

2013

# Richmond Fed Research Digest

Summaries of work by economists in the Bank's Research Department published externally from June 1, 2012, through May 31, 2013

Welcome to the second annual issue of the *Richmond Fed Research Digest*. The Federal Reserve Bank of Richmond produces several publications that feature the work of economists in its Research Department, but those economists also publish extensively in other venues. The *Richmond Fed Research Digest*, a mid-year annual, brings this externally published research together in one place with brief summaries, full citations, and links to the original work. (Please note that access to articles may require registration or payment.) So bookmark this spot on the Richmond Fed website and mark your calendar for June 27, 2014, when the Bank will publish the next issue of the *Richmond Fed Research Digest*.

## Over-the-Counter Loans, Adverse Selection, and Stigma in the Interbank Market

By Huberto M. Ennis and John A. Weinberg

Review of Economic Dynamics, 2013, forthcoming.

There have been many instances in which banks have obtained loans in the interbank market at a higher rate than they would have received from the Federal Reserve's discount window. This behavior was particularly apparent during the 2007–09 financial crisis. Market observers have explained this as the result of a stigma effect associated with the discount window. Although the Fed takes measures to protect the identities of discount window borrowers, it may sometimes be possible for market participants to discover their identities. The stigma hypothesis states that banks are apprehensive about borrowing from the discount window for fear that it could be interpreted as a sign of financial weakness. For this reason, banks may be willing to accept higher rates in the interbank market to avoid tapping the discount window.

**Ennis and Weinberg provide a framework for studying explicitly and in detail the logic behind the notion of discount window stigma.**

While evidence suggests that the stigma hypothesis is plausible, it has not been studied formally in a model. In a *Review of Economic Dynamics* article, Huberto Ennis and John Weinberg of the Richmond Fed analyze the microeconomic foundations of stigma. To do this, they develop a model of interbank credit in which banks obtain loans in one period and must repay those loans in a subsequent period via asset sales to outside investors. The model's key features include decentralized trade in the interbank loan market (a feature that has become commonly used to study over-the-counter financial markets) and imperfect information about asset quality and bank trading histories. Ennis and Weinberg study versions of the model with and without a discount window. Although discount window borrowing is not publicly observed, there is some probability that investors could discover the identity of a borrower after the fact. While the Fed's stated purpose in discount window lending is to provide credit only to institutions with minimal

repayment risk, Ennis and Weinberg note that the stigma effect requires that “there is at least a perception in the market that imperfect screening is happening at the window.” They use this assumption in their model.

The authors consider the case in which a borrowing bank’s asset quality is observable by loan counterparties but not by investors. In this case, a bank’s discount window borrowing may indicate that it was not able to secure a loan in the market, generating a possible negative signal to investors about its asset quality. This negative signal would cause the bank to receive worse terms of trade in future transactions. Because of this, Ennis and Weinberg find that some banks in their model are willing to borrow in the interbank market at a higher rate than what they would pay at the discount window. Thus, they derive behavior in their model consistent with the stigma effect observed in the data.

Ennis and Weinberg provide a framework for studying explicitly and in detail the logic behind the notion of discount window stigma. Through a model of intertemporal trade and asymmetric information, they show how discount window borrowing can signal asset quality and affect asset prices in a way that would make banks reluctant to use the window. While their work does not demonstrate that behavior in the interbank market during the financial crisis was caused by stigma, it provides a first step toward a formal understanding of the idea of stigma at the discount window and opens the door to more grounded discussions of possible policies designed to address the issue.

<http://dx.doi.org/10.1016/j.red.2012.09.005>

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## **Competitors, Complementors, Parents and Places: Explaining Regional Agglomeration in the U.S. Auto Industry**

*By Luís Cabral, Zhu Wang, and Daniel Yi Xu  
NBER Working Paper No. 18973, April 2013.*

Over the years, economists have offered different explanations for the phenomenon of agglomeration, the geographic clustering of firms within an industry. Alfred Marshall provided one of the earliest hypotheses for agglomeration in his 1890 text, *Principles of Economics*. He posited that firms cluster together to benefit from knowledge spillovers from neighboring firms in the same industry (or intra-industry spillovers). An alternative hypothesis is that industries benefit from knowledge spillovers from nearby related industries (or inter-industry spillovers). Still others have suggested that industry clustering is the result of spinoffs (new firms formed by former employees of existing firms) that settle in the same area. Finally, some economists have argued that the locations themselves are important, offering unique advantages for particular industries and prompting agglomeration.

In a National Bureau of Economic Research working paper, Luís Cabral of New York University, Zhu Wang of the Richmond Fed, and Daniel Yi Xu of Duke University evaluate the extent to which these four hypotheses explain the agglomeration of the U.S. auto industry. They use data on the auto industry ranging from 1895–1969, including data on the precursor carriage and wagon industry that sheds light on inter-industry spillover. The data allow the authors to identify six historically important auto-production centers: Detroit, New York, Indianapolis, Chicago, Rochester, and St. Louis. They then develop a structural model to evaluate the driving forces behind agglomeration.

From the analysis, Cabral, Wang, and Xu find that, contrary to Marshall's hypothesis, intra-industry spillover had no measurable effect on auto-industry clustering. This is interpreted as implying that negative competition externalities outweigh Marshallian positive spillovers. In contrast, inter-industry spillover was very important, accounting for about half of the agglomeration seen in the data. The size of the carriage and wagon industry, in particular, significantly affected the number and quality of auto firms in several clusters. Spinoffs were the next largest contributing factor, accounting for about one-third of industry agglomeration. The authors discover that high-performing firms were more likely to generate spinoffs. To the extent that the positive superior performance of spinoffs from high-performing parents is only observed when the spinoff locates close to the parent, the hereditary benefit may result from access to information or other forms of support rather than common "genes." Finally, the authors find that location fixed effects accounted for slightly less than one-fifth of industry clustering.

The authors' findings indicate that the centers of the carriage and wagon industry were instrumental in determining the centers of auto manufacturing in the United States, while spinoffs and location fixed effects played some additional roles. Cabral, Wang, and Xu suggest that further research on the evolution of other industries could provide greater understanding of the driving factors behind industry clustering in general. Cross-country comparisons also could shed light on how agglomeration occurs in advanced countries relative to developing countries.

<http://www.nber.org/papers/w18973>

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## International Reserves and Rollover Risk

By Javier Bianchi, Juan Carlos Hatchondo, and Leonardo Martinez  
NBER Working Paper No. 18628, December 2012.

**D**uring the past decade, nations with emerging economies have accumulated large quantities of international reserves. In a National Bureau of Economic Research working paper, Javier Bianchi of the University of Wisconsin, Juan Carlos Hatchondo of the Richmond Fed, and Leonardo Martinez of the International Monetary Fund quantify the role of rollover risk in reserve accumulation. Their framework replicates salient features of the data and enables them to conclude that rollover risk plays a significant role in reserve accumulation. A notable feature of their setup is that it accounts not only for the joint accumulation of debt and reserves but also for the fact that domestic-asset purchases by non-residents and foreign-asset purchases by residents are procyclical activities that collapse during financial crises. Several existing models have failed to reconcile these two facts.

**In the model, international reserves help the government insure against rollover risk—the possibility that the cost of issuing debt increases.**

The authors use a model of sovereign defaultable debt à la Jonathan Eaton and Mark Gersovitz (1981) augmented with international reserves as their "theoretical laboratory." In this setup, a benevolent government in an emerging market sells risky long-duration domestic bonds and purchases "risk-free" foreign bonds (for example, U.S. Treasury securities). The authors assume that the government can default, temporarily preventing it from issuing new debt. In addition, the government faces an exogenous financial shock (a "sudden stop") that affects the government's ability to issue bonds. They also assume that sovereign debt in their model is priced by risk-neutral foreign investors in competitive markets. Therefore, in equilibrium, the model's sovereign spread reflects how the government's mix of outstanding debt and international reserves would affect its future incentives to repay. The authors use data from Mexico to calibrate their model, matching targets for the levels of debt and sovereign spread, the spread volatility,

and the frequency of sudden stops. International reserves in their simulations are equivalent to one-third of Mexico's average reserves between 1994 and 2011. The authors show that optimal reserves in their model can be as large as the level in the data when reserves play a role in decreasing the arrival probability of a sudden stop.

In the model, international reserves help the government insure against rollover risk—the possibility that the cost of issuing debt increases. If the government expects its borrowing costs to increase significantly, then it might be willing to tolerate a sizeable sovereign spread to accumulate international reserves. The authors show that simultaneously issuing long-duration bonds and accumulating international reserves allows the government to transfer resources to future periods with potentially higher borrowing costs.

During good times (high domestic aggregate income), a lower sovereign spread encourages the government to issue more bonds and purchase more reserves. Conversely, a sudden stop would force the government to curtail borrowing and start selling reserves to smooth out consumption. Taken together, these two results from the model explain why purchases of domestic assets by non-residents and purchases of foreign assets by residents are procyclical and why they collapse during financial crises.

<http://www.nber.org/papers/w18628>

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## Understanding the Interventionist Impulse of the Modern Central Bank

By Jeffrey M. Lacker

Cato Journal, Spring/Summer 2012, vol. 32, no. 2, pp. 247–253.

**D**uring financial crises, central banks typically expand bank reserves to prevent a monetary contraction from causing a deflationary spiral. During the financial crisis that began in 2007, however, the Federal Reserve's response went beyond mere monetary accommodation to include significant credit allocation as well.

In a speech before the Cato Institute's 29th Annual Monetary Conference, later published in a special issue of the *Cato Journal*, Richmond Fed President Jeffrey Lacker reflected on "some of the institutional reasons behind the prevailing propensity of many modern central banks to intervene in credit markets."

During the first phase of the financial crisis, the Fed attempted to "sterilize" its credit actions. The central bank sold U.S. Treasury securities, for example, to offset the effects of lending to support the merger of Bear Stearns and JPMorgan Chase. In later phases of the crisis, however, the Fed expanded bank reserves by acquiring private assets, such as loans to financial institutions, mortgage-backed securities, and debt issued by Fannie Mae and Freddie Mac. "Clearly, an equivalent expansion of reserve supply could have been achieved via purchases of U.S. Treasury securities—that is, without credit allocation," Lacker noted.

The Fed's credit actions were well-intentioned attempts to fix perceived market problems, but credit allocation can redirect resources from taxpayers to financial market participants. It also can expand moral hazard and distort the allocation of capital over time. The net benefits are debatable, but Lacker expressed no doubt that "central bank intervention in credit markets will have distributional consequences."

During the past 25 years, economists at the Richmond Fed have consistently advised against credit allocation because central bank lending circumvents the checks and balances of the fiscal process and threatens the Fed's independence. But during financial crises, central banks' unique ability to provide immediate assistance to key participants in credit markets is a tempting tool. "Central bank lending is often the path of least resistance in a financial crisis," Lacker noted. "The resulting political entanglements, though, as we have seen, create risks for the independence of monetary policy."

Central bank rescues provide short-term protection against market losses, but they can erode market discipline in the long run by encouraging excessive risk-taking in the future. "The conundrum facing central banks, then, is that the balance sheet independence that proved crucial in the fight to tame inflation is itself a handicap in the pursuit of financial market stability," Lacker said. The ability that central banks have demonstrated to intervene in credit markets only increases expectations of future rescues.

If central banks simply refused to exercise their power to allocate credit, they eventually could alleviate moral hazard and excessive risk-taking, but Lacker suggested that avowed self-restraint might not be sufficient. "While it might sound extreme, I believe that a regime in which the Federal Reserve is restricted to hold only U.S. Treasury securities purchased on the open market is worthy of consideration," Lacker said. "Such a regime, if credible, would over time force changes in market practices that would alter the likelihood and magnitude of crises and the behavior of private market arrangements during a crisis. It would strengthen market discipline and incentivize institutions to operate with more capital and less short-term debt funding—changes we are now trying to achieve through regulatory means."

<http://www.cato.org/cato-journal/springsummer-2012>

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## The Great Inflation of the 1970s

By Robert L. Hetzel

*In Routledge Handbook of Major Events in Economic History, edited by Randall E. Parker and Robert Whaples, New York: Routledge, 2013, pp. 223–238.*

The Great Inflation was a watershed event in U.S. economic and monetary history, so it is no surprise to find a chapter devoted to its origins and effects in the *Routledge Handbook of Major Events in Economic History*. In 1970, inflation in the United States was at an already elevated 5.7 percent, as measured by the year-over-year change in the consumer price index, and by 1980, it had surged to an unprecedented peacetime level of 13.5 percent.

**Hetzel notes that despite the Fed's shift from a Keynesian policy of "fine tuning," it continues to "employ the language of discretion."**

As with all major macroeconomic events, the causes and effects can be difficult to disentangle, but Robert Hetzel of the Richmond Fed argues that the 1960s and 1970s offer a unique opportunity to study the effects of distinct changes in monetary policy. He frames the Great Inflation as a "controlled experiment" to target specific levels of unemployment in exchange for expected levels of inflation. This experiment was guided by a largely Keynesian economic view over the objections of monetarists.

The Keynesian view held that inflation was determined by real forces. Inflation arose from a gap between real aggregate demand, composed of total consumption and investment, and potential output. If aggregate demand was too low, then the government should run a budget deficit to make up the shortfall in spending and return the economy to full employ-

ment. If aggregate demand was too high, inflation would rise, and the government would have to counteract this by running a budget surplus. To determine how much inflation they should expect at a given employment rate, Keynesians relied on the Phillips Curve, an empirical relationship that suggested a tradeoff between inflation and unemployment.

Monetarists rejected this tradeoff as structural, as well as the Keynesian assertion that inflation was determined by real variables. Milton Friedman argued that the tradeoff implied by the Phillips Curve only worked as long as inflation remained unexpected; once the public came to expect higher inflation, the relationship would disappear. He also argued that inflation was a monetary phenomenon and that the central bank could ensure price stability by following a rule of predictable money growth.

In the 1960s and 1970s, policymakers followed the Keynesian interpretation of the Phillips Curve and targeted unemployment of 4 percent. By the late 1960s, monetary policy became the "preferred instrument" for managing unemployment, Hetzel notes. The Fed engaged in what became known as "stop-go" monetary policy. In the go periods, the Fed would attempt to reduce unemployment to 4 percent by accelerating money growth. This inevitably would fuel inflation, which the Fed would respond to in the stop periods by raising the federal funds rate to slow money growth. As Hetzel explains, this back-and-forth response "destabilized the economy," resulting in successively higher peaks in inflation throughout the 1970s. Friedman's argument that the Phillips Curve tradeoff would not last in the long run proved correct as inflation increased without lowering unemployment.

In the 1980s, under Paul Volcker and later Alan Greenspan, the Fed demonstrated that inflation could be kept in check through a commitment to rule-like behavior to anchor inflation expectations. Hetzel notes, however, that despite the Fed's shift from a Keynesian policy of "fine tuning," it continues to "employ the language of discretion." He argues that this approach "does not allow the Fed to learn in any systematic way from historical experience," and he attributes the severity of 2007–09 recession to contractionary monetary policy in 2008 similar to the stop periods of the 1970s.

<http://www.routledge.com/books/details/9780415677035/>

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## Politics and Foreign Direct Investment

*By Nathan M. Jensen, Glen Biglaiser, Quan Li, Edmund Malesky, Pablo M. Pinto, Santiago M. Pinto, and Joseph L. Staats  
Ann Arbor, Mich.: University of Michigan Press, 2012, 211 pages.*

In recent decades, the importance of foreign direct investment (FDI) has been rising steadily. Even with global economic downturns in the 2000s, FDI has continued to play an active role in countries around the world, with investments spreading across all developed and most developing economies. The proliferation of FDI raises a number of questions about its origins and effects on local economies and politics.

In this book, six political science professors and economist Santiago Pinto of the Richmond Fed evaluate disparities in foreign investment flows and examine why some countries, and not others, attract high levels of foreign investment. They argue that politics plays a critical role, partly because it affects the risk environment that investors must consider. Political stability, rule of law, independent judiciary, and distributive effects are key elements driving investor perceptions of the desirability of different countries as hosts for FDI.

The authors begin by distinguishing between “push” and “pull” factors in FDI location decisions. Push factors include financial market conditions, technological changes, and growth. Pull factors refer to the economic and political conditions in host countries that may attract foreign investors. The authors focus on political pull factors because there is not much literature on the effects of politics on FDI and because host countries can do little to influence push factors.

In the first section of the book, the authors study links between regime type and political risk and conclude that democracies are more successful than authoritarian governments in attracting foreign investment. Democracies lower investor perception of political risk because they are relatively stable, transparent, and amenable to change. In other words, they give investors an opportunity to lobby for or against policies that affect their investments. In addition, democracies usually have more veto players who can block radical policy changes that might harm foreign investors.

Within regime types, the authors urge further examination of key factors such as strong courts, rule of law, and property rights protection. The authors also note a relationship between government promotion of certain types of investment and partisan politics. Leftist governments tend to favor foreign investment in sectors that benefit local labor, while rightist governments tend to attract FDI into sectors that complement domestic capital.

The last section of the book considers the influence of foreign investors in changing a host country’s policy environment to reduce risks and increase profits. Investors most strongly influence policies on the liberalization of trade and prices, large privatization, and competition. They demonstrate considerably less influence over the financial sector. Investor influence is closely tied to electoral competition; the more an electoral system allows open entry of new political parties and unfettered competition of political groups, the less influence investors have on politics.

Ultimately, the authors find a conclusive relationship between politics and FDI—including a strong correlation between democratic institutions and investor interest. Highly inclusive democracies tend to dilute investors’ influence over public policy, but more importantly, democracies limit the ability of politicians to nationalize firms or enact sweeping political reforms that hurt businesses in other unanticipated ways.

[http://www.press.umich.edu/3425019/politics\\_and\\_foreign\\_direct\\_investment](http://www.press.umich.edu/3425019/politics_and_foreign_direct_investment)

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