BANK OF CANADA
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Bank of Canada Graduate Student Paper Award Workshop Summary

Workshop presenters. Front row, from left: Ella D. S. Patelli, Mark Rempel and Genevieve Nelson. Back row, from left: Eyub Yegen, Yuxi Yao and Aruni Mitra.

September 16, 2019

Mark Rempel (University of Wisconsin-Madison)
Ella D. S. Patelli (HEC Montréal)
Eyub Yegen (Rotman School of Management, University of Toronto)
Aruni Mitra (Vancouver School of Economics, University of British Columbia)
Genevieve Nelson (University of Oxford)
Yuxi Yao (University of Western Ontario)

Public Listing Choice with Persistent Hidden Information

Mark Rempel (University of Wisconsin-Madison)

Mark Rempel, along with co-author Francesco Celentano, studies whether an increase in intangibility drives the decline of public stock listings. The intuition behind the paper is that increasing intangibility creates a private information wedge of insiders, and the persistent private information leads to an increase in the volatility of performance pay for CEOs. Private investors, such as venture capitalists, can avoid this information problem by monitoring firms. To explain these dynamics, the authors construct a model of an optimal firm contracting with external financiers in public and private markets. The model predicts that an increase in intangibility and firm cash-flow volatility will lead to an increase in the sensitivity of compensation for CEOs of public firms to their performance and a decrease in the probability that these firms will be listed publicly. The authors empirically test the model's predictions on data from both private and public firms. The conditional analysis supports the sorting predictions of the model and provides evidence that executive compensation increases with proxies of increased private information (i.e., higher intangibility and higher firm volatility). The paper also evaluates the effect of the *Sarbanes-Oxley Act* and finds that it is not a fundamental driver of the decline in public listings.

A participant asked whether the share of CEO compensation has grown, and whether this trend is the same for all workers or is variable. Rempel said that within firms, the CEO is important, but other key players, such as head engineers, could also affect long-run performance. However, he did not have a detailed empirical decomposition of these key players or other factors. Work by Song et al. suggests an increase in the variation of compensation between firms, not within firms.[1] Another participant asked whether the authors would consider splitting the data into sub-samples of firms (e.g., Taylor's method of capital intangibility); one sub-sample would be high-tech firms. Rempel replied that they did not look at a sub-sample of firms, but all the regressions did include industry fixed effects. Concerning high-tech firms, he is looking at analyzing patent data for the subset of firms that hold patents to capture an alternative measure of firm intangibility. A participant asked whether the model has implications for the relationship between private information and the vertical hierarchy of firms in the supply chain. Rempel said they had not studied this question, although it would be an interesting avenue to explore in the future.

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[1] J. Song, D. J. Price, F. Guvenen, N. Bloom, and T. von Wachter, "Firming Up Inequality," *The Quarterly Journal of Economics* 134, no. 1 (2019): 1–50.

Learning from Analysts' Forecasts: Implications for Asset Prices

Ella D. S. Patelli (HEC Montréal)

Ella D. S. Patelli argues that researchers assessing the impact of uncertainty on stock market valuation face two challenges. First, there is no clear consensus regarding the definition of uncertainty. Second, since uncertainty is unobservable, researchers must use imperfect proxies for it. Patelli uses analysts' forecasts for American-listed firms to estimate two model-based measures of idiosyncratic and systematic uncertainty. Reconciling some opposing views within the literature, she shows that uncertainty generated by idiosyncratic shocks is associated positively with market valuation, while uncertainty generated by systematic shocks is associated negatively with market valuation.

During the discussion, participants raised several questions. Some asked for clarity regarding the distinction between idiosyncratic and aggregate shocks and why the model does not have two separate signals in the earnings equations. Although the current approach seems to work in the sense that the estimated shocks follow the economic cycles, Patelli asked for suggestions to improve the set-up of the model. Participants discussed the Liptser and Shiryayev filter used in the paper. One said the variables filtered using Liptser and Shiryayev's method[2] could actually be estimated with a more commonly used Kalman filter. Other participants said additional equations would be needed to identify common shocks. The split of total uncertainty between idiosyncratic and systemic components is perceived to be counterintuitive. For example, the sum does not add up to the total uncertainty. One suggestion is to define the two uncertainties as the coefficients of the idiosyncratic and systemic shocks. Finally, a factor stochastic volatility model was recommended to estimate the common volatility.

[2] R. Liptser and A. Shiryayev, *Statistics of Random Processes* (Berlin: Springer-Verlag, 1977).

Common Ownership and Portfolio Rebalancing

Eyub Yegen (Rotman School of Management, University of Toronto)

Eyub Yegen contributes to the empirical literature by examining the potential role of collusive effects of common ownership. He addresses possible endogeneity issues related to the choice of common-ownership decisions by using financial institution mergers, which is an identification strategy used in more than 30 recent academic studies. Following prior studies, Yegen undertakes a difference-in-differences identification strategy using the mergers of financial institutions to create a treatment group and a control group to ascertain whether there are any product market effects of newly formed common-ownership positions. He finds that 85 percent of pre-merger treated firms are no longer commonly held by the acquiring institutions after the merger. Indeed, most of the firms are liquidated in the first quarter following the merger, consistent with Baker, Coval and Stein.[3] When portfolio rebalancing is taken into account in the difference-in-differences tests, the author's findings shed doubt on previous results that suggest that common holdings have anti-competitive effects on product market outcomes. Yegen finds further evidence that portfolio rebalancing post-merger is driven by factors such as portfolio diversification and index tracking.

During the discussion a participant asked about the possibility of a selection problem in the merger firms related to the degree of exogeneity of these mergers. Yegen said selection might be an issue, but only at the level of asset management. A participant suggested examining variations in merger limits across countries. Another asked whether the liquidations following mergers were due to regulation or diversification. Yegen used the S&P 500 as a dummy and found that liquidation was caused by the rebalancing of the portfolio to achieve diversification. He said if liquidation were a result of regulation, acquiring institutions would keep the better-performing firms, which is not the case. Another participant questioned why the He and Huang[4] paper predicted that market shares would increase. Yegen said He and Huang do not take rebalancing into consideration. Investors tend to shy away from common ownership, creating a lot of selling pressure. The empirical basis for claiming collusive effects of common ownership is weaker than it appears, and there is no strong evidence to support policy concerns about institutional common ownership.

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[3] M. Baker, J. Coval and J. C. Stein, "Corporate Financing Decisions When Investors Take the Path of Least Resistance," *Journal of Financial Economics* 84, no. 2 (2007): 266–298.

[4] J. He and J. Huang, "Product Market Competition in a World of Common-Ownership: Evidence from Institutional Blockholdings," *Review of Financial Studies* 30, no. 8 (2017): 2674–2718.

The Labour Productivity Puzzle and Structural Change

Aruni Mitra (Vancouver School of Economics, University of British Columbia)

Aruni Mitra shows that the sharp fall in the correlation of measured productivity with output and labour input during the mid-1980s in the United States was driven by the decreased variance of the factor utilization rate. Rapid de-unionization caused a major structural shift in labour markets, increasing the flexibility of the labour market. The changing composition and impact of technology and demand shocks in the US economy are broadly consistent with this story. Mitra develops a standard New Keynesian model with an endogenous factor utilization rate and time-varying convex cost of employment adjustment. The findings of the model match the empirical patterns in business cycle moments quite well.

A participant asked about a structural shift in the United States due to right-to-work laws creating less demand for unionized workers. Mitra did a cross-sectional analysis focusing only on states without right-to-work laws and found similar significant results. Another participant asked why there is a correlation between hours and productivity, but none between output and productivity. The participant also asked how effort and capital are differentiated in the model. Mitra showed that output consists of both effort and employment, meaning employment and output may be moving in opposite directions. Effort and capital are not differentiated in the model, but he said capital and effort are not interchangeable. A participant said the model might have imposed an artificial correlation between output and employment. Participants discussed the role of multinational firms in the decline of productivity share and the extent to which multinationals are linked to de-unionization. Asked whether he had considered the structural change regarding the flattening of the Phillips curve, Mitra said increasing nominal wage rigidity in the post-1984 period would improve the quantitative performance of the model, while increasing nominal price rigidity would have the opposite effect.

Securitization and House Price Growth

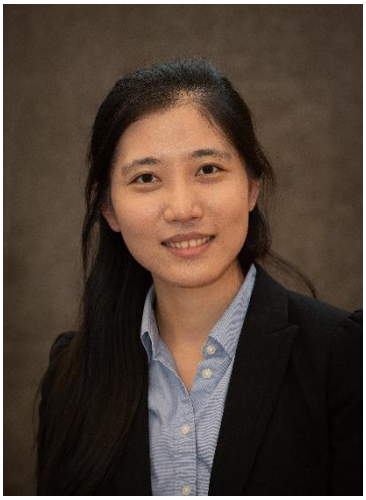
Genevieve Nelson (University of Oxford)

Genevieve Nelson investigates factors driving the boom in US house prices and mortgage debt between 2000 and 2006. Focusing on credit supply, her paper models the securitization of mortgage credit in a dynamic stochastic general equilibrium framework incorporating both primary and secondary (shadow banking) mortgage markets. The calibrated model is used to perform a horse race between innovation in securitization shocks, housing preference shocks and shocks to saver time preference. Nelson finds that only the securitization shock can explain the decline in the mortgage spread, a private-label mortgage-backed securitization boom and the shifting of mortgages to the non-bank sector.

A participant asked why the island assumption set-up is used, which results in banks not diversifying sufficiently. Another asked whether evidence suggests that banks do not have strong diversification portfolios. Nelson replied that inside the United States, geographical diversification exists. Unlike large banks, smaller, localized banks provide local loans. Commercial banks hold mortgage-backed securities, so they cannot diversify on the balance sheet. The shadow banks are outside the island to capture regulatory arbitrage, since shadow banks are subject to fewer constraints. A participant asked whether the securitization shock can be interpreted as a reduced-form variable capturing entries and exits. Nelson suggested that the securitization shock should be viewed as increasing or decreasing the comfort of the financial sector with securitization. Finally, a participant asked whether the 2003 change in mortgage insurance, which enabled banks to hold mortgages safely, would lead to the creation of shadow banks in the model. Nelson remarked that those changes are related to assets on balance sheets, which is distinct from securitization because of the shifting of those assets off balance sheets.

Accounting for the Rise in Dispersion of Housing Price-Rent Ratios across US Cities

Yuxi Yao (University of Western Ontario)



Since the 1980s, the housing price-rent ratio has both risen in mean and become more dispersed across US cities. This has caused concerns that residential properties are overvalued. Yuxi Yao explores the fact that the commonly used prices and rents capture the cost of different types of dwellings; rental apartments are less land-intensive, while owned single-family detached houses (SFDH) are more land-intensive. The difference in land intensity implies that price-rent ratios are increasing in land prices. Yao develops a model that quantitatively accounts for the cross-city variation in price-rent ratios, the high correlation between prices and rents and the increase in the dispersion of price-rent ratios from 1980 to 2010.

A participant asked what price-rent ratios are in condos and how they vary across cities. Yao said price and rent for condos may not be directly comparable because owned condos are generally better than rental condos in terms of location and quality. However, she does find that the price growth for SFDH is higher than for condos because condos are more likely to be used as rental properties. Another participant asked whether the model considers SFDH as a luxury good. Yao replied that the preference of more affluent owners to live in houses is stated in the model. Another participant asked whether the model captures household sizes; as family size increases, demand for a larger house increases. Yao said the model does consider this, resulting in household sizes varying across cities. A participant asked whether the income process is non-stationary as the richer get richer, and whether this feature is reflected in the model. Yao said the income process is assumed to be the same across all cities, and she is trying to build that into the model. Another participant asked whether land prices are at the city level and whether there are within-city variations. Yao replied that this can be captured by the relative productivity under the assumption that the ratio between land price in downtown and land price in the suburbs remains the same across all cities. Asked how construction costs are included in the model, she said construction wages are used as a proxy. She found that the wage ratios between construction workers and other workers do not vary with housing demand across cities. Moreover, most of the variation is attributable to changes in the price of land.

Workshop presenters and Bank staff. First row, from left: Bruno Feunou, Kim Huynh, Ella D. S. Patelli, Mark Rempel, Genevieve Nelson and Geoffrey R. Dunbar. Second row, from left: Césaire Meh, Eyub Yegen, Yuxi Yao, Aruni Mitra and Wei Dong. Third row, from left: Jonathan Chiu, Grzegorz Halaj, Lawrence L. Schembri and James C. MacGee.