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## **A SURVEY OF EMPIRICAL RESEARCH ON FISCAL POLICY ANALYSIS BASED ON REAL-TIME DATA**

This paper surveys the empirical research on fiscal policy analysis based on real-time data. This literature can be broadly divided into three groups that focus on: (1) the statistical properties of revisions in fiscal data; (2) the political and institutional determinants of fiscal data revisions and of one-year-ahead projection errors by governments, and (3) the reaction of fiscal policies to the business cycle. It emerges that, first, fiscal data revisions are large and initial releases are biased estimates of final values. Second, the presence of strong fiscal rules and institutions leads to relatively more accurate releases of fiscal data and small deviations of fiscal outcomes from government plans. Third, the cyclical stance of fiscal policies is estimated to be more “counter-cyclical” when real-time data are used instead of ex-post data. Finally, more work is needed for the development of real-time data sets for fiscal policy analysis. In particular, a comprehensive real-time data set, including fiscal variables for industrialized (and possibly developing) countries, published and maintained by central banks or other institutions, is still missing.

*Working Paper 11-25, “Real-Time Data and Fiscal Policy Analysis: A Survey of the Literature,” Jacopo Cimadomo, European Central Bank*

## **A QUANTITATIVE EQUILIBRIUM MODEL OF THE HOUSING SECTOR**

The authors construct a quantitative equilibrium model of the housing sector that accounts for the homeownership rate, the average foreclosure rate, and the distribution of home-equity ratios across homeowners prior to the recent boom and bust in the housing market. They analyze the key mechanisms that account for these facts, including the preferential tax treatment of housing and inflation. The authors then use the model to gain a deeper understanding of the recent housing and mortgage crisis by studying the consequence of an unanticipated increase in the supply of housing (overbuilding shock). They show that the model can account for the observed decline in house prices and much of the increase in the foreclosure rate if two additional forces are taken into account: (i) the lengthening of the time to complete a foreclosure (during which a defaulter can stay rent-free in his house) and (ii) the tightening of credit constraints in the market for new mortgages.

*Working Paper 11-26, “A Quantitative Analysis of the U.S. Housing and Mortgage Markets and the Foreclosure Crisis,” Satyajit Chatterjee, Federal Reserve Bank of Philadelphia, and Burcu Eyigungor, Federal Reserve Bank of Philadelphia*

## **ESTIMATING SCALE ECONOMIES AT LARGE BANKS**

Earlier studies found little evidence of

scale economies at large banks; later studies using data from the 1990s uncovered such evidence, providing a rationale for very large banks seen worldwide. Using more recent data, the authors estimate scale economies using two production models. The standard risk-neutral model finds little evidence of scale economies. The model using more general risk preferences and endogenous risk-taking finds large scale economies. The authors show that these economies are not driven by too-big-to-fail considerations. They evaluate the cost implications of breaking up the largest banks into banks of smaller size.

*Working Paper 11-27, "Who Said Large Banks Don't Experience Scale Economies? Evidence from a Risk-Return-Driven Cost Function," Joseph P. Hughes, Rutgers University, and Loretta J. Mester, Federal Reserve Bank of Philadelphia*

### **CAN MONETARY POLICY ENHANCE THE FUNCTIONING OF THE PRIVATE CREDIT SYSTEM?**

The authors investigate the extent to which monetary policy can enhance the functioning of the private credit system. Specifically, they characterize the optimal return on money in the presence of credit arrangements. There is a dual role for credit: It allows buyers to trade without fiat money and also permits them to borrow against future income. However, not all traders have access to credit. As a result, there is a social role for fiat money because it allows agents to self-insure against the risk of not being able to use credit in some transactions. The authors consider a (nonlinear) monetary mechanism that is designed to enhance the credit system. An active monetary policy is sufficient for relaxing credit constraints. Finally, they characterize the optimal monetary policy and show that it necessarily entails a positive inflation rate, which is required to induce cooperation in the credit system.

*Working Paper 11-28, "Optimal Monetary Policy in a Model of Money and Credit," Pedro Gomis-Porqueras, Monash University, and Daniel R. Sanches, Federal Reserve Bank of Philadelphia*

### **HOW STRATEGIC COMPLEMENTARITIES INTERACT WITH MARKOV-PERFECT POLICIES**

The literature on optimal monetary policy in New Keynesian models under both commitment and

discretion usually solves for the optimal allocations that are consistent with a rational expectations market equilibrium, but it does not study whether the policy can be implemented given the available policy instruments. Recently, King and Wolman (2004) have provided an example for which a time-consistent policy cannot be implemented through the control of nominal money balances. In particular, they find that equilibria are not unique under a money stock regime and they attribute the nonuniqueness to strategic complementarities in the price-setting process. The authors clarify how the choice of monetary policy instrument contributes to the emergence of strategic complementarities in the King and Wolman (2004) example. In particular, they show that for an alternative monetary policy instrument, namely, the nominal interest rate, there exists a unique Markov-perfect equilibrium. The authors also discuss how a time-consistent planner can implement the optimal allocation by simply announcing his policy rule in a decentralized setting.

*Working Paper 11-29, "On the Implementation of Markov-Perfect Monetary Policy," Michael Dotsey, Federal Reserve Bank of Philadelphia, and Andreas Hornstein, Federal Reserve Bank of Richmond*

### **ANALYZING THE STRUCTURED FINANCE ASSET-BACKED SECURITIES CDO MARKET**

This paper conducts an in-depth analysis of structured finance asset-backed securities collateralized debt obligations (SF ABS CDOs), the subset of CDOs that traded on the ABS CDO desks at the major investment banks and were a major contributor to the global financial panic of August 2007. Despite their importance, we have yet to determine the exact size and composition of the SF ABS CDO market or get a good sense of the write-downs these CDOs will generate. In this paper the authors identify these SF ABS CDOs with data from Intex<sup>®</sup>, the source data and valuation software for the universe of publicly traded ABS/MBS securities and SF ABS CDOs. They estimate that 727 publicly traded SF ABS CDOs were issued between 1999 and 2007, totaling \$641 billion. Once identified, they describe how and why multisector structured finance CDOs became subprime CDOs, and show why they were so susceptible to catastrophic losses. The authors then track the flows of subprime bonds into CDOs to document the enormous cross-

referencing of subprime securities into CDOs. They calculate that \$201 billion of the underlying collateral of these CDOs was referenced by synthetic credit default swaps (CDSs) and show how some 5,500 BBB-rated subprime bonds were placed or referenced into these CDOs some 37,000 times, transforming \$64 billion of BBB subprime bonds into \$140 billion of CDO assets. For the valuation exercise, the authors estimate that total write-downs on SF ABS CDOs will be \$420 billion, 65 percent of original issuance balance, with over 70 percent of these losses having already been incurred. They then extend the work of Barnett-Hart (2009) to analyze the determinants of expected losses on the deals and AAA bonds and examine the performance of the dealers, collateral managers, and rating agencies. Finally, the authors discuss the implications of their findings for the “subprime CDO crisis” and discuss the many areas for future work.

*Working Paper 11-30, “Collateral Damage: Sizing and Assessing the Subprime CDO Crisis,” Larry Cordell, Federal Reserve Bank of Philadelphia; Yilin Huang, Federal Reserve Bank of Philadelphia; and Meredith Williams, Federal Reserve Bank of Philadelphia*

### **NEW METHODOLOGIES FOR EVALUATING OUT-OF-SAMPLE FORECASTING PERFORMANCE**

This paper proposes new methodologies for evaluating out-of-sample forecasting performance that are robust to the choice of the estimation window size. The methodologies involve evaluating the predictive ability of forecasting models over a wide range of window sizes. The authors show that the tests proposed in the literature may lack the power to detect predictive ability and might be subject to data snooping across different window sizes if used repeatedly. An empirical application shows the usefulness of the methodologies for evaluating exchange rate models’ forecasting ability.

*Working Paper 11-31, “Out-of-Sample Forecast Tests Robust to the Choice of Window Size,” Barbara Rossi, Duke University, and Visiting Scholar, Federal Reserve Bank of Philadelphia, and Atsushi Inoue, North Carolina State University*

### **EFFECTS OF FISCAL POLICY UNCERTAINTY ON AGGREGATE ECONOMIC ACTIVITY**

The authors study the effects of changes in uncertainty about future fiscal policy on aggregate

economic activity. Fiscal deficits and public debt have risen sharply in the wake of the financial crisis. While these developments make fiscal consolidation inevitable, there is considerable uncertainty about the policy mix and timing of such budgetary adjustment. To evaluate the consequences of this increased uncertainty, the authors first estimate tax and spending processes for the U.S. that allow for time-varying volatility. They then feed these processes into an otherwise standard New Keynesian business cycle model calibrated to the U.S. economy. The authors find that fiscal volatility shocks have an adverse effect on economic activity that is comparable to the effects of a 25-basis-point innovation in the federal funds rate.

*Working Paper 11-32, “Fiscal Volatility Shocks and Economic Activity,” Jesus Fernandez-Villaverde, University of Pennsylvania; Pablo Guerron-Quintana, Federal Reserve Bank of Philadelphia; Keith Kuester, Federal Reserve Bank of Philadelphia; and Juan Rubio-Ramirez, Duke University*

### **INCORPORATING LONG-TERM DEBT INTO MODELS OF SOVEREIGN DEBT**

In this paper, the authors advance the theory and computation of Eaton-Gersovitz style models of sovereign debt by incorporating long-term debt and proving the existence of an equilibrium price function with the property that the interest rate on debt is increasing in the amount borrowed and implementing a novel method of computing the equilibrium accurately. Using Argentina as a test case, they show that incorporating long-term debt allows the model to match the average external debt-to-output ratio, average spread on external debt, the standard deviation of spreads and simultaneously improve upon the model’s ability to account for Argentina’s other cyclical facts.

*Working Paper 11-33, “Maturity, Indebtedness, and Default Risk,” Satyajit Chatterjee, Federal Reserve Bank of Philadelphia, and Burcu Eyigungor, Federal Reserve Bank of Philadelphia*

### **DO OIL PRICES HAVE A STABLE OUT-OF-SAMPLE RELATIONSHIP WITH THE CANADIAN/U.S. DOLLAR EXCHANGE RATE?**

This paper investigates whether oil prices have a reliable and stable out-of-sample relationship with the Canadian/U.S. dollar nominal exchange rate. Despite state-of-the-art methodologies, the authors find little

systematic relation between oil prices and the exchange rate at the monthly and quarterly frequencies. In contrast, the main contribution is to show the existence of a very short-term relationship at the daily frequency, which is rather robust and holds no matter whether the authors use contemporaneous (realized) or lagged oil prices in their regression. However, in the latter case the predictive ability is ephemeral, mostly appearing after instabilities have been appropriately taken into account.

*Working Paper 11-34, "Can Oil Prices Forecast Exchange Rates?," by Domenico Ferraro, Duke University; Ken Rogoff, Harvard University; and Barbara Rossi, Duke University, and Visiting Scholar, Federal Reserve Bank of Philadelphia*

### **IMPLICATIONS OF ELIMINATING BANKRUPTCY PROTECTION FOR INDEBTED INDIVIDUALS**

What are the positive and normative implications of eliminating bankruptcy protection for indebted individuals? Without bankruptcy protection, creditors can collect on defaulted debt to the extent permitted by wage garnishment laws. The elimination lowers the default premium on unsecured debt and permits low-net-worth individuals suffering bad earnings shocks to smooth consumption by borrowing. There is a large increase in consumer debt financed essentially by super-wealthy individuals, a modest drop in capital per worker, and a higher frequency of consumer default. Average welfare rises by 1 percent of consumption in perpetuity, with about 90 percent of households favoring the change.

*Working Paper 11-35, "Dealing with Consumer Default: Bankruptcy vs. Garnishment," Satyajit Chatterjee, Federal Reserve Bank of Philadelphia, and Grey Gordon, University of Pennsylvania*

### **STUDYING THE RELATIONSHIP BETWEEN THE SEVERITY OF THE LEMONS PROBLEM AND MARKET LIQUIDITY**

The authors study a dynamic, decentralized lemons market with one-time entry and characterize its set of nonstationary equilibria. This framework offers a theory of how a market suffering from adverse selection recovers over time endogenously; given an initial fraction of lemons, the model provides sharp predictions about how prices and the composition of

assets evolve over time. Comparing economies in which the initial fraction of lemons varies, the authors study the relationship between the severity of the lemons problem and *market liquidity*. They use this framework to understand how asymmetric information contributed to the breakdown in trade of asset-backed securities during the recent financial crisis and to evaluate the efficacy of one policy that was implemented in attempt to restore liquidity.

*Working Paper 11-36, "Trading Dynamics in Decentralized Markets with Adverse Selection," Braz Camargo, São Paulo School of Economics—FGV, and Benjamin Lester, Federal Reserve Bank of Philadelphia*

### **ESTIMATING THE VALUE OF THE TOO-BIG-TO-FAIL SUBSIDY**

This paper estimates the value of the too-big-to-fail (TBTF) subsidy. Using data from the merger boom of 1991-2004, the authors find that banking organizations were willing to pay an added premium for mergers that would put them over the asset sizes that are commonly viewed as the thresholds for being TBTF. They estimate at least \$15 billion in added premiums for the eight merger deals that brought the organizations to over \$100 billion in assets. In addition, the authors find that both the stock and bond markets reacted positively to these TBTF merger deals. Their estimated TBTF subsidy is large enough to create serious concern, particularly since the recently assisted mergers have effectively allowed for TBTF banking organizations to become even bigger and for nonbanks to become part of TBTF banking organizations, thus extending the TBTF subsidy beyond banking.

*Working Paper 11-37, "How Much Did Banks Pay to Become Too-Big-to-Fail and to Become Systemically Important?," Elijah Brewer III, DePaul University, and Julapa Jagtiani, Federal Reserve Bank of Philadelphia*

### **THE CONTINUING IMPORTANCE OF PORTAGE SITES**

The authors examine portage sites in the U.S. South, Mid-Atlantic, and Midwest, including those on the fall line, a geo-morphological feature in the southeastern U.S. marking the final rapids on rivers before the ocean. Historically, waterborne transport of goods required portage around the falls at these points, while some falls provided water power during early industrialization. These factors attracted commerce and

manufacturing. Although these original advantages have long since been made obsolete, the authors document the continuing importance of these portage sites over time. They interpret these results as path dependence and contrast explanations based on sunk costs interacting with decreasing versus increasing returns to scale.

*Working Paper 11-38, "Portage and Path Dependence," Hoyt Bleakley, University of Chicago, and Jeffrey Lin, Federal Reserve Bank of Philadelphia*

## **MACROECONOMIC AND WELFARE IMPLICATIONS OF RELAXING BORROWING CONSTRAINTS**

Is the observed large increase in consumer indebtedness since 1970 beneficial for U.S. consumers? This paper quantitatively investigates the macroeconomic and welfare implications of relaxing borrowing constraints using a model with preferences featuring temptation and self-control. The model can capture two contrasting views: the positive view, which links increased indebtedness to financial innovation and thus better consumption smoothing, and the negative view, which is associated with consumers' over-borrowing. The author finds that the latter is sizable: The calibrated model implies a social welfare loss equivalent to a 0.4 percent decrease in per-period consumption from the relaxed borrowing constraint consistent with the observed increase in indebtedness. The welfare implication is strikingly different from the standard model without temptation, which implies a welfare gain of 0.7 percent, even though the two models are observationally similar. Naturally, the optimal level of the borrowing limit is significantly tighter according to the temptation model, as a tighter borrowing limit helps consumers by preventing over-borrowing.

*Working Paper 11-39, "Rising Indebtedness and Temptation: A Welfare Analysis," Makoto Nakajima, Federal Reserve Bank of Philadelphia*

## **EXAMINING THE FORECASTING ABILITY OF PHILLIPS CURVE MODELS**

The Phillips curve has long been used as a foundation for forecasting inflation. Yet numerous studies indicate that over the past 20 years or so, inflation forecasts based on the Phillips curve generally do not predict inflation any better than a univariate forecasting model. In this paper, the

authors take a deeper look at the forecasting ability of Phillips curves from both an unconditional and a conditional view. Namely, they use the test results developed by Giacomini and White (2006) to examine the forecasting ability of Phillips curve models. The authors' main results indicate that forecasts from their Phillips curve models are unconditionally inferior to those of their univariate forecasting models and sometimes the difference is statistically significant. However, the authors do find that conditioning on various measures of the state of the economy does at times improve the performance of the Phillips curve model in a statistically significant way. Of interest is that improvement is more likely to occur at longer forecasting horizons and over the sample period 1984Q1–2010Q3. Strikingly, the improvement is asymmetric — Phillips curve forecasts tend to be more accurate when the economy is weak and less accurate when the economy is strong. It, therefore, appears that forecasters should not fully discount the inflation forecasts of Phillips curve-based models when the economy is weak.

*Working Paper 11-40, "Do Phillips Curves Conditionally Help to Forecast Inflation?," Michael Dotsey, Federal Reserve Bank of Philadelphia; Shigeru Fujita, Federal Reserve Bank of Philadelphia; and Tom Stark, Federal Reserve Bank of Philadelphia*

## **POOLING INFORMATION IN ESTIMATES OF GDP TO CONSTRUCT A COMBINED ESTIMATE**

Two often-divergent U.S. GDP estimates are available: a widely used expenditure-side version  $GDP_E$ , and a much less widely used income-side version  $GD_I$ . The authors propose and explore a "forecast combination" approach to combining them. They then put the theory to work, producing a superior combined estimate of GDP growth for the U.S.,  $GDP_C$ . The authors compare  $GDP_C$  to  $GDP_E$  and  $GDP_I$ , with particular attention to behavior over the business cycle. They discuss several variations and extensions.

*Working Paper 11-41, "Improving GDP Measurement: A Forecast Combination Perspective," S. Boragan Aruoba, University of Maryland, and Visiting Scholar, Federal Reserve Bank of Philadelphia; Francis X. Diebold, University of Pennsylvania, and Visiting Scholar, Federal Reserve Bank of Philadelphia; Jeremy Nalewaik, Federal Reserve Board of Governors; Frank Schorfheide, University*

of Pennsylvania, and Visiting Scholar, Federal Reserve Bank of Philadelphia; and Dongho Song, University of Pennsylvania

### STUDYING THE SPATIAL CONCENTRATION OF R&D LABS

The authors study the location and productivity of more than 1,000 research and development (R&D) labs located in the Northeast corridor of the U.S. Using a variety of spatial econometric techniques, they find that these labs are substantially more concentrated in space than the underlying distribution of manufacturing activity. Ripley's K-function tests over a variety of spatial scales reveal that the strongest evidence of concentration occurs at two discrete distances: one at about one-quarter of a mile and another at about 40 miles. These findings are consistent with empirical research that suggests that some spillovers depreciate very rapidly with distance, while others operate at the spatial scale of labor markets. The authors also find that R&D labs in some industries (e.g., chemicals, including drugs) are substantially more spatially concentrated than are R&D labs as a whole.

Tests using *local* K-functions reveal several concentrations of R&D labs (Boston, New York-Northern New Jersey, Philadelphia-Wilmington, and Washington, DC) that appear to represent research clusters. The authors verify this conjecture using significance-maximizing techniques (e.g., SATSCAN) that also address econometric issues related to "multiple testing" and spatial autocorrelation.

The authors develop a new procedure for identifying clusters — the *multiscale core-cluster* approach — to identify labs that appear to be clustered at a variety of spatial scales. They document that while locations in these clusters are often related to basic infrastructure, such as access to major roads, there is significant variation in the composition of labs across these clusters. Finally, the authors show that R&D labs located in clusters defined by this approach are, all else equal, substantially more productive in terms of the patents or citation-weighted patents they receive.

*Working Paper 11-42, "The Agglomeration of R&D Labs," Gerald A. Carlino, Federal Reserve Bank of Philadelphia; Jake K. Carr, Federal Reserve Bank of Philadelphia; Robert M. Hunt, Federal Reserve Bank of Philadelphia; and Tony E. Smith, University of Pennsylvania*

### EFFECTS OF GOVERNMENT SPENDING CUTS ON ECONOMIC ACTIVITY IN AN ENVIRONMENT OF SEVERE FISCAL STRAIN

The authors analyze the effects of government spending cuts on economic activity in an environment of severe fiscal strain, as reflected by a sizeable risk premium on government debt. Specifically, they consider a "sovereign risk channel," through which sovereign default risk spills over to the rest of the economy, raising funding costs in the private sector. The authors' analysis is based on a variant of the model suggested by Cúrdia and Woodford (2009). It allows for costly financial intermediation and inter-household borrowing and lending in equilibrium but maintains the tractability of the baseline New Keynesian model. They show that if monetary policy is constrained in offsetting the effect of higher sovereign risk on private-sector borrowing conditions, the sovereign risk channel exacerbates indeterminacy problems: private-sector beliefs of a weakening economy can become self-fulfilling. Under these conditions, fiscal retrenchment can limit the risk of macroeconomic instability. In addition, if fiscal strain is very severe and monetary policy is constrained for an extended period, fiscal retrenchment may actually stimulate economic activity.

*Working Paper 11-43, "Sovereign Risk and the Effects of Fiscal Retrenchment in Deep Recessions," Giancarlo Corsetti, Cambridge University; Keith Kuester, Federal Reserve Bank of Philadelphia; André Meier, International Monetary Fund; and Gernot J. Müller, University of Bonn*

### IDENTIFYING SOURCES OF THE DECLINE IN THE AGGREGATE JOB SEPARATION RATE

The purpose of this paper is to identify possible sources of the secular decline in the aggregate job separation rate over the last three decades. The author first shows that aging of the labor force alone cannot account for the entire decline. To explore other sources, he uses a simple labor matching model with two types of workers, experienced and inexperienced, where the former type faces a risk of skill obsolescence during unemployment. When the skill depreciation occurs, the worker is required to restart his career and thus suffers a drop in earnings. The author shows that a higher skill depreciation risk results in a *lower* aggregate separation rate and a *smaller* earnings loss. The key mechanisms are that the experienced workers accept lower wages in exchange for keeping the job and that the reluctance to

separate from the job produces a larger mass of low-quality matches. He also presents empirical evidence consistent with these predictions.

*Working Paper 11-44, "Declining Labor Turnover and Turbulence," Shigeru Fujita, Federal Reserve Bank of Philadelphia*

### **DEVELOPING A UNIFIED FRAMEWORK FOR MEASURING CONNECTEDNESS AT VARIOUS LEVELS**

The authors propose several connectedness measures built from pieces of variance decompositions and argue that they provide natural and insightful measures of connectedness among financial asset returns and volatilities. They also show that variance decompositions define weighted, directed networks, so that their connectedness measures are intimately related to key measures of connectedness used in the network literature. Building on these insights, the authors track both average and daily time-varying connectedness of major U.S. financial institutions' stock return volatilities in recent years, including during the financial crisis of 2007-2008.

*Working Paper 11-45, "Measuring the Connectedness of Financial Firms," Francis X. Diebold University of Pennsylvania, and Visiting Scholar, Federal Reserve Bank of Philadelphia, and Kamil Yilmaz, Koç University*

### **EXAMINING INVESTORS' REACTIONS TO SEASONED EQUITY OFFERINGS**

The authors examine investors' reactions to announcements of large seasoned equity offerings (SEOs) by U.S. financial institutions (FIs) from 2000

to 2009. These offerings include market infusions as well as injections of government capital under the Troubled Asset Relief Program (TARP). The sample period covers both business cycle expansions and contractions and the recent financial crisis. The authors present evidence on the factors affecting FI decisions to issue capital, the determinants of investor reactions, and post-SEO performance of issuers as well as a sample of matching FIs. They find that investors reacted negatively to the news of private market SEOs by FIs, both in the immediate term (e.g., the two days surrounding the announcement) and over the subsequent year, but positively to TARP injections. Reactions differed depending on the characteristics of the FIs, stage of the business cycle, and conditions of financial crisis. Larger institutions were less likely to have raised capital through market offerings during the period prior to TARP, and firms receiving a TARP injection tended to be larger than other issuers. The authors find that while TARP may have allowed FIs to increase their lending (as a share of assets) in the year after the issuance, they took on more credit risk to do so. They find no evidence that banks' capital adequacy increased after the capital injections.

*Working Paper 11-46, "Large Capital Infusions, Investor Reactions, and the Return and Risk Performance of Financial Institutions over the Business Cycle and Recent Financial Crisis," Elyas Elyasiani, Fox School of Business, Temple University; Loretta J. Mester, Federal Reserve Bank of Philadelphia and The Wharton School, University of Pennsylvania; Michael S. Pagano Villanova School of Business, Villanova University*