

## ANALYSIS AND MODELING OF THE GROWTH OF THE ECONOMY

**Анотація.** Увага зосереджена на важливій галузі досліджень, що викликана фінансовою кризою: взаємодії на фінансових ринках. Стаття носить теоретичний характер, досліджує нові ідеї та думки, розглядає їх кількісні характеристики, досліджуючи значення різних фінансових і ринкових відносин в моделях загальної динамічної та стохастичної рівноваги.

**Ключові слова:** фінансова криза, ринки капіталу, прогнозування, емпіричні методи, динамічні моделі рівноваги.

**Summary.** This paper focused on an important area of research stimulated by the financial crisis: understanding the role of financial market frictions. The article is of a theoretical in nature, exploring new ideas and views and considers are more quantitative in nature, exploring the significance of different financial market frictions in dynamic stochastic general equilibrium (DSGE) models.

**Key words:** financial crisis, capital markets, forecasting, empirical methods, dynamic equilibrium models.

**Statement of the problem.** The capital markets: studies interactions between the real and financial economy. The recent financial crisis has sparked new and interesting research on the sources of the crisis, how such a crisis might be prevented or foreseen, the potential impact on the macroeconomy, and policy responses.

We examined several aspects related to market dynamics that are similar to bank runs, but occur outside the banking sector. Presented a novel model of how payments clearing among interconnected agents are settled, and how the amount of liquidity needed to clear the payments depends on the payments system among the agents, consider the effect of financing longer-term investments by rolling over short-term assets, as in many financial institutions. The papers consider the risks associated with this maturity transformation and the roles played by volatility, liquidity, and maturity, as well the potential role of financial regulation in mitigating these risks.

The discussed two related empirical papers. The first, Banking Crises, carefully considers the roots of measured banking crises and finds that the crises arise from underlying systemic bank shocks. Since the shocks pre-date the crises, using the shocks to date the origins of the crisis changes one's view of the dynamics and causes of financial crises. Secondly looks at data during the financial crisis, and shows that because of re-default risk and self-cures (mortgages becoming current again), renegotiating delinquent mortgages is not very attractive to investors. Hence, payment-reducing loan modifications have been uncommon in both securitized and non-securitized pools of mortgages.

Finally, we considered several theoretical treatments of the recent financial crisis: there are cases where the release of coarse information is preferred by bond issuers enhancing primary market liquidity, at the cost of secondary market liquidity.

**Analysis of recent research and publications.** The labor market is central to many issues in macroeconomics, including business cycles, unemployment, inequality, and growth. We considers models of the labor market, data analysis, and the use of models to carry out substantive policy analysis.

Modern models of the labor market stress the underlying dynamics in job and worker flows. High-quality data on these flows is central to developing better models of these processes and assessing their consequences for a variety of substantive and policy issues. Therefore, we has always emphasized the analysis of new datasets that can shed additional light on the empirical properties of these flows. A recent example of this is the work of Steven Davis, Jason Faberman, and John Haltiwanger, «The Establishment-Level Behavior of Vacancies and Hiring». Recent models of labor market flows stress the role of vacancy creation in understanding labor market outcomes, and this is the first paper to provide systematic evidence on the relationship between vacancy posting and hiring. The paper uses data from the recent JOLTS dataset and the facts that it presents will play a key role in guiding the development and calibration of models of labor market dynamics.

Understanding the nature and causes of labor market fluctuations associated with business cycles remains a key issue in economics, and research on this issue has always featured prominently in the group's meetings. A recent example is paper, «Reconciling Cyclical Movements in the Marginal Value of Time and the Marginal Product of Labor», which shows that a standard macroeconomic model appended to capture labor market frictions, in the spirit of work pioneered by Diamond, Mortensen, and Pissarides, can reconcile observed labor market fluctuations in a framework where all bilateral gains from trade are realized. It does not follow that fluctuations are optimal from the perspective of society-high unemployment is socially inefficient.

Another long-standing issue in the analysis of aggregate labor market outcomes concerns the elasticity of aggregate labor supply, and in particular, the apparent inconsistency between low labor-supply elasticities that are estimated from micro data and the much larger values implicit in many aggregate models. The elasticity of aggregate labor supply has important implications both for the propagation of shocks in business cycle models and for assessing the implications of fiscal policy instruments, such as tax and transfer programs. Some authors argue that there is no inconsistency. They present a model of life — cycle labor supply in which standard procedures used to infer elasticities using micro data would find a small elasticity even though the aggregate elasticity is large. Central to this finding is the fact that individuals adjust their lifetime labor supply along two margins: how much to work while employed, and what fraction of their lives to spend in employment. An important implication of the analysis is that tax and transfer policies generate large responses in aggregate hours worked.

**The purpose of the article (problem):** the forecasting and Empirical methods focus on the development and assessment of econometric methods for use in empirical macroeconomics and finance, placing special emphasis on problems of prediction.

**The main material of the study.** Analysis tend to involve two types: one type with models or forecasts of one or more variables, using novel or technically advanced methods; a second type in which the authors develop and evaluate a new methodology for estimation, inference, or prediction.

In the first category, the study the term structure of nominal government debt, showing that a combination of a standard parametric specification and an arbitrage-free specification leads to improvement in predictive performance.

In the second category, in Dynamic Hierarchical Factor Models, develop and apply a procedure that allows a hierarchy across cross-section units prior to estimation; this is natural, for example, in applications with global, country, and regional factors. In real-time forecasting of real activity show that quarterly forecasts improve if monthly data are used.

**Methods and application for dynamic equilibrium models.** The dynamic equilibrium group conducts research on a range of subjects related to the construction, computation, estimation, and evaluation of dynamic models and their applications in empirical research. These types of models have become one of the main workhorses of modern macroeconomics and related fields such as finance. Sophisticated empirical analysis based on dynamic equilibrium models has produced novel substantive findings. An increasing number of policy-making institutions, including the Federal Reserve Board and many central banks including the European Central Bank, are actively formulating and estimating DSGE models for policy analysis and forecasting.

One active area of research is the incorporation of time variation into the parameterization of DSGE models. Time-varying parameters can be used, for instance, to capture changes in monetary policy over the post-war period. Develop and apply tools to solve rational expectations models with regime-switching coefficients derived from estimated DSGE models, for instance with respect to the sources of business cycles, are sensitive to assumptions about the driving forces of macro fluctuations.

Because direct information about the agents' information sets is not available, this information needs to be extracted in an efficient manner from the autocovariance properties of observable macroeconomic variables.

**Extending the monopolistic competition model.** A great deal of research in international trade uses the monopolistic competition model. The early models assumed that firms were symmetric in size, which contradicts the fact that a large fraction of exports in most economies are accounted for by a relatively small number of large firms. That observation was incorporated into the monopolistic competition model by Melitz, who added heterogeneous firms with random productivities. Since that time, the research has focused on extending many other aspects of the monopolistic competition model. Costas Arkolakis and Vogel make two rather fundamental contributions. Arkolakis introduces marketing costs into the model, thereby allowing for the presence of small exporters (which cannot arise in the Melitz model). Vogel is the first to introduce heterogeneous firms into a spatial version of the monopolistic competition model.

Other important features of the monopolistic competition model being examined in current research are product quality and product variety. It can be noted, that exogenous product quality enters the heterogeneous-firms model in much the same mathematical way as exogenous productivity. But a key difference is that with productivity, the firms that become large are the most productive and therefore have the lowest prices, whereas with quality, the largest firms have the highest quality products and therefore high prices. So, this implies a natural dichotomy between industries where firms compete based on productivity and the largest firms should have low prices and industries where firms compete based on product quality and the largest firms should have high prices.

We would expect that the demand for high-quality goods varies with income, so that non-homothetic preferences and the distribution of income become important. Studied the role of income distribution, using a utility function from Harry Flam and Elhanan Helpman, which implies that cross-country differences in income distributions are related to variations in import variety and price distributions. They find empirical support for the model by using micro data on income and price distributions that are derived

from trade data. Pablo Fajgelbaum, Gene Grossman, and Helpman use an alternative preference structure, drawing on the discrete choice literature. Their framework allows us to study the welfare consequences of trade, transport costs, and trade policy for different income groups in an economy. Ina Simonovska also uses a non-homothetic utility function to study the role of price discrimination in international trade, while Ana Cecilia Fieler introduces non-homothetic preferences into the Eaton-Kortum model of trade. James Markusen provides a survey of results obtained with non-homothetic preferences. Finally, Maurice Kugler and Eric Verhoogen, who analyze data for firms, develop a production-side explanation for the quality of traded inputs and outputs.

The studies described above are general equilibrium, combining theory and empirical work. Other empirical research focuses on partial-equilibrium frameworks used to develop measures of product quality. Amit Khandewal uses a discrete choice framework to estimate product quality in a wide range of U. S. manufacturing industries, at the Harmonized System 10-digit level. In his framework, a product that is in high demand but does not have a low price necessarily must be high quality. The same idea, but with different functional form for demand, is used by Juan Carlos Hallak and Schott to estimate product quality for the United States. Manova and Zhiwei Zhang examine the quality heterogeneity across Chinese exporting firms.

Not only product quality but also product variety lends itself to empirical implementation. Compare two methods of measuring product variety in automobiles: one using product-level import data and the second using actual market data on automobiles sold in the country. They find that implied welfare benefits from using the product-level import data are only half what is found with the market-based data. They further show that the welfare gains from all foreign-owned varieties (both imported and from foreign affiliates) are well over 50 percent larger than those stemming from imported varieties alone. In dynamic models the gains from product variety in inputs can contribute to enhanced efficiency and increased growth. Closely related to the concept of variety in trade is the extensive margin of exports, which refers to the number of firms within an industry who are exporting. For an individual firm, the extensive margin of exports refers to the range of products that it produces and exports. Hand-in-hand with the large differences in the size and productivity of firms are differences in their product range. Bernard, Jensen, Redding, and Schott demonstrate this theoretically and empirically in U. S. data. An alternative theoretical approach to analyzing the scope of firms is presented by Volker Nocke and Stephen Yeaple.

A final area where the monopolistic competition model is being extended is the assumption of CES preferences, which leads to constant markups being charged by firms. Alternative preferences, such as the

non-homothetic cases referred to above, will lead to markups that are endogenous and therefore have important implications for welfare.

**Conclusions.** The model of growth focuses on differences in income across countries, firm-level, productivity growth, and technical progress over time. Simulation in time, the revision to the annual growth rate of a country had a standard deviation of 5.4 percent, much greater than the average growth rate itself of 1.5 percent. Remarkably, the revision to the average 30-year growth rate had a standard deviation of only 1.1 percent.

Examine theoretically how technological change and environmental problems can interact. In particular, study situations in which researchers can choose to work on improving «dirty» technologies like the internal combustion engine, or «clean» technologies like fuel cells and electric cars. They find that achieving optimal growth without an environmental catastrophe often involves not only input taxes (such as a carbon tax) but also efforts to direct technical change through research subsidies or profit taxes. When inputs are sufficiently substitutable, such subsidies or taxes can be temporary.

High-growth countries tend to accumulate official net foreign assets, but not private net foreign assets. Their explanation: the government in power has a bias toward current consumption (which it can direct while it is temporarily in power), and cannot commit the future government to a low tax rate on capital. Reforms that reduce these political economy and contracting frictions result in less government debt, and therefore less temptation to tax capital — but only gradually over time. So growth proceeds as the tax on capital slowly falls and official net foreign assets rise. Their theory implies that unconditional foreign aid does not boost growth even temporarily, and that unconditional debt relief lifts growth only temporarily.

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