DANMARKS NATIONALBANK DEUTSCHE BUNDESBANK EUROSYSTEM NORGES BANK

Heterogeneity in Firms, Households and Financial Intermediaries: New Developments in Business Cycle Analysis

5th – 6th October 2017
Danmarks Nationalbank – Copenhagen

POSTER SESSION

Asymmetric effects of monetary policy in regional housing markets

Knut Are Aastveit (Norges Bank) and Andre Anundsen (Norges Bank)

The effectiveness of monetary policy in affecting house prices depend both on the nature of the shock; expansionary versus contractionary, and on local housing market characteristics. Standard supply-demand theory suggests that an interest rate reduction should have a greater impact on house prices in markets with lower housing supply elasticities. We confirm this conjecture studying a panel of 263 US MSAs with different supply elasticities. Moreover, due to the downward rigidity of housing supply, theory suggests that the effect of contractionary shocks should be independent of the supply elasticity. Our results support this. A final theoretical conjecture is that contractionary shocks should always have a greater impact on house prices than expansionary shocks, as long as supply is not perfectly inelastic. Our findings suggest the opposite for most of the empirically observable elasticities in the US. For the most elastic areas, we find that contractionary shocks have a greater impact on house price dynamics. We provide some indicative evidence that this is related to a momentum effect that is more important in a booming market

Did ECB Liquidity Injections help the Real Economy?

Stine Louise Daetz (Danmarks Nationalbank and Copenhagen Business School)**,** M. G. Subrahmanyam (New York University – Stern School of Business), D. Y. Tang (Hong Kong University) and S. Q. Wang (Warwick Business School)

We investigate the corporate-level efficacy of unconventional monetary interventions using Longer-Term Refinancing Operations (LTROs), through which the European Central Bank provided long-term funds to banks. We find that Eurozone corporations did not increase investments even when their banks retained LTRO funds for a long period. However, counterfactual analysis suggests that LTROs helped Eurozone corporations sustain their investments better than European corporations outside the Eurozone. The LTROs were more effective in countries with accommodative fiscal policies. Our findings demonstrate that monetary interventions help decelerate economic decline, but also reveal the difficulty of boosting investments by injecting liquidity into the banking system.

New perspectives on the estimation of consumption Euler equations

Francesco Furlanetto (Norges Bank), Kate Reinhold (Bank of England) and Martin Seneca (Bank of England)

Consumption is the largest component of aggregate demand. Identifying the underlying parameters that govern consumption behavior is therefore important both for understanding dynamics in the macroeconomy and for devising good macroeconomic stabilization policy. While the pure life cycle-permanent income hypothesis (LC-PIH) has been consistently rejected by the data, the evidence in favor of various alternatives remains weak. We seek to make progress on two fronts. First, we present a new model-based perspective on the relative importance of rule-of-thumb behavior, non-separable preferences, and habit formation for consumption. We obtain an aggregate Euler equation that allows us to separate the individual parameters characterizing these features. The general framework facilitates the identification of the elasticity of intertemporal substitution. Moreover, a steady-state restriction in the model allows us to draw inference on the wealth effect on labor supply from the estimated parameters in the Euler equation. Second, we take a step in bridging macro and micro evidence by seeking to use disaggregated consumption data for different consumer types.

Housing over the Life Cycle and Across Countries: A Structural Analysis

Julia Le Blanc (Deutsche Bundesbank) and Jiri Slacalek (ECB)

Micro data document striking differences in household wealth across European countries; for example, the median net wealth in Italy and Spain exceeds more than three times that in Germany. The bulk of this variation in wealth is driven by the home-ownership rate and house prices. We solve a life-cycle model with a discrete choice between owning and renting a house. Countries differ in the dynamics of house prices and in the institutional set-up of the housing market (maximum loan-to-value ratios, tax deductibility of mortgage payments and costs of buying, selling and maintaining a house). We calibrate the model using country-specific labor income profiles, mortality rates and family sizes over the life cycle. Through the lens of the model, we study and interpret the substantial differences in homeownership rates, holdings of wealth and household saving behaviour across large European countries. In addition, we undertake simulations to understand the roles of the various demographic and institutional factors, house-price expectations and collateral constraints for the accumulation of wealth over the life cycle and across countries.

Reach for yield in investment funds

Alexandru Barbu (London Business School), Christoph Fricke (Deutsche Bundesbank) and **Emanuel Moench** (Deutsche Bundesbank)

Are low yields precipitating higher risk-taking among investment managers? What are the mechanisms through which funds' risk-taking operates? And does such behavior in turn affect the pricing of risk? We tackle these questions using a comprehensive data set on the monthly security-level holdings of over 4500 German retail and institutional investment funds for the sample period 2009-2017. We document that German investment funds have increased the duration and credit risk of their portfolios substantially over the past eight years. We propose a measure of funds' deliberate reach-for-yield based on transactions. We find that across fund categories reach for yield intensifies as risk-free rates fall and credit spreads become

compressed. Trading at negative rates only adds to this tendency, particularly in funds offering capital-protection clauses. Decomposing changes in the term structure of credit risk-free government bonds into changes in expected short rates and term premiums, we find that short rate expectations are the more important driver of reach-for-yield. Finally, we show that fund sector demand pressures have persistent effects on bond prices, controlling for past returns, bond-specific characteristics, time fixed effects, and other sectors' holdings of these funds.

Corporate Debt Maturity and Investment over the Business Cycle

Johannes Poeschl (Danmarks Nationalbank)

I document that the share of long-term debt of US corporate non-financial firms is pro-cyclical. Furthermore, the long-term debt share of small firms has a higher standard deviation and correlation with output than the long-term debt share of large firms. I construct a quantitative model in which firms optimally choose investment, leverage, the maturity structure of debt, dividends, and default. Firms face idiosyncratic and aggregate productivity risk. When they choose their maturity structure, firms trade off default incentives and roll-over costs. As a result, financially constrained firms endogenously prefer to issue short-term debt, because they face high default premia on long-term debt. Financially unconstrained firms issue long-term debt, because it has lower roll-over costs. The model, which is calibrated to match cross-sectional moments, can explain about one third of the variation of the aggregate maturity structure, and about sixty percent of the variation of the maturity structure of small firms. Restricting firms to issue only short-term debt or no debt at all can lead to higher average equity values and less default, but does not increase the average firm value.

Everyday Reference Prices and Nominal Rigidities

Nicoletta Berardi (Banque de France), **Federico Ravenna** (Danmarks Nationalbank) and Mario Samano (HEC Montreal)

We study retail price-setting behaviour using a Euro-area supermarket scanner dataset for a retailer which never adopts temporary sales. In several grocery retail-price datasets temporary sales account for a very large share of observed price changes, implying a short median price duration. Whether temporary price changes triggered by sale events play the same role in retailers' response to shocks as non-sale price changes is still an open question. Temporary sale price-changes have been shown to follow sticky plans and to be insensitive to changes in wholesale costs. On the other hand, there is evidence that 'reference prices' - defined as the most often quoted price at the item-level within a given time period - are set by grocery retailers so as to limit the variability of markups, consistently with leading theories of price-setting (Eichenbaum, Jaimovich and Rebelo, 2011). However reference prices are transaction prices for only a subset of a retailer's sale volume, and the duration of temporary sales may be adjusted in response to the state of the business cycle even if the price points are sticky and planned in advance. Our analysis sheds light on retail pricing behaviour by using item-level weekly and monthly prices for a grocery retailer adopting an everyday-low-price strategy. Since price changes are never engineered to represent a temporary sale event, every observed price effectively constitutes a 'reference price'. The analysis of a price dataset which nets out price changes potentially orthogonal to the retailer's optimal response to shocks yields the following results: I) prices are very sticky, with a median duration of 12 months and with over a quarter of all prices never changing over a 5-year period; II) price changes are state-dependent, and react to demand shifts specific to a single family of product; III) the pricing behaviour is heterogeneous across items: 10% of the items sold amount to 60% of the revenue, and their price responds strongly to demand shifts, while the price for the remaining items do not respond significantly to demand shifts.

The joint distribution of income, wealth and consumption in Germany

Julia Le Blanc (Deutsche Bundesbank) and **Tobias Schmidt** (Deutsche Bundesbank)

Recent research stresses the importance of reliable information on the joint distributions of consumption, income and wealth. The availability of micro-level data on income, wealth and consumption in one data set has been limited so far, however. In this paper we address this gap and make use of state of the art methods to estimate consumption in a survey on individual households' wealth and income: First, using the method by Browning et al (2014) we imputed total and non-durable consumption for the German wealth survey (Panel of Household Finances - PHF) by making use of information from the German budget survey (EVS). Second, a direct one-shot question on total non-durable consumption from the 2014 PHF survey will be used. Third, to get an alternative measure of total consumption we make use of the household's budget constraint and calculate income - savings flows. This is possible because the PHF survey is unique in the sense that it contains a large set of questions on active savings flows, including loan repayments and dissaving. Our results show that income and consumption are more equal distributed than the wealth distribution. About 60% of total wealth belongs to the 10% richest households, while only 30% of total income and 20% of nondurable consumption are generated by the 10% income (consumption) richest households. The correlation between the three measures is high but far from perfect. 1.5% of all households are among the top 10% for all three measures simultaneously. These results improve our understanding of inequality in the largest Euro area economy and furthermore add new dimensions to measuring inequality which has been impeded by data limitations in the past.

Comparing behavioral heterogeneity across asset classes

Saskia ter Ellen (Norges Bank), Cars H. Hommes (University of Amsterdam), Remco C.J. Zwinkels (Vrije Univesiteit Amsterdam)

We estimate a generic agent-based model in which agents have heterogeneous beliefs about the future price to see to what extent behaviour differs across assets, and what this implies for market stability. We find evidence for behavioural heterogeneity for all asset classes, except for equities. Heterogeneity is especially pronounced for macro-economic variables. Agents update their beliefs frequently in financial markets, and only gradually in the case of macro-economic variables. Consequently, we find that the probability of behavioural bubbles is substantially higher for the macro-economic variables than for financial assets.