



2008 Research Working Papers

February 22, 2021

Policy Regime Shifts and Inflation Persistence

By *Troy Davig* and *Taeyoung Doh*

RWP 08-16, December 2008; updated December 2009

Using Bayesian methods, we estimate a Markov-switching New Keynesian (MSNK) model that allows shifts in the monetary policy reaction coefficients and shock volatilities. Using U.S. data, we find that a more-aggressive monetary policy regime was in place after the Volcker disinflation and before 1970 than during the Great Inflation of the 1970s. Our estimates also indicate that a low-volatility regime has been in place during most of the sample period after 1984. We connect the timing of the different regimes to a measure of inflation persistence. In the MSNK model, the population moment describing the serial correlation of inflation is a weighted average of the autocorrelation parameters of the exogenous shocks. A shift to an aggressive monetary regime or a low-volatility regime shuffles the weight from the more-persistent to the less-persistent shocks, resulting in a decline in inflation persistence. The timing of regimes from the estimated MSNK model generates a statistically significant 'low-high-low' pattern of inflation persistence that is consistent with reduced-form empirical models. We discuss relative importance of policy shifts and volatility shifts in explaining this pattern.

JEL Classification: C11, E31, E52

Keywords: inflation persistence, Bayesian estimation, Markov-switching, DSGE models

Spin-offs: Theory and Evidence from the Early U.S. Automobile Industry

By *Luis Cabral* and *Zhu Wang*

RWP 08-15 December 2008; updated July 2009

We develop a "passive learning" model of firm entry by spin-off: firm employees leave their employer and create a new firm when (a) they learn they are good entrepreneurs (type I spin-offs) or (b) they learn their employer's prospects are bad (type II spin-offs). Our theory predicts a high correlation between spin-offs and parent exit, especially when the parent is a low-productivity firm. This correlation may correspond to two types of causality: spin-off causes firm exit (type I spin-offs)

and firm exit causes spin-off (type II spin-offs). We test and confirm this and other model predictions on a unique data set of the U.S. automobile industry. Finally, we discuss policy implications regarding "covenant not to compete" laws.

JEL Classification: L26, L62

Keywords: spin-offs, passive learning, entry and exit

Product Innovation and Network Survival in the U.S. ATM and Debit Card Industry

By *Fumiko Hayashi* and *Zhu Wang*

RWP 08-14, December 2008; updated January 2011

This paper provides a model to explain the shakeout of the U.S. ATM and debit card industry, which emphasizes the role that a major product innovation – introducing the debit function in the mid 1980s – played in driving the network consolidation. Consistent with the theory, our empirical findings show that large networks had a better chance of adopting the debit innovation and surviving the shakeout. However, in contrast to previous studies, we find little advantage of being an early entrant in this network industry. Rather, ownership and organizational structure had an important influence on network size and survival.

JEL Classification: E30, L10, O30

Keywords: product innovations, firm survival, shakeout

Why Do Card Issuers Charge Proportional Fees?

By *Oz Shy* and *Zhu Wang*

RWP 08-13, December 2008

This paper explains why payment card companies charge consumers and merchants fees which are proportional to the transaction values instead of charging a fixed per-transaction fee. Our theory shows that, even in the absence of any cost considerations, card companies earn much higher profit when they charge proportional fees. It is also shown that competition among merchants reduces card companies' gains from using proportional fees relative to a fixed per-transaction fee. Merchants are found to be the losers from proportional fees whereas consumer and social welfare are invariant with respect to the two types of fees.

JEL Classification: D4, L1, G2

Keywords: payment cards, proportional and fixed fees, two-sided market

The Economics of Two-Sided Payment Card Markets: Pricing, Adoption and Usage

By James McAndrews and Zhu Wang

RWP 08-12, December 2008

This paper provides a new theory for two-sided payment card markets by positing better microfoundations. Adopting payment cards by consumers and merchants requires a fixed cost, but yields lower marginal costs of making payments. Considering this together with the heterogeneity of consumer income and merchant size, our theory derives card adoption and usage pattern consistent with cross-section and time-series evidence. Our analyses also help explain the observed card pricing pattern, particularly the rising merchant (interchange) fees over time. This is because a private card network, besides internalizing the two-sided market externality, has the incentive to inflate the card transaction value. We show that privately determined card pricing, adoption and usage tend to deviate from the social optimum, and imposing a ceiling on interchange fees may improve consumer welfare.

JEL Classification: L10, D40, O30

Keywords: payment cards, two-sided market, interchange fees

Long Run Risks in the Term Structure of Interest Rates: Estimation

By Taeyoung Doh

RWP 08-11 December 2008; updated October 2010

Using Bayesian methods, this paper estimates a model in which persistent fluctuations in expected consumption growth, expected inflation, and their time-varying volatility determine asset price variation. The analysis of the U.S. nominal term structure data from 1953 to 2006 shows that i) agents dislike high uncertainty and demand compensation for volatility risks, ii) the time variation of the term premium is driven by the compensation for fluctuating inflation volatility, and iii) estimates of risk factors are broadly consistent with survey data evidence.

JEL Classification: C32, E43, G12

Keywords: long-run Risk, Bayesian econometrics, term structure of interest rates, inflation volatility

Alternative Methods of Solving State-Dependent Pricing Models

By Edward S. Knotek II and Stephen Terry

RWP 08-10, December 2008

We use simulation-based techniques to compare and contrast two methods for solving state-dependent pricing models: discretization, which solves and simulates the model on a grid; and collocation, which relies on Chebyshev polynomials. While both methods produce qualitatively similar results, statistically significant quantitative differences do arise. We present evidence favoring discretization over collocation in this context, given a lack of robustness in the latter.

JEL Classification: E31, E37, C63, C68

Keywords: state-dependent prices, discretization, collocation, value function iteration

Price-Level Targeting and Risk Management in a Low-Inflation Economy

By Roberto Billi

RWP 08-09, December 2008

With inflation and policy interest rates at historically low levels, policymakers show great concern about "downside tail risks" due to a zero lower bound on nominal interest rates. Low probability or tail events, such as sustained deflation or recession, are disruptive for the economy and can be difficult to resolve. This paper shows that price-level targeting mitigates downside tail risks respect to inflation targeting when policy is conducted through a simple interest-rate rule subject to a zero lower bound. Thus, price-level targeting is a more effective policy framework than inflation targeting for the management of downside tail risks in a low-inflation economy. At the same time, the average performance of the economy is not very different if policy implements price-level targeting instead of inflation targeting through a simple interest-rate rule. Price-level targeting may imply less variability of inflation than inflation targeting because policymakers can shape private-sector expectations about future inflation more effectively by targeting directly the price level path rather than inflation.

JEL Classification: C63, E31, E52

Keywords: kurtosis, liquidity trap, long-run tradeoffs, monetary policy design, nonlinear, simple optimal rules, skewness, long-run stationary distribution

The Economics of Payment Card Fee Structure: Policy Considerations of Payment Card Rewards

By Fumiko Hayashi

RWP 08-08, November 2008

This paper considers possible public policies that could improve efficiency and welfare distribution in the U.S. retail payments industry. Mainly, four options, i) encouraging competition; ii) allowing merchants to surcharge; iii) regulating merchant fees; and iv) regulating payment card rewards, are discussed, but each option has advantages and disadvantages. Any single option may not achieve the policymakers' objective; rather, combining several policy options may be required.

JEL Classification: L51, D63

Keywords: Payment card rewards, merchant fees, competition policies, regulations

The Economics of Payment Card Fee Structure: What Drives Payment Card Rewards?

By *Fumiko Hayashi*

RWP 08-07, November 2008; updated March 2009

This paper investigates potential market forces that cause payment card rewards even when providing payment card rewards is not the most efficient. Three factors-oligopolistic merchants, output-maximizing card networks, and the merchant's inability to set different prices across payment methods-may potentially explain the prevalence of payment card rewards programs in the United States today. The paper also points out that competition among card networks may potentially make payment rewards too generous, and thus deteriorate social welfare and its distribution. The situation may potentially warrant public policy interventions.

JEL Classification: L13, L22

Keywords: payment card rewards, equilibrium fee structure, oligopolistic merchants, card network competition, no-surcharge-rules

The Economics of Payment Card Fee Structure: What is the Optimal Balance Between Merchant Fee and Payment Card Rewards?

By *Fumiko Hayashi*

RWP 08-06, November 2008

This paper theoretically considers the optimal balance between the merchant fee and the cardholder fee (rewards) from both efficiency and equity perspectives. First, the paper constructs the models that can be used by the U.S. policymakers. Because theoretical results are very sensitive to the assumptions of the models, it is important to construct models that reflect the reality of the market. Second, the most efficient fee structure and product price are considered under the various combinations of the assumptions. And finally, the paper considers welfare consequences of the most efficient fee structure.

JEL Classification: D61, D63

Keywords: payment card rewards, optimal fee structure, efficiency, equity

An Empirical Assessment of the Relationships Among Inflation and Short- and Long-Term Expectations

By Todd E. Clark and Troy Davig

RWP 08-05, November 2008

This paper uses a detailed literature review and an empirical analysis of three models to assess the links among inflation and survey measures of long- and short-term expectations. In the first approach, we jointly estimate a model of inflation, survey expectations and monetary policy, where each is a function of a common time-varying inflation trend. In the estimates, long-term expectations track closely the unobserved trend that is an important factor in inflation dynamics, implying that changes in long-run expectations can lead to persistent movements in inflation. In the second approach, we estimate a time-varying parameter VAR with stochastic volatility. This model relaxes the cross-equation and constant parameter restrictions from the first model. Impulse response analysis shows a relatively stable relationship between inflation and survey measures of inflation, although with some modest changes consistent with improved anchoring of long-term expectations. Finally, we rely on a conventional VAR framework incorporating several macroeconomic variables, including both short- and long-term measures of expected inflation. In these estimates, shocks to either measure of expectations lead to a rise in the other measure and some limited pass-through to inflation. Shocks to inflation cause both short- and long-term expectations to rise. Other factors such as monetary policy, economic activity, and food price inflation also affect expectations and inflation.

JEL Classification: E31, E32, E52

Keywords: expectation, trend inflation, inflation dynamics

Convenient Prices and Price Rigidity: Cross-Sectional Evidence

By Edward S. Knotek II

RWP 08-04, October 2008; updated January 2010

This paper provides cross-sectional evidence of convenient prices that simplify and expedite transactions, reducing the time costs from physically making a transaction. Firms may wish to set convenient prices for items that (1) are typically purchased with cash; (2) are sold alone or with a few similar items; and (3) are high-traffic transactions, i.e., require queuing or are frequently purchased. I collect a new data set and find broad support for the use of convenient prices in locations where making a rapid transaction is important. Convenience also appears to predominantly affect goods and services with above-average

price rigidity.

JEL Classification: E31, D11, D21, C2, L11, M31

Keywords: convenient prices, price rigidity, price points, 9-ending prices

Labor Market Search and Interest Rate Policy

By Takushi Kurozumi and Willem VanZandweghe

RWP 08-03, October 2008

We investigate implications of search and matching frictions in the labor market for inflation targeting interest rate policy in terms of equilibrium stability. When the interest rate is set in response to past or present inflation, determinacy of equilibrium is ensured similarly to comparable previous studies with frictionless labor markets. In stark contrast to these studies, indeterminacy is very likely if the interest rate is adjusted in response solely to expected future inflation. This is due to a vacancy channel of monetary policy that stems from the labor market frictions and renders inflation expectations self-fulfilling. The indeterminacy can be overcome once the interest rate is adjusted in response also to output or the unemployment rate or if the policy contains interest rate smoothing. When E-stability is adopted as an equilibrium selection criterion, a unique E-stable fundamental rational expectations equilibrium is generated under active, but not too strong, policy responses only to expected future inflation. This suggests that the problem is not critical from the perspective of learnability of the fundamental equilibrium.

JEL Classification: E24, E52

Keywords: labor market search and matching frictions; inflation targeting; indeterminacy; vacancy channel of monetary policy; E-stability

Markov-Chain Approximations of Vector Autoregressions: Application of General Multivariate-Normal Integration Techniques

By Edward S. Knotek II and Stephen Terry

RWP 08-02, October 2008

Discrete Markov chains can be useful to approximate vector autoregressive processes for economists doing computational work. One such approximation method first presented by Tauchen (1986) operates under the general theoretical assumption of a transformed VAR with diagonal covariance structure for the process error term. We demonstrate one simple method of more conveniently treating this approximation problem in practice using readily available multivariate-normal integration

techniques to allow for arbitrary positive-semidefinite covariance structures. Examples are provided using processes with non-diagonal and singular non-diagonal error covariances.

JEL Classification: C63, C32

Keywords: Markov-chain approximations; non-diagonal, singular covariance

How Do Large Banking Organizations Manage their Capital Ratio?

By Allen Berger, Robert DeYoung, Mark Flannery, David Lee and Ozde Oztekin

RWP 08-01, April 2008

Large banking organizations in the U.S. hold significantly more equity capital than the minimum required by bank regulators. This capital cushion has built up during a period of unusual profitability for the banking system, leading some observers to argue that the capital merely reflects recent profits. Others contend that the banks deliberately choose target capital levels based on their risk exposures and their counterparties' sensitivities to default risk. In either case, the existence of "excess" capital makes it difficult to observe how banks manage their capital levels, particularly in response to regulatory changes (such as Basel II). We propose several hypotheses to explain this "excess" capital, and test these hypotheses using annual panel data for large, publicly traded U.S. bank holding companies (BHCs) from 1992 through 2006, and an innovative partial adjustment approach that allows both the target capital ratios and the speed of adjustment toward those targets to vary with firm-specific characteristics. We find evidence to suggest that large BHCs actively managed their capital ratios during our sample period. Our tests suggest that large BHCs choose target capital levels substantially above well-capitalized regulatory minima; that these targets increase with BHC risk but decrease with BHC size; that BHCs adjust toward these targets relatively quickly; and that adjustment speeds are faster for poorly capitalized BHCs, but slower (*ceteris paribus*) for BHCs under severe regulatory pressure.

JEL Classification: G21, G28, G32

Keywords: banks, capital management, capital regulation, partial adjustment models