

IRVING FISHER'S PROGENY AND THE 2008 FINANCIAL CRISIS

BY

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Irving Fisher believed in evidence-based decision making. This paper considers how three aspects of Fisher's methodology could be useful now in the quest to deal with U.S. financial instability: (1) his institutional approach; (2) his efforts to use index number theory as a means to improve official statistics data; and (3) his interest in automating aspects of data analyses. The paper concludes with a call to action for Fisher's progeny. Actions to solve US financial instability are surely the most fitting possible tribute to Irving Fisher.

I. INTRODUCTION

Prior to the Great Depression, Irving Fisher believed economists could prevent future severe recessions. Seeking ways to make that prior belief come true became his life's focus thereafter. Fisher believed in evidence-based decision making. Researchers who look to observed experience for answers tend to fall into either of two, largely

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non-intersecting, groups: those focusing on unique differences (e.g., institutional differences among nations), which mostly cannot be examined using statistical methods rooted in the Law of Large Numbers; and those seeking answers in masses of data. Fisher did both. He studied how institutions and history shape economic outcomes. He also founded an institute, which put out weekly price index releases.

As a researcher interested in learning from masses of data, Fisher turned to mathematics and machinery: hallmarks more often associated with economic theorists and engineers. He understood that the functional forms used for summary statistics affect what users see in data. This was the motivation for his 1922 book. And, he saw the importance of automating aspects of data analysis. This was the basis, for example, for his machine to determine equilibrium prices.

Given modern research knowledge, data, and data-processing capabilities, how might Fisher mobilize to try to conquer the financial crisis disease? This is the subject of this paper.

I consider how three aspects of Fisher's methodology could be useful now in the quest to deal with US financial instability: (1) his institutional approach; (2) his efforts to use index number theory as a means to improve official statistics data; and (3) his interest in automating aspects of data analyses. These three aspects are taken up in the following three sections. The first constitutes a small case study, and provides a context for brief remarks on the other two.

The paper concludes with a call to action for Fisher's progeny. Actions to solve US financial instability are surely the most fitting possible tribute to Irving Fisher.

II. LEARNING FROM SPECIAL EVENTS AND INSTITUTIONS

Fisher's father died of tuberculosis, and he himself suffered from TB subsequently. These experiences led him to read epidemiology studies focusing on national differences in public infrastructure. In his subsequent economic studies, Fisher considered distinctive features of nations in trying to understand what predisposes some to more financial instability. Epidemiologists also note distinctive phases for illnesses and propose remedies for each of those, and Fisher did this, too, in studying the financial crisis disease. The US financial crisis that broke in 2008 is examined here through the lens of this first aspect of Fisher's research approach.

The Origins of the 2008 Financial Crisis: A Brief Study of Relevant US Institutions

This section begins with an overview of the 2008 crisis. America has distinctive financial institutions that might help explain the nation's financial instability.¹ The Great Depression shaped some of these. Going into the Depression, most US mortgages were short term (three to five years) and callable any time by lenders. The Depression brought thousands of foreclosures. Banks took the collateral. However, home prices continued to fall and banks struggled to sell the foreclosed homes. Thousands of banks failed. There was no deposit insurance then, so families lost their savings when banks failed.

¹See Bordo, Redish, and Rockoff (1994, 2010); and Romer (1993).

The Depression experience led to changes aimed at making it safer for Americans to save money in banks and get mortgages. The 1927 McFadden Act prohibited interstate activities for depository banks. The intent was to stop banks from growing big, and to stop regional problems from propagating across the nation via banks. Also, the 1933 Glass-Steagall Act prohibited depository banks from creating and selling securities, and created the Federal Deposit Insurance Corporation (FDIC) to insure US depository bank accounts.

The Securities and Exchange Commission (SEC) was established in 1934 to regulate the stock and options exchanges. In addition, government created new institutions to try to overcome financing problems caused by the limitations placed on depository banks. These included the Federal Home Loan Banks (FHL Banks) chartered in 1932, the Federal Housing Administration (FHA) created in 1934 as part of the National Housing Act, and a trio of secondary mortgage market agencies now known as Fannie Mae, Ginnie Mae, and Freddie Mac.

The FHL Banks system accesses global capital markets daily, using its system-wide size to obtain better opportunities for the depository banks that are FHL system shareholders. The FHL system also facilitated the movement of funds around the US; a crucial function while the McFadden Act still outlawed interstate bank activities.

The FHA created a new thirty-year mortgage instrument with the interest rate fixed for the full term. It was, and is, prepayable without penalty. These features made mortgages less risky for homeowners, but more so for lenders (Woodward and Hall 2009).

As another means of moving funds around the nation, Fannie Mae was created in 1938 with the initial mandate to borrow funds and then buy up mortgages from banks and other private lenders. This worked well. Hence, the US government created Ginnie Mae in 1968. Ginnie Mae was given the mission of selling mortgages to investors for which the principal was already guaranteed by the FHA or another government agency. However, whole mortgages still proved hard to sell. Mortgages are loans of long duration, and investors usually do not want to tie up their funds for long periods. Therefore, government officials designed a mortgage-backed security (an MBS). Mortgage-backed securities are collections of bonds backed by pools of debt assets (e.g., mortgages). This was the origin of the *securitization* of mortgages.²

In 1970, the US government created Freddie Mac as yet another mortgage market intermediary. However, Freddie, from the start, like Fannie Mae from 1968 on, was 100% stockholder owned. Hence, going into the financial crisis of 2008, the debt of Fannie and Freddie was *not* officially backed by the US government. If the guarantees given are taken into account, Fannie and Freddie were operating with far higher leverage than even the US investment banks.

Another strand of this story is that the US private sector also developed consumer credit scoring to support consumer lending. By the mid-1980s, those credit-scoring agencies were receiving daily a wide range of consumer bill-payment information and were producing a variety of consumer credit scores. The first of the generic consumer credit scoring systems was developed by the Fair Isaac Corporation: the FICO scores.

Prior to the financial crisis of 2008, proprietary empirical research based on generic FICO score data merged with mortgage data was widely believed to show that consumers

²Woodward and Hall (2009) report that interest rates on FHA-guaranteed mortgage loans were lowered by 60 to 80 basis points!

with good credit scores (e.g., “prime” FICO scores over 660) almost never default on mortgage loans. Based on these sorts of findings, the FICO scores of loan applicants soon began to be used instead of other documentation in consumer credit underwriting.

In an April 2005 speech,³ Greenspan praised the rise in the US of tools for assessing consumer credit-worthiness:

[L]enders have taken advantage of credit-scoring models and other techniques for efficiently extending credit to a broader spectrum of consumers.... Where once more-marginal applicants would simply have been denied credit, lenders are now able ... to price that risk appropriately. These improvements have led to rapid growth in subprime mortgage lending....

As the market grew for the MBS that Ginnie, Fannie, and Freddie sold, private financial firms worked to develop competing products. Success came with the private label of Collateralized Debt Obligation (CDO) (Brunnermeier 2009). A CDO is a collection of bonds, termed ‘tranches,’ backed by a pool of debt assets, much like an MBS. However, instead of the revenue stream from the debt asset pool flowing equally to the associated securities, as with a regular MBS, with a CDO, the payments flow to the tranches in seniority order.

Creation of a CDO typically begins with the creation of a corporate entity, referred to by various names, including Special Investment Vehicle (SIV). The SIV is usually established in a tax haven and as ‘bankruptcy-remote,’ meaning its assets cannot be taken over even if the entity that created it goes bankrupt. SIV typically pre-sell some or all of the CDO bonds to investors and then use the proceeds to pay for the CDO debt assets. Private-label CDOs were traded in unregulated over-the-counter (OTC) markets. Private sources claim that, from 2004 to 2007, CDO returns were much higher than for equivalently rated corporate bonds.

In addition, the US developed the world’s most known and used private-sector companies for assessing the riskiness of securities. Selected ones of these companies essentially became part of the US financial regulatory system: the Nationally Recognized Statistical Rating Organizations (NRSRO). So-designated from 1973 on, these are the only companies whose ratings can be used to satisfy SEC requirements involving ratings. The dominant NRSRO are Standard & Poor’s, Moody’s, and Fitch. Holding securities with triple-A ratings from NRSRO typically allows a financial institution to operate with less capital. This has been true not just for US financial institutions, but also those in Europe, as spelled out in the Basel Accords.⁴ This reality created a strong demand for triple-A NRSRO-rated securities. The more senior CDO tranches were virtually all triple-A rated.

Higher ratings for CDO tranches could be obtained by also purchasing a form of insurance-like protection called Credit Default Swaps (CDS). The buyer of a CDS is entitled to a payout in the event of a specified “credit event” involving the “reference entity,” as named in the CDS. Prior to the 2008 financial crisis, the main CDS sellers—a London office of the American International Group (AIG) and monoline insurance companies—had triple-A ratings from the NRSRO.

A CDS sold to a party with no direct stake in the named reference entity (i.e., with no insurable risk) is called “naked.” One use of naked CDS was for creating synthetic

³<http://www.federalreserve.gov/boarddocs/speeches/2005/20050408/default.htm>

⁴http://en.wikipedia.org/wiki/Basel_Accords

CDO. This is a combination of naked CDS with other securities such as pre-existing CDO, with the failure of the latter being the named credit event for the included CDS (e.g., the stated credit event might be ratings downgrades for the included CDO bonds). The creation of synthetic CDO made it possible for more mortgage-backed securities to be created and sold (including large numbers of triple-A-rated tranches) without new mortgages being originated.

Buyers of synthetic CDO tranches take the “long” position, meaning that they are betting that the named securities will do well. The seller of those tranches commits to paying premiums to the buyers, and takes a “short” position, betting that the referenced securities will suffer downgrades (or whatever the stated credit event might be). In the latter case, the seller wins a payout from the buyers of the synthetic CDO tranches. That payout can be far larger than the current or historical value of the named securities. In this regard, synthetic CDO are far more risky for buyers than ordinary CDO.

The US mortgage market differs in important ways from the Canadian case. For example, though Canada adopted a US-style mortgage following the Great Depression, in the 1960s, Canada shifted to mortgages that require the interest rate to be reset at least every five years. Like their US counterparts, Canadian homeowners can refinance before their mortgage contracts expire, but the Canadian homeowners pay penalties, thereby splitting with lenders the risks associated with mortgage interest movements. Also, Canadian mortgage insurance rules are stricter, and Canadians cannot walk away from their mortgages, as in some US states.

In Canada also, federally regulated banks have continued to handle most financial services, including the funding and servicing of mortgages, moving money around the nation, and accessing global capital markets. Recall that the US kept its depository banks small and greatly limited their functions for decades. In compensation, the US government created financial intermediaries, and also bank-like private-sector firms (e.g., investment banks) that perform functions banks carry out in Canada.

Phases of the 2008 US Financial Crisis

The 2008 US financial crisis can be broken into five component phases. Recognizing these can provide insight into why multiple sorts of regulatory reforms have been included in the Dodd-Frank Wall Street Reform and Consumer Protection Act (the Dodd-Frank Act).⁵

Phase 1 is a mortgage default crisis. When the average US home price, which had risen for decades, began to fall in 2006, refinancing or selling a home became tough. It turns out that there is one condition—by now, well documented—under which mortgage default becomes relatively likely for homeowners, including those with good credit ratings. That is when the market value of a home falls below the value of the mortgage (i.e., when a homeowner is “under water”).⁶ Subprime buyers who took out

⁵See http://banking.senate.gov/public/_files/070110_Dodd_Frank_Wall_Street_Reform_comprehensive_summary_Final.pdf and http://en.wikipedia.org/wiki/Dodd%E2%80%93Frank_Wall_Street_Reform_and_Consumer_Protection_Act. See also Acharya, Cooley, Richardson, and Walter (2011).

⁶See Mayer, Pence, and Sherlund (2009). Subsequent research shows that the change in the national housing price trend was the main cause of the foreclosure crisis. For example, Gerardi, Shapiro, and Willen (2009) reach this conclusion using a data set that includes every residential mortgage, purchase-and-sale, and foreclosure transaction in Massachusetts for 1989 to 2008.

home loans with little or no money down had only a small cushion between their starting positions and being under water. As a result, the subprime mortgage default rate began to move up quickly once housing prices started to fall. As home prices fell further, homeowners with mortgages classified as prime began increasingly to be under water too, and the default rates on prime mortgages began rising as well.

Proposed reforms motivated by the Phase 1 experience include requiring more retained home equity for borrowing, secured against owned homes (as in Canada), and imposing stricter ability-to-pay requirements for consumer loan applicants (as in Canada).

Phase 2 is the collapse of the CDO market. The prices for mortgage-backed CDO began to fall as mortgage defaults rose and CDO trading became difficult (Newman et al. 2008).

The clearing house arrangements that back up exchange trading result in daily reassessments of open contracts, and collateral adjustments are made as risk levels change. The clearing house becomes the counterparty for all trades, thereby substantially eliminating the risk of counterparty default. These arrangements make trading safer for participants in a position to continue trading. The lack of arrangements of this sort from 2000 to 2008 for the markets where CDO and CDS were mostly traded is believed to be one reason why those markets seized-up long before the organized stock exchanges were affected.⁷ A phase-specific proposed reform is that all securities being traded in financially important volumes should be traded and cleared on regulated exchanges.

Phase 3 of the 2008 financial crisis came with the downgrading of CDS sellers. The owners of CDO who had hedged their risk by buying CDS, and also speculators who bought naked CDS as bets that there would be widespread mortgage defaults, began to submit claims once housing prices began falling instead of rising, and mortgage-default rates began rising. Concerns grew that the CDS sellers were unprepared for the growing claims volume. Those concerns turned to panic when, in January 2008, Ambac, the largest of the monoline sellers of CDS, suffered a ratings downgrade.

When a government or company issues bonds and buys CDS protection to go with them, this can result in a higher credit rating for the bonds, and can result in lower costs of raising capital for the bond issuer. However, this way of enhancing the rating of a bond lasts only so long as the *issuer* of the CDS protection *continues to have* a sufficiently high credit rating. The downgrade of Ambac resulted in downgrades for thousands of municipal bonds as well as CDO. As other CDS sellers were downgraded too, vast numbers of additional bond downgrades followed. The money market funds, pension funds, and other institutions that are committed to holding only triple-A-rated securities, or just certain proportions of lesser rated securities, were forced to try to sell the downgraded securities. This led to further price declines for CDO, more CDS payouts, and further downgrades for the CDS sellers.

If CDS had been treated as insurance, it seems plausible that Phase 3 of the 2008 financial crisis would not have happened. As insurance, CDS could have been sold only to parties with insurable interests. Thus, naked CDS could not have existed, and synthetic CDO created using naked CDS also could not have existed.⁸

⁷See Greenberger (2010).

⁸Geanakoplos (2011) argues that, by providing an opportunity for mortgage market pessimists to leverage, naked CDS greatly magnified the damage from the mortgage market and CDO market crashes (phases 1 and 2 above). See also Greenberger (2010, 2011).

Naked CDS have continued to cause problems since the 2008 crisis erupted. This includes a situation involving YRC Worldwide, Inc. (YRC),⁹ a large US trucking firm. In 2009, to avoid bankruptcy, YRC needed to convince some of their bondholders to convert to equity. Richard B. Freeman (2010) notes that, a decade earlier, the YRC bondholders would have made the exchange readily, since their bonds would be worthless if YRC went bankrupt. However, progress toward the needed bondholder accommodation proved slow. Eventually, the Teamsters Union, representing the YRC workers, discovered that a financial package was being marketed that included the sale of YRC bonds along with naked CDS that would pay off if YRC went bankrupt, with the payout amounts exceeding the expected value of the YRC bonds if the company survived.¹⁰ Teamsters president James Hoffa held a press conference denouncing the attempt to profit from the destruction of 30,000 union jobs. The Teamsters' reaction seems to have garnered sufficient support. The company survived.

Phase 3-related observations include noting that a subsidiary of a US banking conglomerate might be subject to different regulatory authority according to whether it is classed as an insurance company or investment bank. In contrast, in Canada, the Office of the Superintendent of Financial Institutions (OSFI) regulates the entity as a whole. Another Phase 3 observation is that perhaps CDS should be treated as insurance. If CDS were regulated as insurance, then CDS could not have been used as they were in the YRC case.¹¹

Phase 4 is the series of financial firm failures that started in the second half of 2007 and culminated with the collapse of large funds, investment banks, and Fannie and Freddie.

In the summer of 2007, two Bear Stearns hedge funds collapsed because of an inability to roll over short-term wholesale debt. Bear continued to sustain losses, and JP Morgan Chase bought Bear for just \$2 a share in March 2008. On September 15, Lehman Brothers declared bankruptcy. Also on September 15, Merrill Lynch was purchased by the Bank of America in an emergency deal. On September 21, Morgan Stanley and Goldman Sachs became bank holding companies so they could receive federal aid. And, in the midst of this rash of investment bank failures, on September 7 of 2008, Fannie and Freddie were put into conservatorship.

Hedge funds and investment banks have tended to rely on inexpensive, short-term "wholesale" funding. This funding comes from relatively few sources, and the managers for those sources pull back in the event of market uncertainty (Mora 2010). Based on a study of large banks and bank holding companies, Lev Ratnovski and Rocco Huang (2009) conclude that the extent of reliance on wholesale funding was a key causal factor for financial institutions that fared badly in the 2008 crisis.

John Geanakoplos (2011) marshals evidence indicating that for bank-like entities, financial regulators should monitor and manage both leverage and collateral rates. Moreover, it is important to note that what he means by 'leverage' is the loan-to-value ratio for *new* loans.

⁹<http://www.yrcw.com/about/index.shtml>

¹⁰Bolton and Oehmke (2011) explain how use of CDS can create debt holders interested in the bankruptcy of the debtor.

¹¹There was a time in America when insurance policies could be purchased by anyone on anyone, or any thing. However, in 1746, the insurance law was modernized. Thereafter, it was required that "the purchaser of the policy must have a legitimate interest in the preservation of the insured," with this condition being referred to as having an insurable risk or interest.

Adelheid Burgi-Schmelz (2010) sums up the essence of the Phase 4 crisis¹²:

A key feature of the crisis was the high recourse to short-term finance to purchase long-term assets.... However, due to a lack of data, regulators, supervisors and market participants could not fully measure the degree of maturity transformation or the extent to which financial institutions and markets were interconnected. (p. 5, paragraph 20)

Canadian regulations, all along, have come far closer to ensuring that *all* of a financial group's activities are declared and are included in leverage calculations (Leblond 2011). Also, when Canadian banks use wholesale funding, they must maintain stocks of highly liquid assets.¹³ Informed in part by the Canadian practices, Phase 4-related reform proposals include requiring all corporate entities affiliated with bank-like institutions to be on-book, improved monitoring of leverage, and a requirement for all bank-like institutions to maintain levels of liquid assets sufficient to meet liquidity stress needs for at least a thirty-day time horizon.

Phase 5 is the clean-up phase of the 2008 financial crisis.

Following a financial crisis, failure to resolve insolvency of financial companies can predictably worsen the resulting damage to the economy. Examples of this include the Lehman bankruptcy—declared in 2008—which is still not resolved.¹⁴ Christopher Mayer and Glenn Hubbard (2009) argue also that when large numbers of home foreclosures have been part of a financial crisis, it is important as well to have mechanisms for quickly dealing with those. Otherwise, those properties become a cause of further home price deflation. (See also Mayer, Morrison, and Piskorsk 2009.)

III. LEARNING FROM THE THEORY BEHIND OFFICIAL STATISTICS

Finding ways to improve the extraction of information from masses of data may matter too for dealing with the US financial instability.

Barnett (2011) argues that faulty monetary statistics contributed to excessive leverage and risk taking in the run-up to the 2008 financial crisis. Barnett and Chauvet (2010) note that Fisher (1922) deplored the functional form still used now for important monetary aggregates. They argue, on both theoretical and empirical grounds, that Barnett's *Divisia monetary aggregates*, which meet the Diewert (1976) superlative criteria, would provide better guidance for monetary policy formation.¹⁵

Secondly, Diewert (2006) argues that Net Domestic Product is a more appropriate output measure than Gross Domestic Product. The difference between the measures is

¹²See also the Report of the Examiner, Anton Valukas, in the Lehman bankruptcy: <http://lehmanreport.jenner.com/>.

¹³See Crawford, Graham, and Bordeleau (2009) for more on leverage regulation in Canada.

¹⁴As of April 1, 2011, a group of Lehman creditors, including Calpers, which is the largest US public pension fund, had just asked a bankruptcy judge to consider their reorganization plan for the defunct company: <http://www.reuters.com/article/2011/04/07/lehman-reorganizationplan-idUSL3E7F710120110407>

¹⁵See Barnett (1980, 1982, and 2011), and Barnett and Serletis (2000).

the depreciation and obsolescence of durables.¹⁶ This difference might matter more following a financial crisis.

Thirdly, as Diewert (2003), and Erwin Diewert, Alice Nakamura, and Leonard Nakamura (2009) explain, the US treatment of owner-occupied housing in measures of inflation and also in the National Income and Product Accounts (the NIPAs) means that home-price rises will typically show up in US national economic performance measures as output quantity rather than price increases. This, in turn, can result in an overestimate of national output available to support living standards, and mismeasurement as well of inflationary pressures and productivity.

Finally, systematic analysis of the structure of the system of national accounts suggests that the financial sector is not being properly accounted for in national economic statistics.¹⁷ This might especially matter for the US because of the relatively large size of its financial sector.

IV. MECHANISING MASS DATA ANALYSIS

To work out the best configuration for reform measures with interrelated outcomes, it would surely help to have an accounting framework that could be used to conveniently compare how various proposed remedies would help support objectives such as leverage control. Along these lines, John Geanakoplos (2010, 2011) has been pushing to have collateral and leverage brought into the macro models utilized by the US Federal Reserve banks. However, leverage control begins, operationally, at the level of individual financial firms. Fisher, if with us now, would surely push for construction of a *loan level* accounting financial simulation system (a LLAFS system), with the loans identified by what or whom they are from and the borrower.

Guy H. Orcutt, who came to Yale in 1969 as an Irving Fisher visiting professor,¹⁸ designed and oversaw the building of such a model in 1968 while he was with the World Bank. That model was used for decades by the World Bank, but belonged to the World Bank and did not become known beyond those directly involved with its use. It was a model that drew on, but also differed in important ways from, the microsimulation models associated with Orcutt's name.

Beginning in the 1950s, Orcutt, with various collaborators, developed a microanalytic research strategy that involved computer-assisted updating of micro unit attributes, and then implementation of computer-assisted interactions and also aggregation for relevant outputs and outcomes.¹⁹ Orcutt's most-known microanalytic research efforts place

¹⁶Diewert (2006) actually focuses on net national product (NNP), but the points being made here still apply. Diewert and Nakamura (2007) explain that problems with devising good measures of depreciation are the explanation of the continued dominance of GDP. Yet, Diewert (2006) argues that by deducting even very imperfect measures of depreciation (and obsolescence) from gross investment, nations would end up with better measures of what can be consumed over time.

¹⁷See Diewert and Nakamura (2013).

¹⁸From 1970 until his retirement in 1988, Guy H. Orcutt was a Yale professor of economics and the A. Whitney Griswold Professor of Urban Studies.

¹⁹See Orcutt (1957); and Orcutt, Greenberger, Korbel, and Rivlin (1961).

people as the micro units.²⁰ However, in his World Bank model, individual loans were the micro units. The bank used the model for managing lending, borrowing, and liquidity. With the far more powerful computers available now, such a model could feasibly be constructed for the whole US financial sector. The approach Orcutt envisioned is especially suited for situations where the aging of micro entities is strongly affected by entity-specific past conditions, as is the case for loans.

The US Office of Financial Research (OFR) has now been established within the Treasury Department by the Dodd-Frank Act. The OFR will collect both what are referred to as Reference Data and Business Confidential Data. Reference Data include common identifiers for firms and their subsidiaries and for financial instruments. Business Confidential Data include balance-sheet information and reports on trading and other financial activities needed in order to understand how firms are interconnected. The OFR is, therefore, supposed to receive the information that would be needed for a full-blown LLAFS system. This system would enable the government to provide customized, timely, descriptive information about the state of the US financial sector, even though much of the underlying data cannot (yet, at least) be released to market participants or to researchers and the public in general in its raw form. The proposed model would make it easier to see the relationships between loan-level decisions and consequences for financial firms and funds, and the relationships between choices made by the firms and funds, and outcomes for the US financial sector.

V. A CALL TO ACTION FOR FISHER'S PROGENY

It is the 100th anniversary of Irving Fisher's 1911 book, *The Purchasing Power of Money*. In that book, he argues that financial crises result from overborrowing during an expansion period coupled with changes in the purchasing power of money that the expansion brings on, and a collapse in credit as the price level falls. This theory is more succinctly stated in a 1933 article. There, Irving Fisher writes that the causes of all great depressions can be summed up as "over-indebtedness to start with and deflation following soon after ..." (Fisher 1933, p. 341).

Building on Fisher's (1911) theory of financial crisis and on the work of Hyman Minsky (who was himself influenced by Fisher 1933), enables putting forward behavioral economics theories for why financial crises keep occurring. Charles Kindleberger (1933) claims that, in the wake of each new financial crisis, when a nation is still suffering the terrible effects, politicians are voted into office, and have political support, to enact draconian financial-sector control measures. However, once economic recovery becomes the new reality, businesses and households want to borrow to participate in the opportunities materializing around them. In this environment, the financial sector is able to convince voters, politicians, and regulators to ignore, gut, or even fully repeal the constraints on the financial sector that were enacted in the wake of the last financial crisis, and the financial crisis cycle begins anew. Kindleberger portrays this cycle as

²⁰Microsimulation models of that sort are now widely used for public policy analysis. See <http://www.microsimulation.org/IMA/Past%20Meetings.htm> on the International Microsimulation Association conference celebration of Orcutt's vision. See also Sutherland (2001), Davies (2004), and Wolfson (2009).

rooted in human nature and, hence, essentially inevitable. In contrast, Fisher argues that this dynamic might be changed.

Many who studied Irving Fisher's work were greatly influenced by that work. This includes people such as Guy H. Orcutt, who worked on topics quite different from Fisher's and who thus rarely cited Fisher. Orcutt spoke to me many times about how Fisher's example was the inspiration even for the machine he designed as part of his PhD thesis, which subsequently played an important role in the development of better ways of extracting information from macro economic time series.²¹

Irving Fisher attracted many followers who came to share his commitment to vanquishing the recession disease. These are Fisher's intellectual progeny. A fitting way of honoring him is for his living progeny to redouble efforts to end the tragedy of recurring financial crises.

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²¹Stone persuaded Orcutt to bring along the machine for a two-year visit at Cambridge University, resulting in the development of treatments for the autocorrelation that is a dominant feature of national accounts: treatments still used. See Orcutt (1948); and Nakamura, Nakamura, and Orcutt (1976). See Berndt (1991, pp. 3–4).

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