



University of Virginia – Richmond Fed Research Workshop

Summary of Presented Research

April 19, 2019
Charlottesville, Virginia

9:00 a.m.

Lee Lockwood

Assistant Professor, University of Virginia
*The Risk of Owning vs. Renting Housing in
Spatial Equilibrium*

10:15 a.m.

Felipe Schwartzman

Senior Economist
Federal Reserve Bank of Richmond
*What Do Sectoral Dynamics Tell Us About
the Origins of Business Cycles?*

11:15 a.m.

Cailin Ryan Slattery

University of Virginia
*Bidding for Firms: Subsidy Competition in
the U.S.*

1:30 p.m.

Thomas Lubik

Senior Advisor
Federal Reserve Bank of Richmond
Is There News in Inventories?

2:45 p.m.

Steven Baker

Assistant Professor, University of Virginia
Asset Prices and Portfolios with Externalities

Since 2014, the Research Department of the Federal Reserve Bank of Richmond and the Economics Department of the University of Virginia have held a semiannual workshop to share their latest research.

The workshop began as a way to build on the existing partnerships between Richmond Fed and UVA economists. The two institutions have enjoyed long-standing connections on the teaching side, with Richmond Fed economists teaching both undergraduate and graduate classes at UVA, as well as participating in PhD student advising. UVA faculty have been frequent visitors to the Richmond Fed, and there have been many fruitful coauthor relationships between the two groups. In addition, both institutions have a deep interest in understanding the economic forces that shape our national and regional economy. These connections spurred them to partner more formally — on UVA's campus in the spring and in Richmond in the fall — to exchange research ideas. Economists and graduate students have benefited tremendously from the dialogue with their colleagues from different areas of the economics profession.

Within this pamphlet, you'll find summaries of the research discussed at the most recent Richmond Fed-UVA workshop on topics ranging from business cycles to green investment portfolios. Both the Richmond Fed and UVA look forward to continuing and strengthening this relationship.

The Risk of Owning vs. Renting Housing in Spatial Equilibrium

By Scott Baker (Northwestern University), Lee Lockwood (University of Virginia), Lorenz Kueng (Northwestern University), and Pinchuan Ong (Northwestern University) – presented by Lee Lockwood

Apart from human capital, housing is the most important asset of most households, making the trade-off between owning and renting a home particularly consequential. Financial advisers and news media have often highlighted the alleged attractiveness of housing as an investment. In addition, the promotion of homeownership is an implicit or explicit goal of many federal policies. Baker, Lockwood, Kueng, and Ong examine the riskiness of housing investment and the conditions under which households are better off choosing renting over owning.

The paper considers two forms of risk: housing price fluctuations after purchase and rental price changes

while renting. The authors initially present evidence of a strong positive correlation among wages, rents, and housing prices. Using 1940-2010 U.S. data and a spatial equilibrium model based on commute zones, they infer that local labor markets and local housing markets are closely tied and that location-specific risks are a substantial source of risk in homeownership. The authors note that for households with long-term stays, owning eliminates renting risk. But they find that for typical working-age households, renting is preferable financially — that is, renters tend to lose less lifetime consumption than homeowners — because renting in principle is hedging some house-price risk.

What Do Sectoral Dynamics Tell Us About the Origins of Business Cycles?

By Christian Matthes (Richmond Fed) and Felipe Schwartzman (Richmond Fed) – presented by Felipe Schwartzman

Business cycles have numerous plausible causes, including demand factors such as monetary and fiscal expenditure shocks and supply factors such as productivity and commodity price shocks. In some past work, researchers have decomposed output fluctuations into the contributions of various shocks using tightly specified structural models and have found a prominent role for supply shocks. In the paper presented here, Matthes and Schwartzman exploit variation between sectors in terms of sensitivity to different aggregate shocks to help identify their effects. They build a new framework using a time series vector autoregression (VAR) model and associated Gibbs sampler that is scalable. They find that demand shocks are more important than supply shocks in driving the U.S. business cycle; in particular, they find that demand-side fluctuations account for 43 percent more of the variance of the U.S. GDP growth at business cycle frequencies than those originating in the supply side.

The authors' model is a flexible statistical framework for identifying a variety of demand and supply shocks simultaneously based on prior knowledge of their differential impact on different sectoral prices and quantities. For example, an energy cost shock is identified with an aggregate shock that increases energy prices and has a larger price and output impact on energy-intensive sectors. The identification scheme used for each shock mostly relies on input or demand intensity shares available in input-output tables. The VAR that they introduce to implement this identification scheme, the Hierarchical Vector Autoregression (Hi-VAR), is a large-scale, flexible, and tractable model that allows them to analyze aggregate and sectoral time series jointly while allowing for rich internal sectoral dynamics.

Bidding for Firms: Subsidy Competition in the U.S.

By Cailin Ryan Slattery (University of Virginia)

State governments spend large portions of their local development budgets on subsidies that induce large mobile firms to locate in their states. For example, in 2016, state governments promised \$7.6 billion to just thirty-six firms. The welfare consequences of such policies are uncertain. If subsidy competition between states results in transfers of rents from states to firms, this race to the bottom hinders the provisions of public goods. On the other hand, subsidies enhance welfare if they improve the match between firms and locations by allowing firms to internalize the positive externalities of the indirect jobs they create.

Slattery considers the welfare implications of subsidy competition and the factors that determine those subsidies. She tracks news and state budget statements to build a novel dataset of state incentive spending and related information on 485 firm-level subsidy deals from 2002-16. She then develops a

structural model of subsidy competition in which states bid in an English auction for each firm. States are allowed to value potential indirect job creation with the entry of small firms, and firms choose their location based on the subsidy and the characteristics of the state.

She finds limited evidence that subsidies are related to the direct job creation promised by firms. She suggests that the apparent weakness of this relationship may be due to differences in state characteristics, to differences in the anticipated indirect creation of jobs, or to political motivations. She also finds that subsidies do affect firms' location decisions; in the absence of subsidies, she estimates, 68 percent of firms would locate in a different state. She finds that the subsidies do increase total welfare — by 22 percent — but that all of this welfare gain is captured by the firms.

Is There News in Inventories?

By Christoph Görtz (University of Birmingham), Christopher Gunn (Carleton University), and Thomas Lubik (Richmond Fed) – presented by Thomas Lubik

While the importance of inventory investment in explaining aggregate fluctuations is well documented, much less is known about how inventories move along with other aggregate variables in response to total factor productivity (TFP) news shocks — that is, changes in expectations about future productivity. Görtz, Gunn, and Lubik study the relationship of TFP news shocks and movement of inventory using a vector autoregression (VAR) model and then develop a framework to incorporate and interpret the empirical evidence about inventories.

The authors use the so-called max-share method to identify TFP news shocks. They find that the

standard business cycle model fails to generate the procyclicality of inventory investment when inventories are added to it. In addition, the model predicts that the demand for labor will decrease, suppressing the response of consumption, hours, and output, which is inconsistent with the data. The authors resolve these two challenges by introducing knowledge capital whereby firms can increase their productivity via learning by doing. With knowledge capital, firms can increase labor demand by accumulating knowledge before the TFP rises in the future. In the process of increasing knowledge, firms are likely increasing inventories to limit the rise in marginal costs in the future.

Asset Prices and Portfolios with Externalities

By Steven Baker (University of Virginia), Burton Hollifield (Carnegie Mellon University), and Emilio Osambela (Federal Reserve Board of Governors) – presented by Steven Baker

Baker, Hollifield, and Osambela rationalize green portfolios, or socially responsible investment (SRI), by incorporating various modifications into conventional portfolio theory in which investors maximize expected returns subject to risk tolerance. The authors note that serious negative externalities of uncertain magnitude, such as global warming, represent undiversifiable risk. They further argue that under conventional portfolio theory, environmentalists who face the greatest utility loss from the effects of environmental damages, such as the loss of biodiversity, correspondingly have the strongest motive to hedge against this outcome by investing in polluters — contrary to the actual behavior of those who invest in green portfolios or SRI.

The authors seek to explain investment in such portfolios using an equilibrium model of portfolios and asset prices where one firm produces a negative externality — pollution — and the other does not. Households are assumed to vary in their sensitivity to the externality. In this model, more sensitive agents tilt their portfolios toward the polluting firm, and the polluting firm is more highly valued than the nonpolluting firm. The authors then consider two countervailing motives that might reconcile theory with past empirical work.

First, they consider the case where environmentalists internalize their collective contribution to pollution

and coordinate their investment strategy, optimally reducing their investment in polluters. Because environmentalists who internalize are motivated by the aggregate impact of their actions, they take stronger action when they are a larger share of the population. Therefore, in the authors' view, this case cannot explain unilateral divestment by environmentalists when environmentalists who internalize are a small share of the population.

Second, they consider the case where environmentalists suffer nonpecuniary disutility from investment in polluters, which is similar to taxing environmentalists and nonenvironmentalists at different rates. Under those conditions, they find that aggregate investment in polluters decreases approximately linearly with the environmentalists' share of the population.

Finally, the authors incorporate a green alternative to polluting firms' stock, styled as a carbon emissions forward contract, as a pure financial innovation, leaving the underlying productive technologies unchanged. They find that aggregate investment is unchanged by introducing the green alternative, as the effects on environmentalist investors and nonenvironmentalist investors effectively offset each other.