

Introduction to “*Wealth, Financial Intermediation and the Real Economy*”

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More than six years have passed since the bursting of the housing price bubble, and more than four years since the collapse of Lehman Brothers. Looking at these events in retrospect, what is surprising that the occurrence of these events and their dire consequences came as such a surprise. How could the approach of something so big have been so little noticed? Many causes for the crisis have been proposed, but the question still remains: what was it that prevented most of the world from recognizing the impending crisis and, looking ahead, what needs to be done now to prevent something similar from happening again? Was it a failure of existing data “warning systems” or a failure to appreciate what the data were saying? Or, was it a question of not understanding the complex structural changes that were occurring in the financial sector? It is important to ask these questions in any assessment of what, if anything, needs to be done to improve our existing systems for measuring financial activities and their effects on the real economy.

These questions were the subject of a conference held in Washington DC on November 12-13, 2010, at the Board of Governors of the Federal Reserve System (FRB), organized by Charles Hulten, Michael Palumbo and Marshall Reinsdorf. This volume comprises ten of the papers from the conference and a paper that expands on one of the discussant’s remarks, grouped into three sets. The first set of five papers is organized around the measurement problems associated with financial crisis and identifying improvements in macro and micro-based

measurement needed to deal with future crises. The next set of three papers concern advances in measurement in particular areas of financial activity that have raised questions of sustainability. One of these papers develops more complete measures of defined benefit pension plans for national accounts, and the other two develop detailed breakdowns of cross-border investment flows and returns that provide insights into the role of these flows in the financial crisis and the longer run evolution of the US balance of payments. The third set of papers focusses on measuring the effects of the financial crisis and associated recession on households and on Main Street using micro data on consumers, companies, detailed industries and stock market returns.

Dynamism and Structural Change in the Financial Sector

Several related themes run through the first group papers, each relating to structural changes in the financial sector: technological dynamism, increasing complexity, and growing opaqueness. These changes have been implicated as a cause of the financial crisis. They pose significant problems for economic measurement and they are central to the issues raised by many of the papers in this volume, so they are briefly reviewed in the following section.

The decades before the onset of the financial crisis were a period of significant innovation and structural change in the area of finance. The possibilities introduced by the IT revolution transformed the way stocks were traded and markets organized, and led to more sophisticated trading strategies and portfolio management, including computerized trading and quantitative modeling. The number of shares traded on a daily basis increased dramatically. Major product innovations included an explosive growth in financial derivatives and in structured financial products that collected pools of loans, and then sliced the pools into tranches with diverse safety and maturity characteristics that could be sold to investors with differing

investment objectives. There was also dynamism in the organization of the financial industry itself, the emergence of the shadow banking system being the most salient example.

This dynamism posed significant challenges to regulators and policy analysts, as well as to accountants and statisticians. The significance of new financial instruments and arrangements takes time to understand and to respond to, tasks made more difficult by the facts that making financial information public can reduce its value by sharing it with potential competitors, and that some of the innovation was designed to avoid regulatory constraints. Regulators and accountants were chasing a moving target, and measurement practice lagged.

With all this dynamism came a greatly increased degree of financial market complexity and opaqueness. One implication of the increased importance of asset-backed securities and derivatives was, for example, that the ultimate recipients of interest payments and the ultimate bearers of the default risk were increasingly separated from the underlying income-generating assets. Long gone were the days in which a bank loaned money to a local homebuyer and held the mortgage in its portfolio. Mortgages were pooled into mortgage-backed securities, which were sliced into risk tranches and then recombined into collateralized debt obligations (CDOs). This process could be repeated in the CDO-squared and the CDO-cubed, and other leveraged structured investment vehicles. As the chain of instruments connecting the asset sold to final investors to the original borrower grew, so did the number of links involved in valuation. With this came increased exposure to principal-agent problems and counterparty risk, exacerbated by the difficulty in valuing increasingly specialized derivative instruments. Valuation disconnects could thus easily arise, disconnects that were central to the mark-to-market problems that arose before and during the financial crisis.

Another consequence of these financial innovations was to disperse ownership claims against the underlying income-generating assets, and thus the associated risk. Yet at the same time, the financial system became more interconnected, and with this interconnectedness came increased opaqueness about the location and amount of individual risk. A failure in one part of the complex valuation chain would then propagate to counter-parties along the chain, with effects magnified by leverage and by reliance on short-maturity borrowing to finance longer term, less liquid, positions. Thus, as the bearing of risk associated with individual underlying income streams was diversified, growing complexity and opaqueness increased the overall risk to the system as a whole. The relevance of this point was demonstrated during a financial crisis when a problem in one corner of the mortgage market spread to the financial system as a whole, and then from Wall Street to Main Street in the deep recession that followed.

The approaching financial crisis and collapse of major financial institutions was only vaguely perceived by investors, managers, and regulators; indeed, it seems to have been almost invisible to most participants in the process. Is there, then, a role for statisticians in improving economic and financial visibility? Could measurement procedures be developed to help us to identify signs of bubbles and systemic risks? And how would such procedures cope with the dynamism, complexity, and non-transparency of the financial system?

One message from some of the papers in this volume is that any attempt to improve measurement practices must recognize that the information relevant to understanding events in the financial sector comes in many forms. At one end of the spectrum are the highly structured and publically available macroeconomic databases like the National Income and Product Accounts (NIPAs) from the Bureau of Economic Analysis (BEA) and the statistics on prices and employment from the Bureau of Labor Statistics. These data sets are highly aggregated, general

purpose bodies of information, and while they include information from the financial sector, as well as other variables affected by the operations of the financial sector, they are not specifically designed to track events in that sector. The data from the FRB's Flow of Funds accounts (FFAs) are more focused, but are still highly aggregated, and incomplete in the coverage of non-regulated entities in the shadow banking sector. Moreover, they provided little insight into questions about asset "quality", maturity mismatches and potential counterparty risk, and later, as the crisis began to unfold, questions about where ownership of risky classes of assets was concentrated. Such information is of clear relevance for spotting and managing emerging problems in the complex and dynamic financial industry.

More granular detail about individual firms and instruments, and the associated risks, can be found in regulatory data. Some of this information is publically available (the corporate financial statements filed with the SEC or the public variables on the bank Call Reports, for example). Much supervisory information is, however, protected by confidentiality arrangements. This confidential supervisory information can be qualitative, perhaps even impressionistic, and filling in gaps in information about new kinds of financial instruments and market participants may be a challenge even for regulators. Nevertheless, but it is this kind of data that are likely to be the most effective in diagnosing the early stages of a crisis.

Regulators are in direct contact with the protagonists in the financial sector and are well-positioned to collect and interpret information needed to spot emerging problems in individual companies and in the market as a whole. There are, however, some practical limits to their effectiveness. Important parts of the sector, like hedge funds and private equity funds, have lain outside the purview of regulatory authorities, and even in regulated sectors responsibilities have been divided among different supervisory agencies, as well as across national borders. Since the

crisis, measures have been enacted that help to address this problem, yet larger questions about the limits of regulation remain. These include problems of regulatory capture and regulatory arbitrage, and the incentive for innovation to avoid regulatory constraints or to benefit from mispricing of risk. Also, rights to confidentiality circumscribe the information available to regulators, and even more so to outside analysts.

Though not covered in the papers in this volume, some mention should be made of the great wealth of non-regulatory micro financial information. This includes a large volume of high frequency data from the financial markets, and a large number of reports and commentary from financial analysts and rating agencies. The new techniques associated with Big Data, including data scraping and software programs that take unstructured qualitative information and find patterns in a complex and ever changing environment, could be useful in developing a sort of financial early warning system for detecting approaching financial problem and for informing more the organized quantitative data sets.

Besides improvements in measurement practice, advances in theoretical understanding are also needed to prevent future crises like the one that led to the Great Recession. After all, large amounts of data were available to regulators, market participants, financial analysts, and policy makers before the crisis, yet most of the people involved did not see the crisis coming, or at least did not anticipate its severity or its imminence. The well-known quote about dancing while the music was still playing by the then CEO of Citi Group, Charles Prince, exemplifies this lack of clarity.¹ Was this just a data problem? Or was it more a question of not connecting the

¹ In July, 2007, Mr. Prince was quoted as saying

“When the music stops, in terms of liquidity, things will be complicated. But as long as the music is playing, you’ve got to get up and dance. We’re still dancing.”

dots, or at least recognizing that some important dots were missing. Indeed, when important dots are missing, the problem may be a failure to realize what data are needed. That measurement without theory is problematic is an old lesson, but one that that seemingly needs to be relearned in the aftermath of the financial crisis.

The Papers in this Volume

The papers in this volume identify data improvements needed to better understand developments in finance and their effects on households, Main Street businesses, and the international financial situation of the US economy. They also develop improved measurement methods in areas like defined benefit pension plans and international financial flows. Finally, they use specialized micro data sets to examine how households and businesses fared in the financial crisis. Among their themes are the data gaps revealed by the financial crisis, the

This was in reference to the company's role as a "leading lender to private equity buy-outs". He went on to say

"The depth of the pools of liquidity is so much larger than it used to be that a disruptive event now needs to be much more disruptive than it used to be. ... At some point, the disruptive event will be so significant that instead of liquidity filling in, the liquidity will go the other way. I don't think we're at that point."

(See Michiyo Nakamoto and David Wighton, "Citigroup chief stays bullish on buy-outs," *Financial Times*, July 9, 2007, <http://www.ft.com/intl/cms/s/0/80e2987a-2e50-11dc-821c-000779fd2ac.html#axzz2O6ubeL9Q>). Of course, Mr. Prince was not alone in failing to gauge the speed of the approaching crisis—the depth and widespread nature of the crisis suggest just the opposite. Citigroup's stock closed at a reverse-split adjusted price of \$474.80 on the date of the interview. It subsequently fell to \$10.48 on March 20, 2009.

development of improved financial and economic data and statistics, and approaches to data collection and analysis that will help us to see, understand and manage potential sources of systemic risk, disequilibria and poor economic performance.

Improving Economic and Financial Measurement: Lessons from the Financial Crisis

The first of the papers that focus on statistics for monitoring macroeconomic and financial stability is “**Financial Statistics for the United States and the Crisis: What Did They Get Right, What Did They Miss, and How Should They Change?**” by Matthew Eichner, Donald Kohn and Michael Palumbo. Building on research by Teplin et al. (2006) presented at the 2004 CRIW conference on a new architecture for the U.S. national accounts, the Bureau of Economic Analysis (BEA) and the Federal Reserve Board (FRB) have developed the Integrated Macroeconomic Accounts (IMAs) as a way of presenting production and income data from BEA’s National Income and Product Accounts (NIPAs) together with financial data from the FRB’s Flow of Funds Accounts (FFAs) in the unified framework laid out in the United Nations’ *System of National Accounts* (SNA). Eichner, Kohn and Palumbo identify a few warnings of growing risk or unsustainability that could be seen in the IMAs. Most notably, financial intermediaries normally channel funds made available through household saving to finance the investment needs of businesses, but as households’ saving began to fall short of their housing investment this flow reversed direction and business saving began to be used for lending to households. Also, the proportion of household disposable income needed to service debt rose over the decade preceding the crisis.² On the other hand, major developments that raised systemic risk in the mid-2000s, such as the deterioration in underwriting standards for mortgage

² Yamashita (2013) discusses some additional indications of risk that could have been constructed from the IMAs.

debt and the growth of maturity transformation outside of the traditional banking sector, were invisible to the statistical system.

Although key elements of financial crises—such as excessive leverage and risk-taking and heavy reliance on short-term sources of funding to finance long-term illiquid positions—remain the same, instruments and institutions tend to evolve in ways that require constant updating of risk metrics. Eichner, Kohn and Palumbo therefore emphasize that the dynamism of the world of finance can easily undermine the relevance of any static or pre-defined set of measures of risk. One of their illustrations of this point comes from the failure in 1990 of Drexel Burnham Lambert, which involved heavy reliance on unsecured short-term funding that could not be rolled over when funders lost confidence. This episode suggested that secured funding could be regarded as safe, and securing short-term funding by collateral became the norm. Yet, as asset-backed lending grew, the assets used as collateral began to include instruments whose value would be hard to determine during a time of crisis. A risk metric that treated secured funding as not vulnerable to crises of confidence would have worked well at the time of the Drexel failure, but have been misleading at the time of the financial crisis. In light of the dynamism and complexity of financial markets, the authors conclude that work on improved data and improved analysis of more-specialized data should proceed in tandem. More complete sets of published data on finance and the economy are only part of the process of developing early warning systems. More fundamental is the need to use data in a way that integrates the analysis of macro data to identify areas of interest with the development of specialized information to illuminate those areas.

Another perspective on the usefulness of the IMAs and on improvements in data and methods for monitoring macroeconomic and financial stability is provided by Barry Bosworth in **“Integrating the Accounts: Lessons from the Crisis”**. Bosworth notes that the financial crisis brought into focus some important limitations in the information provided in the IMAs and FFAs for purposes of assessing risks to financial stability and economic conditions during recoveries. The modern view of financial intermediaries emphasizes their role in transforming financial claims in the dimensions of liquidity, maturity, and credit risk, but these transformations are not well-captured by the FFAs. This helped to obscure the emergence of a shadow banking sector characterized by maturity mismatches and excessive leverage as a major provider of financial intermediation. Furthermore, the rise of the subprime mortgage industry on the back of financing made possible by new types of asset-backed securities and credit derivatives was not visible because the FFAs do not distinguish subprime from prime mortgages, nor do they distinguish asset-backed securities such as collateralized debt obligations (CDOs) from standard corporate bonds when looking at the holders of these securities. Another problem was their lack of information on derivatives. Furthermore, looking beyond the FFAs and IMAs, Bosworth notes that our understanding of the behavior of employment and of the current account deficit in the aftermath of the crisis was hindered by weaknesses in GDP and employment data.

Bosworth concludes that the emergence and subsequent collapse of the subprime mortgage industry provides a major lesson about the failure to document and analyze large innovations within the financial system. He also suggests that the IMAs include balance sheets for subsectors of financial business, along with the net worth measures needed for conventional measures of their leverage. Furthermore, data on the roles of prices and quantities in value changes would make the FFAs and IMAs more useful for monitoring financial stability. Finally,

Bosworth sees an important role for academics and other independent researchers, because the financial crisis highlighted the need for better analysis of financial developments that could affect stability and the financial regulators cannot themselves be relied upon to identify emerging risks. To promote research by outsiders on the systemic risk implications of financial developments, academic researchers should have as much access to the detailed data as is possible given the confidentiality constraints.

The next paper, “**Durable Financial Regulation: Monitoring Financial Instruments as a Counterpart to Regulating Financial Institutions**” by Leonard Nakamura, proposes a comprehensive strategy for filling in the sort of data gaps identified by Bosworth and for making possible the sort of detailed analytical research advocated by Eichner, Kohn and Palumbo. Part of this strategy is a linked macro-micro database that would be available to government agencies involved in systemic financial regulation. This database would enable those agencies to identify emerging risks and to obtain the information needed to respond effectively when they begin to threaten financial stability. Research by outside academics may also be needed to identify risks that are not evident to the regulators, so Nakamura recommends that a mechanism be developed so that they can get access to the database, subject to confidentiality restrictions.

The underlying framework for Nakamura’s macro-micro database comes from an extended version of the Flow of Funds Accounts that has a set of satellite accounts providing detailed breakdowns of the stocks and flows that are already shown in the core FFAs. One of the satellite accounts will provide a decomposition of the net change in mortgage liabilities of households into gross flows by tracking originations, repayments, defaults, and revaluations. This recommendation is strikingly similar to one presented at an earlier CRIW

conference on the Flow of Funds Accounts in a paper by Mendelson (1962), though it was the discussant for this paper who suggested putting the detailed gross flows in supplementary tables (Denison, 1962, p. 428). Other satellite accounts will also provide information on prices, including mark-to-market prices of exchange-traded instruments.

An important innovation in the database is that the macro aggregates will be linked to micro data containing samples of the instruments comprised by the macro aggregate. The micro data will have detailed descriptions of the sampled instruments, making possible the kind of analysis that is advocated in the Eichner, Kohn and Palumbo paper. Data showing detailed characteristics of a representative sample of mortgages held by issuers of asset-backed securities would, for example, have enabled researchers and regulators to learn about deteriorating lending standards and inflated appraisals before the financial crisis. Furthermore, when particular instruments migrate out of the heavily regulated parts of the financial system to special purpose entities, hedge funds, insurance companies or other unregulated entities, they become indistinguishable from other kinds of assets, making them invisible in the existing macro statistical system. By tracking instruments by ownership, the database would be able to illuminate parts of the financial system that would otherwise be obscure and to provide more complete information on holders of risky assets.

Besides the information gaps discussed in the first three papers, another problem in using the FFAs to elucidate the key developments that made the financial system vulnerable to a crisis was not knowing what to look for. In “**Shadow Banking and the Funding of the Nonfinancial Sector**” Joshua Gallin shows how a measure of the shadow banking system and its importance to the real economy could have been constructed from the existing FFAs by

combining data from different tables. Gallin's measure of shadow banking is based on the long term financing used by households and nonfinancial businesses whose funding came directly or indirectly from "runnable" short-term liabilities to terminal funders outside of the traditional banking system. Some of this funding comes directly from terminal funders that are potentially subject to runs; in 2006, for example, 2.4 percent of nonfinancial sector debt came directly from money market mutual funds. Much more of this sort of funding was, however, routed through non-bank intermediaries such as government-sponsored enterprises (GSEs) and private-label issuers of asset backed securities (ABS). In 2006, the GSEs and private label ABSs together provided 28 percent of the funding for the nonfinancial sector's debt, and they themselves obtained 16.4 percent of their funding from runnable short-term sources. The runnable short-term liabilities of these intermediaries therefore supported an additional 4.6 percent of the nonfinancial sector's borrowing.

Even after accounting for all of the non-bank intermediaries, the size of the shadow banking system looks modest using Gallin's definition of short-term funding outside of the traditional banking system that supports longer term borrowing. The important thing to look at is, however, its growth, not its level. These expansions and contractions in shadow banking activity had a significant impact on credit availability for the real economy. Over the two years ending in fourth quarter of 2008, the shadow banking system contributed +4.3 percentage points to the two-year growth rate of nonfinancial sector debt, but over the next years it contributed – 3.7 percentage points. Overall, the growth rate of nonfinancial sector debt fell by 8 percentage points between these periods, so the change in the growth contribution of the shadow banking system was on a par with the change in the overall growth rate of nonfinancial sector debt.

The final paper in the group on lessons from the financial crisis is “**Financial Intermediation in the National Accounts: Asset Valuation, Bubbles, and Tobin’s q** ” by Carol Corrado and Charles Hulten. These authors also use the FFAs to develop a new measure, but their use of the FFAs is motivated by a new conceptual framework. The financial crisis has exposed the inadequate treatment of the role of finance in the economy by standard neoclassical theory. The circular flow diagram showing a factor market and a product market but no financial market—which has long been a staple of introductory textbooks in economics—is an example of the neglect of finance. In the diagram’s factor market households obtain income in exchange for providing labor and capital inputs to business, and in its product market households spend their income on the goods and services produced by business. To complete the diagram, Corrado and Hulten add a capital market, where funds saved by households are made available for investment in exchange for financial assets representing claims on the operating surplus of businesses.

The creation of financial assets in capital markets creates the potential for disconnects between the value placed on the capital stock in markets for financial assets and the value of the income stream that the capital stock earns as an input into production. Moreover, the growing complexity of capital markets has increased the chances of such disconnects; with complex intermediation chains, disequilibria in asset valuations in financial markets, such as pricing bubbles, can easily arise. To measure the relationship between the value of the capital stock implied by the market values of financial assets and a measure of value implied by the investment needed to create the capital stock (including intangible capital assets), the authors construct Tobin’s q for the aggregate domestic capital stock. Their estimates of Tobin’s q diverge from the theoretical equilibrium value of 1 in two extended periods of time. From 1973 to 1986 (a time span that encompasses two oil price spikes, three recessions, a productivity

slowdown and spikes in inflation and interest rates) financial markets valued the capital stock at less than its replacement cost. On the other hand, in the decade preceding the financial crisis, the aggregate Tobin's q is mostly above 1. These were times of financial market innovations, such as online stock trading, securitization of mortgages into instruments like MBSs, collateralized debt obligations (CDOs) and CDO-squareds, and of credit default swaps and other derivatives.

The Modigliani-Miller theorem from finance implies that value of q should be unaffected by whether financing is raised through debt or equity. Yet if excessive complexity prevents financial markets from functioning efficiently, growth in borrowing could tend to inflate the value of q . Corrado and Hulten find rising leverage for household owner-occupiers beginning in the late Nineties and accelerating in the years just before the financial crisis. Note, however, that rising leverage does not always stem from increased borrowing: declines in asset prices can raise the ratio of assets to net worth if the presence of debt amplifies their relative effect on net worth. That is why homeowners had a rising leverage ratio after the financial crisis.

Recent Advances in Measuring Financial Activities, Flows and Stocks

The next group of papers presents some practical advances in measuring and analyzing financial activities and flows in the areas of defined benefit pension plans and cross-border investment. In “**Adding Actuarial Estimates of Defined Benefit Pension Plans to National Accounts**” Dominique Durant, David Lenze and Marshall Reinsdorf develop new actuarial measures of the household income and wealth from participation in defined benefit (DB) pension plans, which set benefit levels based on factors like career length and final pay. Until now, national accounts have measured these plans on a cash basis, but the timing of cash transactions may differ greatly from when claims to benefits are accrued, and the plans' asset holdings can differ in value from the benefit claims of plan participants.

One impetus for this change in methods is a new recommendation in the 2008 SNA calling for households' pension wealth from employer-sponsored DB plans to be measured by the actuarial value of benefit entitlements. Durant, Lenze and Reinsdorf design a modified version of the framework that is recommended in the 2008 SNA that includes an imputed interest expense for sponsors of underfunded plans and that has a more consistent treatment of the funding of benefits that comes from holding gains. The results from implementing this framework for DB plans in the US help to explain why the measured personal saving rate has been so low—the cash measures of DB pension plans underestimated the personal saving rate by an average of 1.7 percentage points in the period from 2000 to 2007. The higher estimates of income received by households also imply higher estimates of expenses for employers. Notably, the newly recognized pension expenses for state and local government exceed \$100 billion after 2002, so the picture of the fiscal situation of state and local governments changes from one of balanced budgets to one of significant deficits.

The new treatment of pensions in the 2008 SNA also addresses the problem of institutional differences between countries preventing meaningful international comparisons of retirement saving and wealth. In the core national accounts, government-sponsored pension plans, which predominate in most countries, are grouped with social security and accounted for in the different way from employer-sponsored DB plans. The new SNA has a supplementary table where actuarial measures of government-sponsored plans and social security that are comparable to the measures for employer-sponsored plans are reported in a alongside the figures for employer-sponsored plans.

In France, DB pension plans are largely government-sponsored, while in the US—leaving aside Railroad Retirement—they are employer-sponsored. A comparison of these

countries is therefore a good test of the usefulness of the supplementary table. Durant, Lenze and Reinsdorf find that substituting actuarial measures for cash measures of employer-sponsored pension plans raises the estimate of saving by US households by enough to narrow the large gap between the official household saving rates of the US and France substantially. Yet the size of the gap returns to almost its original level once accruals of benefit entitlements in government-sponsored plans and social security are added. These benefit entitlements are much larger in France, even after deducting the funding gap of social security. Taking social security wealth into account, French households have net wealth equal 8.6 years' worth of disposable income, compared to 6.5 years for American ones.

The group of papers on recent measurement advances is rounded out with two papers on cross-border financial flows and investment positions. A longstanding puzzle in the US balance of payments is how the US can enjoy persistently positive net cross-border receipts of investment income while having a negative net international investment position. In "**The Return on U.S. Direct Investment at Home and Abroad**" Stephanie Curcuru and Charles Thomas attempt to solve this mystery and to answer the related question of whether the US balance of payments is sustainable. Their first step is to locate the source of the investment income surplus in the large gap between the average rate of return on US direct investment abroad (USDIA) and the rate of return on foreign direct investment in the US (FDIUS). Next, to decompose this gap, they use a benchmark rate of return for domestic operations of US firms (USIUS) and find that USDIA has a much higher rate of return than USIUS, while FDIUS has a lower rate of return.

The gap between the average return on USDIA and the average return on tangible assets for USIUS over the entire sample from 1983 to 2010 is 330 basis points. Over half of this gap

disappears, however, once allowance is made for the taxes that US parents must pay on their FDI income. Curcuru and Thomas estimate the risk premium needed to compensate investors for the greater riskiness of the investments in the countries receiving US FDI and find that it can explain much of the remaining gap between returns on USDIA and tangible asset returns on USIUS. The rest of the gap is, they argue, explained by the risk premium needed to compensate the investors in USDIA for the higher amounts of sunk costs.

The low rate of return on FDIUS compared USIUS also needs to be explained. To do this, Curcuru and Thomas construct measures of the average age of FDIUS compared with USIUS, and fit models of how age of investment affects returns. They find that younger investments earn lower returns and that the average age of FDIUS was comparatively young over much of the time period covered by their data. Young ages of FDIUS investments account for 150 of the 230 basis points separating the average rate of return on tangible assets for USIUS and the average rate of return on FDIUS over 1983-2010. This effect comes mostly from the years before 2002, however. The age gap between FDIUS and USIUS closes after 2002, and if the rate of return denominator for USIUS is changed from just tangible assets to tangible and financial assets (with the interest from the financial assets included in returns), it vanishes.

The implications for the sustainability on the US balance of payments of these findings are generally optimistic. The net income paradox is not caused by errors in the data, but by differences in rates of return between USDIA and FDIUS that are mostly due to stable factors such taxes and risk premia. Nevertheless, the favorable gap in investment returns between USDIA and USIUS is likely to be smaller in the future because of the maturing of FDIUS.

Further evidence on US receipts international investment income and rates of return on USDIA and FDIUS is provided in Christopher Gohrband and Kristy Howell's paper on **"U.S. International Financial Flows and the U.S. Net Investment Position: New Perspectives Arising from New International Standards"**. The paper begins by proposing a restructuring of the financial account in the U.S. balance of payments (BOP) tables and in the U.S. International Investment Position (IIP) tables to classify international flows and positions by purpose (such as FDI) rather than by sector. Gohrband and Howell also develop more detailed estimates of the composition of the flows shown in the primary income and financial account sections of the main BOP table. The portfolio investment detail shows that net foreign purchases of the long term Federal agency debt and mortgage-backed securities were very large in the years leading up to the financial crisis, amounting to almost \$800 billion in 2006. Foreign portfolio investment that funded mortgage lending seems, therefore, to have helped to fuel the housing price bubble. When the bubble burst and the crisis began, foreigners became net sellers of mortgage-related securities, and turned to short term and long term Treasury securities; their net purchases of Treasuries reached \$712 billion in 2008.

The paper also provides for the first time a detailed decomposition of the sources of change in the value of international investment positions into income flows, price changes, exchange rate movements, and other changes. The "other changes" component reflects statistical discontinuities and should not be included in a measure of investment returns, so this new decomposition allows returns to be measured more accurately than has been possible until now. For the period 1990-2005, excluding the "other changes" from investment returns makes the gap between the average rate of return on USDIA and the average rate of return on FDIUS even bigger than it is using the measure in Curcuru and Thomas (this volume). Nevertheless, Curcuru

and Thomas's result that the excess return earned by US investors abroad compared to foreign investors in the US is comes from the direct investment component is confirmed by the more detailed analysis.

How Did the Financial Crisis Affect Households and Businesses?

Two papers from the conference develop empirical evidence on how households fared during the financial crisis and recession, while a third develops evidence on the extent to which access to external sources of the funding and liquidity was a problem for nonfinancial businesses in the wake of the financial crisis. The first paper on households' experiences is "**Household Debt and Saving during the 2007 Recession**" by Rajashri Chakrabarti, Donghoon Lee, Wilbert van der Klaauw and Basit Zafar. These authors had access to some unique micro data, including the Federal Reserve Bank of New York (FRBNY) Consumer Credit Panel sample of credit report records, a household survey collected by RAND in November 2008 to assess the impact of the financial crisis, and an FRBNY household survey on saving conducted in October 2009 to January 2010. They use those data to analyze changes in households' financial position and behavior in the recession that began in 2007.

In the RAND and FRBNY surveys about a third of respondents had experienced some type of financial distress, and the effects of the financial crisis were felt by all segments of the population. Different age, income and education groups suffered in different ways, however. When labor market conditions deteriorated, younger and less educated households had high rates of job loss or reductions in pay and benefits. Older and more educated households were less affected by poor labor market conditions, but they lost substantial fractions of their wealth as their home equity and retirement savings shrank. Looking at all households combined, 19

percent of respondents in the FRBNY survey reported that their household's pretax income had declined by 10 percent or more, and over 9 percent had negative equity in their home.

Along with falling income or wealth, the recession also brought a tightening of credit conditions. Mortgages with down payments under 10 percent, which had been common before the crisis, fell to a share of just 7 percent of new originations. In the FRBNY survey, 13 percent of respondents had had a credit card account closed by the bank, and 19 percent had had their credit limit cut. The contraction in credit availability was not the only driver of declines in debt and in lines of credit, however; households also adopted a more conservative approach to borrowing. For example, during a post-crisis period when the number of open credit card accounts fell by over 20 percent, credit card accounts were closed more frequently by consumers than by banks.

Households also reduced their spending. In the November survey conducted by RAND, 75 percent of respondents reported that they had reduced their spending between October 1 and the interview date, with a median cut of about \$200 per month. (The period from mid-September to mid-November 2008 saw the Lehman Brothers bankruptcy, several failures of major commercial banks and thrifts, a run on money market funds, and a large drop in the stock market, so consumers may have been responding to the heightened uncertainty of the economic environment as much as to declines in income that had already occurred.) Macroeconomic data from the NIPAs also show that spending declined faster than disposable income, causing the personal saving rate to rise.

The micro data from the FRBNY household survey show that the rise in saving did not take the form that might be expected. Households did not put more money net of withdrawals into retirement accounts and savings accounts. Instead, to reduce their loan balances, they

borrowed less and paid back more.³ The micro data from the Consumer Credit Panel provide more detail on this change in behavior because they can be used to estimate the change in household debt excluding the effects of write-offs by banks and home purchase transactions. Before 2008, net pay-down of mortgage debt was negative because cash-out refinancing, second mortgages, and use of home equity lines of credit created more new debt than was being extinguished by payments on existing mortgages. Net pay-down turned positive in 2008, and in 2009 the net amount of mortgage debt retired reached 140 billion dollars. In 2009 consumers even started to pay down non-mortgage debt, though the net repayment was held down by rapid growth in student loan debt.

Another set of micro data on households is analyzed in “**Drowning or Weathering the Storm? Changes in Family Finances from 2007 to 2009**” by Jesse Bricker, Brian Bucks, Arthur Kennickell, Traci Mach and Kevin Moore. These data cover participants in the 2007 FRB Survey of Consumer Finances (SCF) who were re-interviewed in the last half of 2009. At that time, the economy was in recession and the unemployment rate was up to nearly 10 percent.

Consistent with the macro data, mean family wealth in the SCF panel was down by 20 percent in 2009. Nonetheless, the macro data could not reveal how much variation there was in how families were faring. Using the data from the SCF panel, the authors find that the variation was considerable, with a quarter of families reporting *increases* in wealth of 25 percent or more. Some of this variation was related to families’ income, debt or employment circumstances. Over 70 percent of the families in the top income decile in 2007 had a fall in wealth, but for families in the lower three income quintiles the probability of a decline in wealth was only around 60

³ In addition, many older households reported that they had changed their retirement plans. Planned delays in retirement reduce the need to save today, but may allow greater saving in future years.

percent. Also, families with high debt payments relative to their income in 2007 were more likely than average to move far down in the wealth distribution, while families with high debt balances relative to assets were unusually likely to have a large move up in the distribution. Wealth declines were much more common among families where the respondent or spouse became unemployed, while relative large moves up in the wealth distribution were more likely than average for families where the respondent or spouse had exited unemployment.

The responses from 2009 also suggested that aggregate spending by consumers was likely to remain depressed. Desired levels of precautionary savings were higher than in 2007, and willingness to take risks was lower. Also, about 60 percent of households reported that they would curtail spending if they experienced a decline in the value of their assets, whereas only around 20 percent said that they would increase spending if their assets were to go up in value. If household spending really did have a stronger marginal response to negative changes in asset values than to positive ones, the large variance in wealth change outcomes may have tended to reduce household spending in the aggregate.⁴

In **“The Misfortune of Non-financial Firms in a Financial Crisis: Disentangling Finance and Demand Shocks”** by Hui Tong and Shang-Jin Wei the focus changes to how businesses fared as the subprime mortgage problems began to reach a crisis stage in mid-2007. The prospect of falling customer spending implied by the SCF panel was not the only problem that businesses had to cope with at this time; they also faced more restricted access to external finance as lenders weakened or failed and investors’ risk tolerance diminished. On the other hand, nonfinancial businesses held record amounts of cash, and even had negative average net

⁴ On the other hand, households approaching retirement age may have buffered their spending cuts by changing their retirement plans—a significant number of respondents said that they planned to delay retirement.

debt (debt minus cash on hand), so whether loss of access to financing would have serious effects was not clear.

A challenge in measuring the effect of access to external finance is disentangling it from the effect of falling demand. To identify financing constraint effects separately from demand destruction effects, authors take advantage of heterogeneity across non-financial firms in their *ex ante* vulnerability to these two types of shock. The terrorist attack of 2001 caused a demand shock but not a financing access shock, so Tong and Wei use stock price behavior just after the terrorist attack to construct a demand shock sensitivity variable. They also use a model fitted by previous researchers to construct a financial constraint (or liquidity constraint) index for firms that reflects their ease of access to outside finance. Finally, as an alternative to this financial constraint index, they also construct a measure of the intrinsic dependence on external finance of about 400 detailed (4-digit SIC) industries. (Airlines, defense, and finance sectors are excluded because these industries were directly affected by the terrorist attack or the subprime crisis.)

The results show that both the firms that were sensitive to a demand contraction and the firms that were liquidity constrained had greater than average declines in their stock price during the subprime crisis. Yet the quantitative impact of the liquidity constraint was much larger, and its effects on stock prices were felt more quickly than the demand contraction effects. Moreover, intrinsic dependence on external finance is also associated with an above average decline in stock price during the crisis, and the combination of a high financial constraint index and dependence on external finance measures is associated with an even larger stock price decline during the crisis than either of these variables on its own. Finally, as a robustness check, Tang and Wei test a number of alternative specifications of the model and confirm their main findings.

In assessing the implications of their results, Tang and Wei conclude that policy measures aimed at relaxing liquidity and financing constraints faced by non-financial firms will be critical for helping the real economy to recover from the financial crisis; policies aimed only at increasing demand are insufficient. In the context of the financial crisis, the capital market in the center of the amended circular flow diagram seems to be the most critical market for the economic recovery.

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