Estimating the Impacts of Contractionary Monetary Policy Shocks on Rental Prices in the Canadian Economy

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Introduction and Motivation

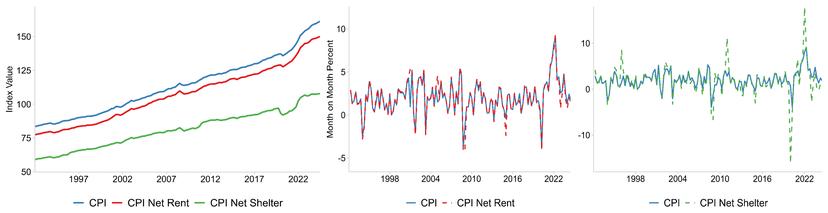
Finding rental accommodation in Canada is a challenge that continues to put stress on the tight budgets of Canadians. Though rental unit supply increased in Canada throughout 2023, demand for rental accommodation continued to outpace supply. This resulted in Canada experiencing record low vacancy rates at 1.5 percent and record high average rent growth at 8 percent (CMHC, 2024). The impact the rental market has on Canadians makes it an important area of research, and it is important that we understand its dynamics so we can understand its full effects on the economy. Rental accommodation makes up a significant portion of Canadian CPI (Lehto, 2023), but most macro-housing papers focus on aspects of owned accommodation (De Albuquerquemello and Besarria, 2021). Rent itself makes up 7.18 percent of CPI (Statistics Canada, 2024), meaning its rate of change has a significant effect on the Canadian inflation rate. Given there is not much research done on the relationship between changes in rental prices and the macroeconomy, particularly in Canada, there is an opportunity for me to bridge a gap in this field.

Though rental prices are largely determined by supply-side factors, there is still an important demand-side relationship to be studied. Duarte and Dias posit that contractionary monetary policy shocks result in rental price increases due to housing tenure decisions (Duarte and Dias, 2019). In the face of high interest rates, people may choose to hold off on buying a home and continue renting. They may also switch tenure from owning a home to renting a home if prices do not adjust quickly to a long-run nominal level. This change in tenure results in an increase in demand and prices for rental housing.

I aim to examine Duarte and Dias' claim in Canada. My research question is as follows: To what extent do contractionary monetary policy shocks affect rental prices in Canada?

Data

I source time series data from five primary sources: Statistics Canada, the Bank of Canada (BOC), the Bank for International Settlements (BIS), the Large Canadian Dataset for Macroeconomic Analysis (LCDMA), and the St. Louis Federal Reserve Database (FRED) at the monthly and quarterly frequency. I average the many monthly series I collect to be at the quarterly frequency. I construct two variables: CPI net rent and CPI net shelter. As the BOC introduced inflation rate targeting in 1991 and the inflation rate only settled down around 1996, I restrict my modeling sample to be 1996Q1-2024Q3. I take the log first difference of all my variables except for the overnight rate and the factors. This transformation converts my variables to a stationary form and allows for easier interpretations of Impulse Response Functions (IRFs).



Methods

I estimate SVAR models with a block of exogenous factors to examine my research question. The SVAR is an appropriate empirical strategy to use, as it allows me to estimate an internally consistent system where I can identify a monetary policy shock with a small set of assumptions (Duarte and Dias, 2019).

$$A_0 Y_t = \sum_{i=1}^{n} \beta_i Y_{t-i} + \sum_{j=0}^{k} \alpha_j F_{t-j} + B_0 \varepsilon_t \quad (1)$$

$$Y_t = A_0^{-1} \sum_{i=1}^{n} \beta_i Y_{t-i} + A_0^{-1} \sum_{j=0}^{k} \alpha_j F_{t-j} + A_0^{-1} B_0 \varepsilon_t \quad (2)$$

In Equation 1, I present the structural equation where A_0 is a matrix that characterizes the contemporaneous relationships among the endogenous variables, Y_t is a vector of endogenous variables, F_t is a vector of exogenous factors, β_i and α_j are coefficients, B_0 is a matrix that transforms uncorrelated structural shocks into the correlated reduced form residuals, and ε_t is a vector of the uncorrelated structural shocks. Equation 2 is the reduced form representation of the structural equation in which I take the assumed inverse of the matrix A_0 on both sides. To make causal inferences and identify monetary policy shocks, I impose the standard Cholesky Decomposition. I restrict the matrix A_0 to the identity matrix so there is no assumed contemporaneous feedback among variables and restrict the matrix B_0 to be lower triangular to impose a recursive structure among variables for Cholesky ordering.

I estimate four factors by performing principal component analysis (PCA) on the large database I have constructed. Including these factors in my model helps deal with omitted variable bias, allowing me to represent a large amount of variation in the Canadian and American economies with only a few variables (Bernanke et al., 2005). I use American series in addition to Canadian series, as the two countries are deeply connected through economic trade and spillovers (Chernis and Sekkel, 2017). The large database I use to estimate the factors is made up of all the continuing series in the LCDMA and seven U.S. series. The LCDMA is already transformed to be stationary and fill in missing values, but I transform the U.S. series to be stationary via a first log difference.

Results

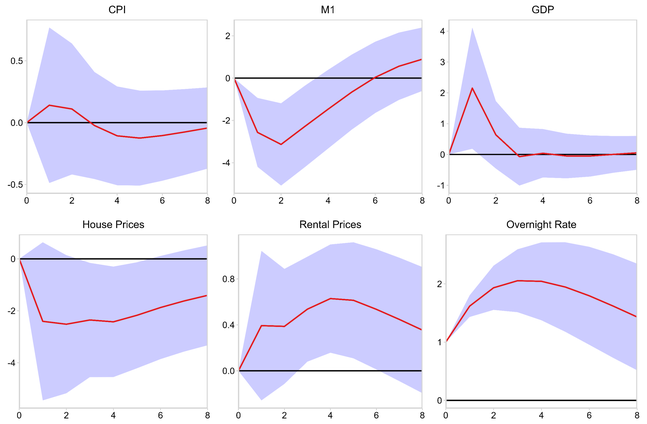


Figure 1: IRF results for the Benchmark SVAR without exogenous factors

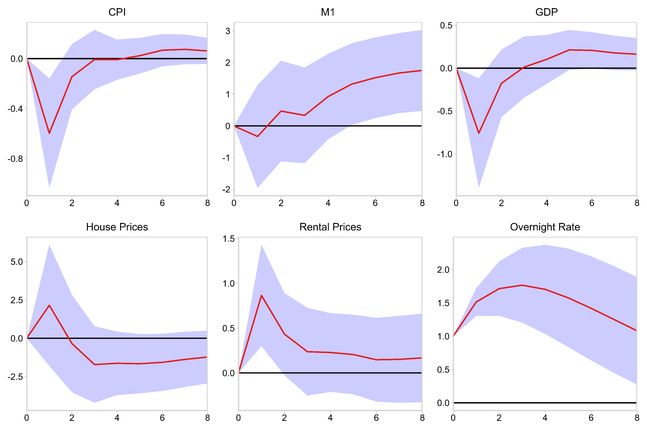


Figure 2: IRF results for the Benchmark SVAR with exogenous factors

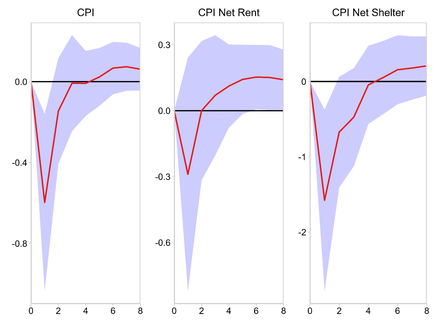


Figure 3: IRF results for the SVARs with exogenous factors where three different measures of CPI are replaced with one another

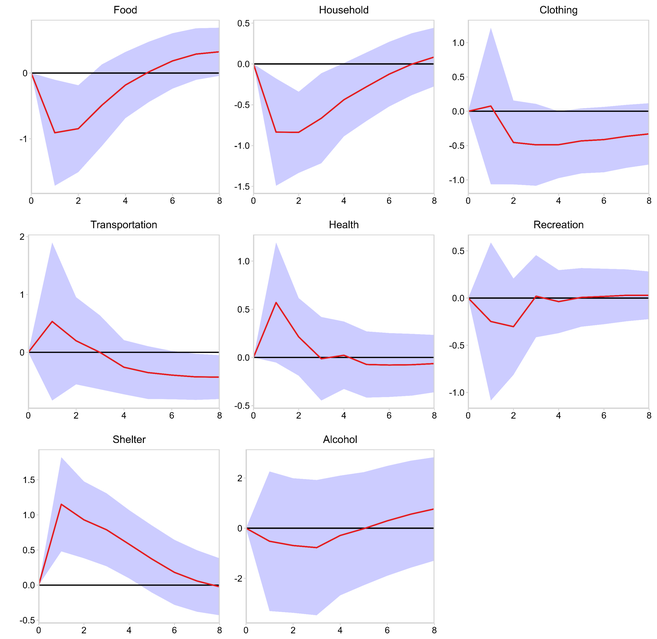


Figure 4: IRF results for the SVARs with exogenous factors where house and rental prices are replaced with the CPI component in question

All IRFs show the response of the system in question to a one standard deviation shock to the overnight interest rate. I construct confidence intervals at 68% by residual bootstrapping with 1000 repetitions. I determine the lag length for each model by consulting the information criteria, making sure the model remains stable and has little autocorrelation in its residuals. The results in Figure 1 show a one standard deviation shock to the overnight rate results in a lagged statistically significant increase in rental prices, while the results in Figure 2 show a significant earlier spike in rental prices that quickly comes down. The addition of the factors also removes the price puzzle found in Figure 1. Figure 3 shows that CPI net of shelter responds most aggressively to a monetary contraction. Interestingly, CPI net of rent responds less aggressively than CPI. Figure 4 shows the response of all the main CPI components to a one standard deviation shock to the overnight rate. Unsurprisingly, most variables initially decrease in response to this shock. The only statistically significant increase comes from the shelter component, while both transportation and health have a statistically insignificant initial spike.

Conclusion

My research has identified a monetary policy transmission mechanism in the Canadian economy that has the potential for further analysis. Understanding the dynamics of rental prices is important. I study the role monetary policy plays in altering these dynamics and find conflicting results. While my benchmark model with and without factors shows a statistically significant increase in rental prices due to monetary contraction, one effect is more lagged than the other. My analysis of how CPI net of rent responds to monetary contraction is peculiar as it responds less aggressively than CPI. A number of my models also show significant autocorrelation in their residuals. The Cholesky Decomposition is a simple framework that could be altered in further research to a richer identification strategy. Access to housing tenure variables like rental vacancy and homeowner vacancy rates would also allow for a formal test of the housing tenure decision.

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