, 2019; Pizzuto, 2020). Most of this work links a region's response to its own structure. Regions, however, trade with each other, share labour markets and supply chains, and a contraction in one region can lower demand and employment in the next. If these links matter, a region's response depends also on how exposed its neighbours are (Furceri et al., 2019; Elhorst et al., 2021).

Chile is a useful case. The central bank follows an inflation-targeting regime with a regular meeting calendar and a liquid swap market, which allows surprises to be measured from market prices. Its 16 regions are strung along a narrow north–south strip, so each region has one to three land neighbours, and manufacturing is concentrated in the centre–south while mining dominates the north. Early evidence for Chile shows that monetary shocks have heterogeneous regional effects on unemployment (Bravo et al., 2003), but, to my knowledge, spatial spillovers have not been measured.

This letter estimates spatial local projections (Jordà, 2005) in the SLX form (Halleck Vega and Elhorst, 2015), separating the direct role of a region's own manufacturing exposure from the role of its neighbours' exposure. The main result is that the neighbours' exposure, not the region's own, predicts a larger rise in unemployment after a monetary tightening.

2 Data and empirical strategy

2.1 Data

Regional unemployment. I use the unemployment rate of the National Employment Survey (INE) for the 16 regions, taken from the Central Bank of Chile statistical database. The published series are rolling quarters; I keep those that coincide with calendar quarters, which gives 2012Q1–2026Q2. The rates are not seasonally adjusted.

Monetary policy surprises. I collect the dates of all 140 scheduled monetary policy meetings between January 2012 and June 2026 from the central bank's statements. Decisions are released from 18:00, after the market close. The surprise at meeting m is the change in the one-year average-overnight-index swap rate (SPC) between the close of the meeting day and the close of the next business day, in the spirit of Gürkaynak et al. (2005) and Pescatori (2018). Surprises have a standard deviation of 4.5 basis points. The quarterly shock S_t is the sum of surprises within the quarter, expressed in units of 25 basis points. The single unscheduled meeting (16 March 2020) is excluded.

Exposure and spatial weights. Exposure z_i is the manufacturing share of nominal regional GDP averaged over 2013–2015, standardised across regions; it ranges from 2.4% (Atacama) to 20.4% (Los Ríos). The spatial weights matrix W is binary contiguity between regions, row-standardised, so $(Wz)_i$ is the average exposure of region i's neighbours. Exposure, the matrix, the shock definition, the control set and the robustness checks were fixed before estimating the model with market-based surprises.

2.2 Spatial local projections

For horizons $h = 0, \ldots, 8$ quarters I estimate

$$u_{i,t+h} - u_{i,t-1} = \alpha^h_{i,q(t)} + \delta^h_t + \beta_h \, S_t z_i + \theta_h \, S_t (Wz)_i + \gamma'_h X_{i,t} + \varepsilon^h_{i,t}, \tag{1}$$

where $\alpha^h_{i,q(t)}$ are region-by-quarter-of-year effects that absorb regional seasonality, and δ^h_t are time effects that absorb the common response to the shock and any other national shock. The controls $X_{i,t}$ include the lagged interactions $S_{t-1} z_i$ and $S_{t-1}(Wz)_i$, two lags of the change in the regional unemployment rate, the lagged average change in neighbours' unemployment, and the interaction of a copper price shock with the region's mining share, which controls for the main source of regional cycles in Chile.

The coefficient β_h is the *direct* effect: the additional response of a region with one standard deviation higher own exposure, holding neighbours' exposure fixed. The coefficient θ_h is the *spillover* effect: the additional response when the neighbours' exposure is one standard deviation higher. The sum $\beta_h + \theta_h$ is the *total* effect when both rise together. Because the model is linear in exogenous regressors, these are directly interpretable without the multiplier calculations of spatial autoregressive models (Halleck Vega and Elhorst, 2015). Standard errors are Driscoll–Kraay (Driscoll and Kraay, 1998) with $h + 1$ lags. With 58 quarters and 16 regions, I also report wild cluster bootstrap p-values, clustering by quarter (Cameron et al., 2008), for the total effect.

Two limitations follow from the geography. First, manufacturing is spatially clustered, so z_i and $(Wz)_i$ are correlated (0.74), and β_h and θ_h are identified from regions whose neighbours differ from them, such as Valparaíso and O'Higgins relative to Santiago, or La Araucanía between Biobío and Los Ríos. Second, as in any SLX model, contiguity is a proxy for economic links, and the estimates capture the combined effect of trade, commuting and supply chains (Debarsy and Le Gallo, 2025).

As a benchmark, I also estimate the average response to S_t without time effects.

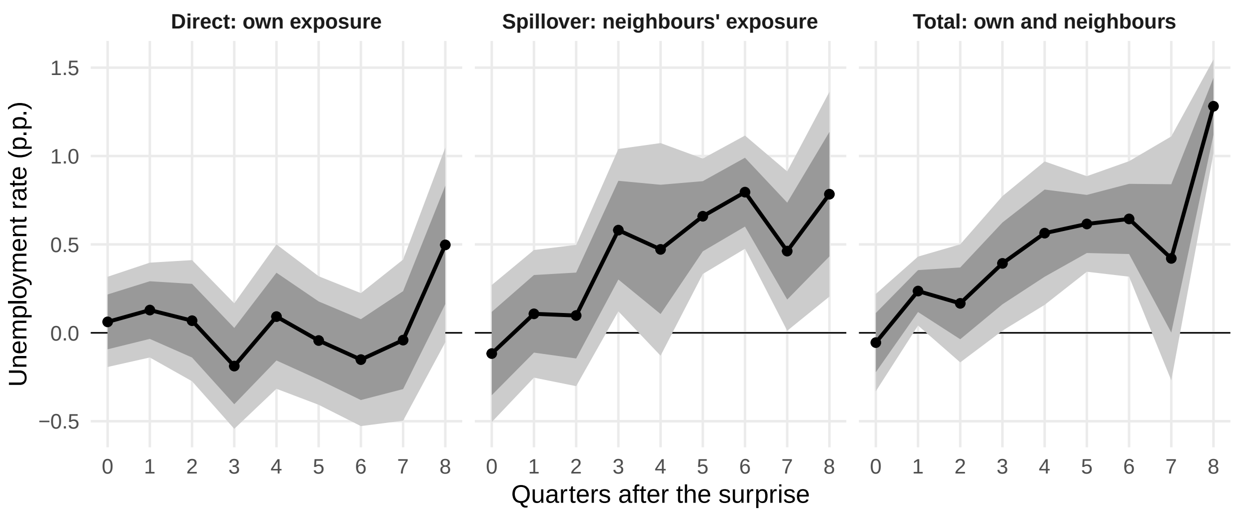
3 Results

The average response of regional unemployment to a monetary surprise is imprecise: point estimates are negative at all horizons, between -0.35 and -1.03 percentage points per 25 basis points, and none is significant at conventional levels. With 58 quarters, the time-series variation in surprises is not enough to pin down the national effect. Cross-regional comparisons, which difference out the common response, are more informative.

Figure 1 shows the spatial estimates. The direct effect of own exposure is small and never significant up to seven quarters. The spillover effect is close to zero on impact and then grows: after a 25 basis point tightening surprise, unemployment is 0.58 percentage points higher three quarters later, and 0.80 percentage points higher six quarters later, in a region whose neighbours are one standard deviation more manufacturing-intensive. The total effect rises steadily to 0.56 percentage points after four quarters and 0.64 after six. The wild bootstrap

p-value for the total effect is 0.06 at $h = 4$ and below 0.01 at $h = 8$. A surprise of one standard deviation (4.5 basis points) implies a total effect of about 0.1 percentage points after four to six quarters.

Figure 1: Direct, spillover and total effects of a 25 basis point monetary policy surprise on regional unemployment



Notes: Coefficients β_h, θ_h and $\beta_h + \theta_h$ from equation (1). Dark and light bands are 68% and 90% confidence intervals with Driscoll–Kraay standard errors.

Table 1 reports robustness checks. The total effect at four to six quarters is similar when Santiago is excluded, when windows that overlap 2020–2021 are dropped, and when exposure is measured by the combined share of construction, manufacturing and commerce. With inverse-distance weights, spillovers are larger and significant from six quarters. Adding the interaction of the surprise with mining exposure and its spatial lag lowers the estimates at four quarters but not at six. In all these cases the spillover effect accounts for most of the total up to six quarters; at eight quarters own exposure also becomes significant in three specifications. The exception is the surprise built from the 90-day swap rate: the total effect is positive at six and eight quarters but imprecise, and the spillover is negative at short horizons. Shorter maturities mostly capture the current decision, while one-year rates also reflect expected future policy, which may be what matters for hiring decisions. Using survey-based surprises from the Financial Operators Survey, the spillover effect is also positive and significant at four and six quarters (0.14 and 0.17 percentage points per 25 basis points).

4 Discussion

A region's unemployment response to monetary policy depends on the structure of the regions around it. In Chile, a region with an average manufacturing share but manufacturing-intensive neighbours sees unemployment rise after a tightening, while its own share adds little once neighbours are accounted for, at least during the first six quarters. This is consistent with regional demand and supply-chain links carrying the contraction across borders, and with studies showing that spatial spillovers amplify regional monetary effects in the United States (Furceri et al., 2019).

The evidence has limits. The sample has 16 regions, exposure is spatially clustered, the effects at eight quarters rest on few observations, and the result does not hold with 90-day swap surprises. The magnitudes per standard deviation of the surprise are modest. Still, the findings suggest that regional assessments of monetary policy that look only at a region's own structure, as is common in central bank analysis, can understate the effect on regions located next to interest-sensitive industrial centres.

Statements and Declarations

Competing interests. The author has no competing interests to declare.

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Data availability. All data are public (Central Bank of Chile statistical database and meeting statements). Code and data to replicate the results in R and Stata are available from the author and will be deposited in a public repository upon publication.

Table 1: Robustness of the direct, spillover and total effects

Horizon h (quarters)	0	2	4	6	8
A. Direct effect (β_h)					
Baseline (contiguity)	0.06	0.07	0.09	−0.15	0.50
	(0.16)	(0.21)	(0.25)	(0.23)	(0.33)
Inverse-distance W	−0.07	0.02	0.19	0.03	0.54***
	(0.15)	(0.23)	(0.20)	(0.21)	(0.21)
Excluding 2020–21 windows	0.20	0.27	0.21	−0.14	0.81***
	(0.15)	(0.21)	(0.24)	(0.26)	(0.29)
Excluding Metropolitana	0.07	0.08	0.12	−0.13	0.55*
	(0.15)	(0.20)	(0.25)	(0.23)	(0.33)
Composite exposure	0.03	0.05	0.15	−0.07	0.40
	(0.10)	(0.18)	(0.16)	(0.16)	(0.27)
Controlling for mining exposure	−0.16	−0.08	−0.17	−0.35	0.19
	(0.18)	(0.23)	(0.25)	(0.21)	(0.30)
90-day swap surprise	−0.15	0.27	0.33	−0.31	0.42
	(0.34)	(0.50)	(0.63)	(0.40)	(0.70)
B. Spillover effect (θ_h)					
Baseline (contiguity)	−0.12	0.10	0.47	0.80***	0.78**
	(0.24)	(0.24)	(0.37)	(0.19)	(0.35)
Inverse-distance W	0.28	0.51	0.90	1.42**	2.03***
	(0.47)	(0.64)	(0.76)	(0.60)	(0.65)
Excluding 2020–21 windows	−0.14	0.00	0.50	0.77***	0.78*
	(0.22)	(0.26)	(0.45)	(0.13)	(0.47)
Excluding Metropolitana	−0.12	0.09	0.45	0.78***	0.74**
	(0.23)	(0.24)	(0.36)	(0.20)	(0.36)
Composite exposure	−0.17	0.05	0.31	0.57***	0.69**
	(0.18)	(0.18)	(0.28)	(0.12)	(0.30)
Controlling for mining exposure	−0.36	0.12	0.51	0.98***	0.57
	(0.34)	(0.40)	(0.47)	(0.26)	(0.63)
90-day swap surprise	−0.19	−0.81	−0.29	0.90	0.07
	(0.61)	(0.69)	(0.96)	(0.62)	(0.89)
C. Total effect ($\beta_h + \theta_h$)					
Baseline (contiguity)	−0.06	0.17	0.56**	0.64***	1.28***
	(0.17)	(0.20)	(0.25)	(0.20)	(0.16)
Excluding 2020–21 windows	0.06	0.27	0.70**	0.63***	1.59***
	(0.15)	(0.20)	(0.36)	(0.23)	(0.25)
90-day swap surprise	−0.35	−0.55	0.05	0.59	0.50
	(0.39)	(0.38)	(0.62)	(0.67)	(0.70)

Notes: Response of the regional unemployment rate (percentage points) to a 25 basis point one-year swap surprise, h quarters ahead. 16 regions, 2012Q1–2026Q2. All regressions include region-by-quarter-of-year and time effects and the controls described in Section 2.2. Driscoll–Kraay standard errors in parentheses. *, **, *** significant at 10%, 5% and 1%.

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