



RESEARCH HIGHLIGHTS

A review of the current research conducted at the Central Bank of Chile

December 2019

This issue of Research Highlights reviews the following subjects that have been recently analyzed at the Central Bank of Chile (CBC):

- Adverse selection in Chile’s consumer credit market
- Sectoral transitions between formal wage jobs in Chile
- Sectoral heterogeneity, input-output relationships and monetary policy pass-through

Adverse selection in Chile’s consumer credit market

In Chile, consumer credit is provided by financial institutions (i.e. banks, department stores, credit unions, etc.) with marked differences in terms of the information available on potential clients and the regulatory framework. This heterogeneity is reflected in different lending conditions (e.g. interest rates) and customer segmentation. In this working paper¹ “Adverse selection, loan access and default in the Chilean consumer debt market,” Central Bank of Chile economist Carlos Madeira uses panel data from the Survey of Household Finances to study this segmentation of borrowers using a model of access to consumer credit, choice of financial institution and non-payment behavior.

The study characterizes the determinants of the following results: (i) consumer credit, (ii) amount of debt, and (iii)

non-payment during the last year. The first is a categorical variable with seven alternatives according to access to consumer credit and

the financial entity providing it. This variable classifies indebted families into seven groups: i)

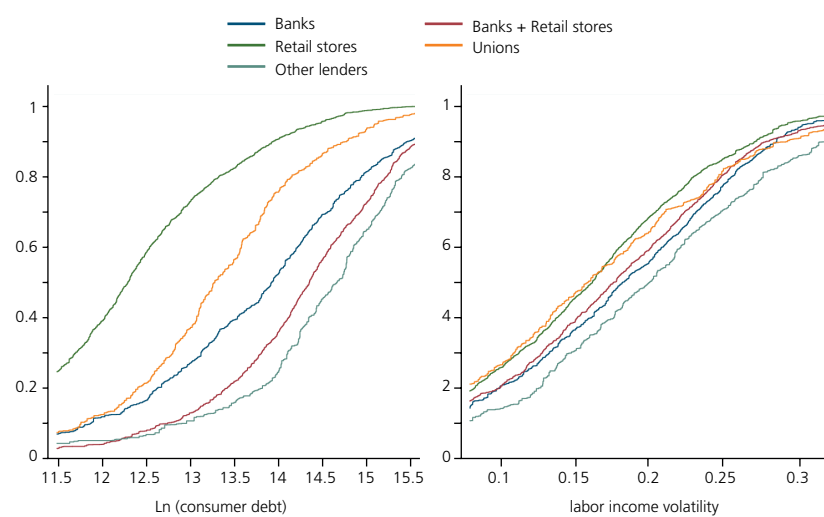
families with no desire to take a consumer loan, ii) families with the need to borrow but no access to credit, iii) families whose main consumer

debt is with banks and the retail sector, iv) families whose main debt is with banks only, v) families whose main debt is with department stores (i.e., the retail sector), vi) families whose main debt is with credit unions or credit cooperatives, and vii) families owing to other providers.

In general, the amount of the loan increases with the risk of unemployment, income volatility and household size. This is consistent with the use of consumer credit to smooth out income fluctuations. Also, the probability of

Households with simultaneous debts with Banks and Retail Stores present higher levels of indebtedness and delinquency risk.

Accumulated probability distribution of total amount of consumer credit outstanding (in logarithm, panel 1) and labor income volatility (panel 2).



¹ Working paper # 838, September 2019.

default diminishes with income and increases with indebtedness, health-related shocks, unemployment risk, and labor income volatility.

The evidence shows that households able to borrow from banks (which on average offer lower interest rates) have higher levels of debt than households owing to commercial houses or credit unions (see Figure, panel 1). This is due to the fact that bank debtors present more favorable characteristics than other debtors, such as higher income and educational level, lower risk of unemployment and lower income

volatility (see Figure, panel 2). Moreover, bank debtors exhibit the lowest default rates.

Meanwhile, households with no access to credit, as well as those holding simultaneously bank and department store debt, present a risk of default than households taking a consumer loan with a single type of financial institution, even after controlling for observable characteristics of the debtors. This suggests that adverse selection exists in the consumer credit market. Creditors are unable to control for all the debtors' risk factors.

In Chile, financial institutions are aware if the household has unpaid debts to any creditor, but they are ignorant of the amount of their debts to non-banking institutions. Therefore, households that have loans from multiple types of financial institutions are at a greater risk than those whose creditors can observe at the time of the lending decision. Access to a more complete credit record of potential customers would allow financial institutions to better assess their risk of non-payment.

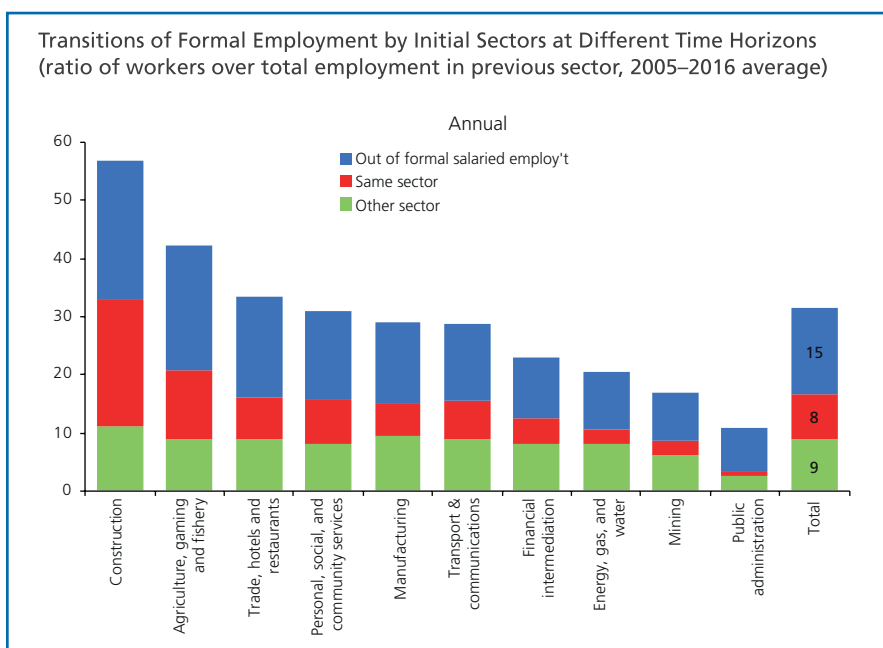
Sectoral transitions between formal wage jobs in Chile

One of the features of a flexible labor market is the possibility for workers to change jobs, either within or across sectors. A labor market with high mobility is important, because it increases the speed at which the economy adjusts to aggregate and sectoral shocks.

In the paper “*Sectoral Transitions between Formal Wage Jobs in Chile*”², CBC economists Rosario Aldunate, Gabriela Contreras and Matias Tapia use census data from the Chilean Internal Revenue Service on formal employment to conduct a detailed empirical analysis of the country's labor mobility during the period 2005-2016. The paper provides evidence about the frequency with

The probability of finding a new job in the same sector is the same as finding a job in a different one.

which workers change jobs within and across sectors, and shows that the characteristics of mobility are heterogeneous across sectors, genders, and age groups.



The results indicate that cross-sector mobility has been significant, as 61% of all formal employees in Chile have worked in at least two different sectors during the period analyzed. Also, for those changing jobs, the probability of finding a new job in the same sector is the same as finding a job in a different one. In this sense, the authors find that, after 12 months, 8% of formal salaried workers moved to a new

² Working paper # 836, August 2019.

³ Employment in the formal sector represents 60% of total employment.

job within the same sector, and 9% moved to a new sector.

The results reveal significant cross-sector heterogeneity. In this manner, construction and agriculture present high mobility, as opposed to low mobility in mining and public administration. For example, after 12 months, only four out of ten workers remained in the construction sector, while nine out of ten remained in public administration. Moreover, mobility across sectors depend on where the worker was initially employed. For example, half of the public servants have not changed sector, while this is the case for only 10% in the construction sector. The paper also shows that mobility is different between the genders. While 46% of women in the sample stayed in the same sector, only 36% of men did so.

Regarding the length of transitions between jobs, the authors find that only 34% of job

changes are direct (job-to-job), and the rest are indirect, with a period out of the formal salaried market. After one quarter, 57% of the workers who quit their jobs are employed in a new one, and after a year the number rises to almost 80%.

Another finding is that transition time is heterogeneous across sectors. For example, in high-mobility sectors such as agriculture and construction, only 10% of workers leaving a job took longer than a year to find a new one in the same sector. This figure changes to 50% for workers in the construction, hotels & restaurants and public administration sectors.

The data indicate that the probability of changing sectors is increasing in the time spent out of the labor market. This suggests that people initially look for a job in the same sector, but after failing to find one they decide to extend the search to other areas of the economy.

Meanwhile, the probability of changing sectors also varies by gender and age. Men are more prone to moving to another sector than women after four months out of the formal salaried market, while the younger the worker, the likelier to move to a new sector, regardless of the duration of the transition.

Finally, the authors show that labor mobility is often accompanied by a wage increase, regardless of whether the shift is within or between sectors or whether the transition was direct or indirect. In this sense, direct movements are associated with wage increases of 10% if the move is within the same sector and 16% otherwise. In the case of indirect transitions, the data shows that wage increases rise with the duration of the time spent out of the formal salaried market. However, these results are also significantly heterogeneous when analyzed by initial sector, gender, and age.

Sectoral heterogeneity, input-output relationships and monetary policy pass-through

What drives the power of monetary policy upon the real economy? This is first-order question for a central bank that seeks to smooth out macroeconomic fluctuations while keep inflation under control. Although this question can be addressed in a variety of ways, in “The Propagation of Monetary Policy Shocks in a Heterogeneous Production Economy,”⁴ the CBC researcher Ernesto Pastén together with Raphael Schoenle and Michael Weber⁵ take a particular perspective by studying the role of sectoral heterogeneity on the power of monetary policy. They focus on three dimensions of sectoral heterogeneity: the

degree of price rigidity, sectors’ weight in GDP, and their relative position in the production network of input-output relationships across all

other firms. These input-output relationships generate interdependence among firms or, in other words, a production network. This

Input-output relationships across firms determine the power of monetary policy on output and employment as well as the identity of firms/sectors where monetary policy has the strongest impact.

sectors. The analysis also allows to characterize economic sectors for which monetary policy has the greater and the lesser impact.

Production within firms is indeed a complex activity involving tasks and inputs provided by

paper shows that, if all firms were identical, the implications of this interdependence would be minor. In real life, however, firms are far from being identical. This paper focuses on sectoral heterogeneity by assuming firms are

⁴ Working paper # 842, September 2019. This paper has recently been accepted for publication at the *Journal of Monetary Economics*.

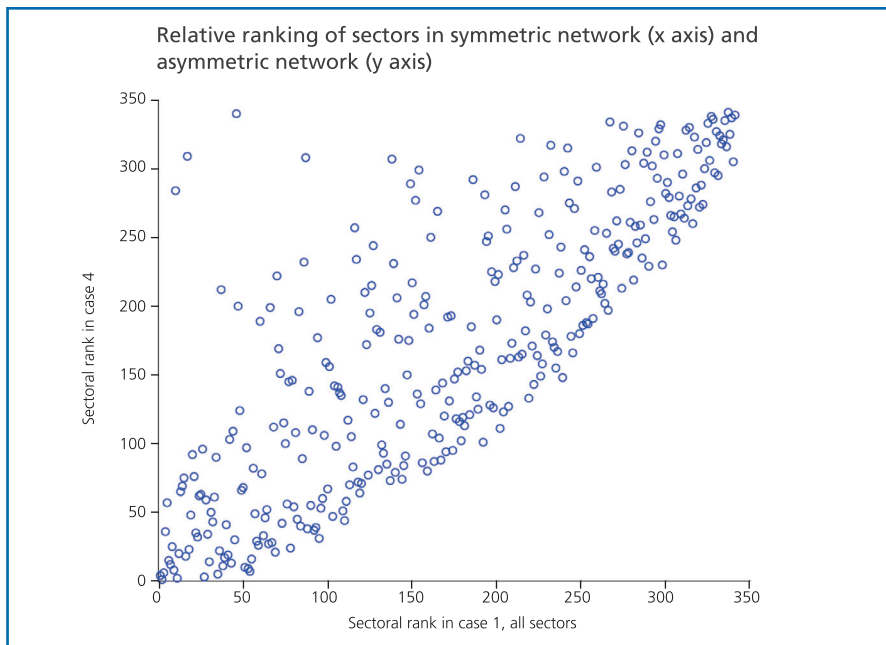
⁵ Raphael Schoenle is an economist with the Federal Reserve of Cleveland and a professor at Brandeis University. Michael Weber is a professor at the University of Chicago Booth School of Business.

identical within sectors but heterogeneous across sectors. This limitation is mitigated by the flexibility of the analysis in the definition of sectors, which can be as disaggregated as data allows for.

The central mechanism is as follows. In an economy with no input-output relationships, a monetary stimulus raises output and employment only if prices remain sticky. A monetary stimulus drives an increase in wages and thus an increase in marginal

costs. If prices are sticky, firms adjust their prices only partially to the stimulus leaving room for an expansion in real aggregate demand, which in turn increase output and employment.

In contrast, if firms do have input-output relationships, the weight of the wage bill in the marginal costs diminishes. Therefore, an increase in wage costs caused by a monetary stimulus has a smaller impact on marginal costs. Furthermore, a firm having sticky prices means that marginal costs are also sticky for all firms to which it supplies inputs. Therefore, which firms have prices more or less sticky and who has an input-output relationship with who determines how much marginal costs react, and with that how much prices and real aggregate demand react. The actual contribution of each sector's price stickiness to the power of monetary policy depends on its weight in GDP



Meanwhile, the identity of the economic sectors where monetary policy has the strongest impact is trivial when there are no input-output relationships: those with prices most sticky. With input-output relationships, how much a sector reacts to monetary policy depends on the joint distribution of price stickiness and the position of each sector in the productive network.

This paper conducts an empirical analysis applied to the United States at a level of disaggregation that classifies firms into 341 economic sectors. The power of monetary policy is 70% greater than in an economy where all firms are identical and have no input-output relationships. A similar analysis with fewer sectors shows that the power of monetary policy depends on the degree of disaggregation. This result partially invalidates the practice—generalized in the profession— of using aggregate models to analyze macroeconomic

phenomena. As for on which sectors a monetary stimulus has greater or lesser power, in the most affected sectors there is a 350% increase in output, while the less affected even suffer a contraction which could never occur if there were no inter-company heterogeneity.

The figure below shows the difference in the descending-order ranking of monetary effect for the 341 sectors that make up the economy when two polar cases are assumed

for the shape of the productive network. In the x-axis, the network is assumed to be symmetric, i.e., all sectors buy inputs from other sectors in the same proportion. In the y-axis, the productive network is assumed to be asymmetric in a way that replicates the input-output matrix for the United States.

If the monetary-effect ranking were to be the same in both cases, then all points should be aligned on a 45-degree line. However, a lot of dispersion can be seen, indicating that the sectors where the monetary policy impact is bigger when the network is symmetric (i.e. sectors with very sticky prices) can have a moderate impact when the network is asymmetric if monetary policy has a low impact on the sectors from which it buys inputs. The opposite is also true, that is, those sectors where monetary policy has a low impact when the network is symmetric (with relatively flexible prices) react strongly when the network is asymmetric.

Recent working papers of the Central Bank of Chile

Number	Title	Authors	Date
845	The "Supply-Side Origins" of U.S. Inflation	Bart Hobijn	October 2019
844	The Pass-Through of Large Cost Shocks in an Inflationary Economy	Fernando Alvarez / Andy Neumeyer	October 2019
843	The Nonpuzzling Behavior of Median Inflation	Laurence Ball / Sandeep Mazumder	October 2019
842	The Propagation of Monetary Policy Shocks in a Heterogeneous Production Economy	Ernesto Pastén / Raphael Schoenle / Michael Weber	September 2019
841	Índice de sincronía bancaria y ciclos financieros	Juan Francisco Martínez / Daniel Oda	September 2019
840	The impact of interest rate ceilings on households' credit access: evidence from a 2013 Chilean legislation	Carlos Madeira	September 2019
839	On Corporate Borrowing, Credit Spreads and Economic Activity in Emerging Economies: An Empirical Investigation	Julián Caballero / Andrés Fernández / Jongho Park	September 2019
838	Adverse selection, loan access and default in the Chilean consumer debt market	Carlos Madeira	September 2019
837	The Persistent Effect of a Credit Crunch on Output and Productivity: Technical or Allocative Efficiency?	Patricio Toro	September 2019
836	Sectoral Transitions Between Formal Wage Jobs in Chile	Rosario Aldunate / Gabriela Contreras / Matías Tapia	August 2019
835	Misallocation or Misspecification? The Effect of "Average" Distortions on TFP Gains Estimations.	Elías Albagli / Mario Canales / Antonio Martner / Matías Tapia / Juan M. Wlasiuk	June 2019