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Irving Fisher, the Debt-Deflation Theory, and the Crisis of 2008-2009

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Irving Fisher, the Debt-Deflation Theory, and the Crisis of 2008-2009

Abstract

Irving Fisher's 1932 *Booms and Depressions* presents a fully specified, nine-pronged model of financial crises that has been widely forgotten by modern macroeconomists. This article builds on the renewed interest in Fisher's Debt-Deflation Theory to explore its pertinence to the Great Recession. By parsing through macroeconomic data from the 2000s, it finds evidence of debt-deflation spiraling and of the nine Fisherian "main factors" co-varying as the author had predicted during the 2008-2009 financial crisis. The article concludes in assessing the uses of Fisher's work in current macroeconomics and in arguing for a greater consideration of its insights.

Keywords

Irving Fisher, Debt-Deflation, Great Recession, 2008-2009 Financial Crisis

Cover Page Footnote

I would like to express my gratitude to Professor Christopher Green at McGill University for his teaching through the years.

In the wake of the 2008-2009 crisis, some economists, standing on the rubbles of the world economy, turned to a somewhat-forgotten name to elucidate the failings of markets and policies alike. In a 2009 column, Enrique Mendoza, professor at the University of Pennsylvania, wrote, comparing Irving Fisher's debt-deflation mechanism to competing recession theories, that "today, [...] there is no doubt that Fisher was right and that the rest are just stories." Paul Krugman, in 2008, commented that Fisher's debt-deflation was "what's happening now." In 2009, *The Economist* opined that the crisis would pull Fisher "out of Keynes's shadow."

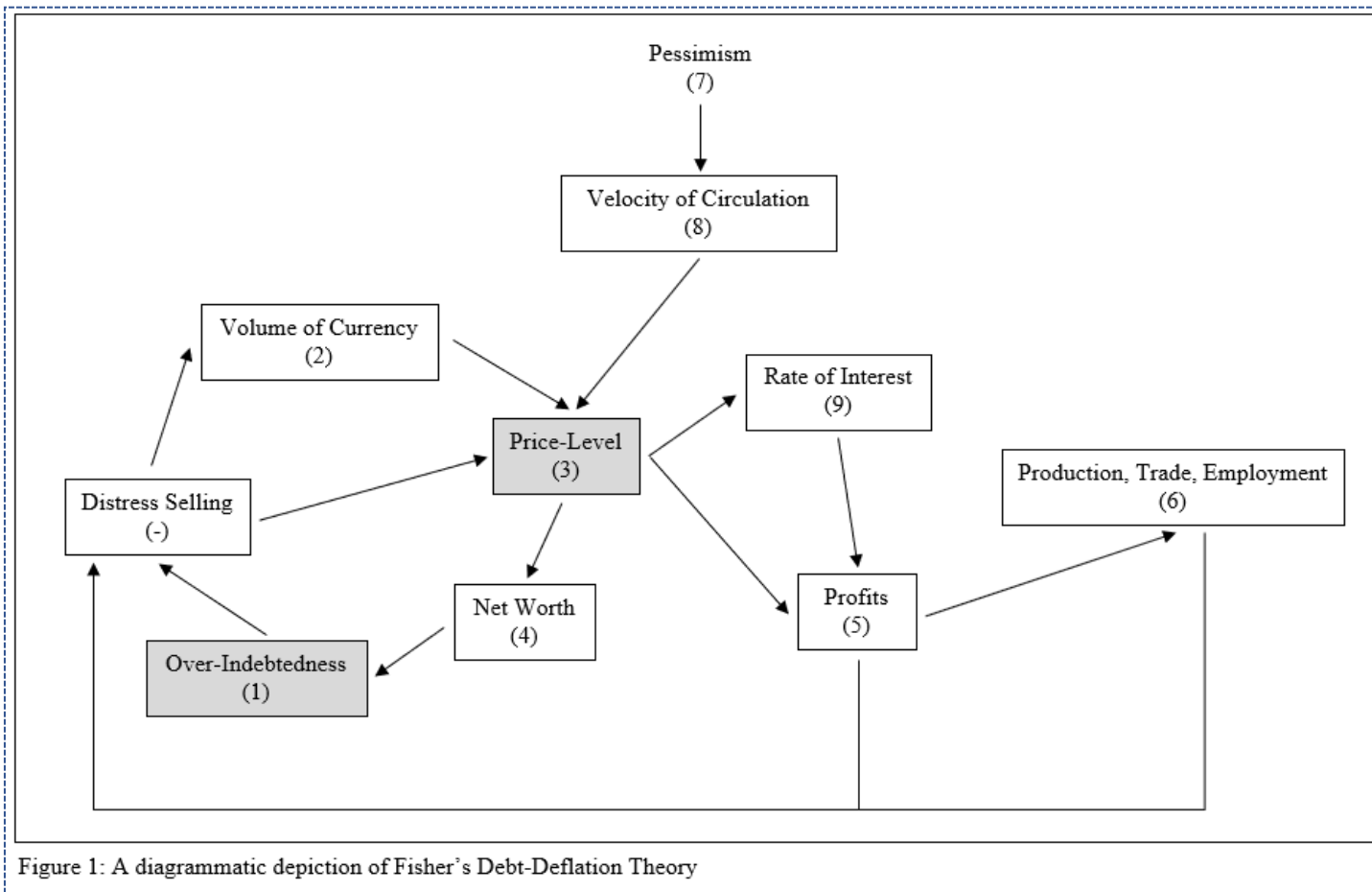
With a decade of hindsight, one can investigate the extent to which Fisher's debt-deflation theory truly analytically describes the 2008-2009 meltdown. Yet, limited effort has been exerted in academia in doing so – flowery rhetoric aside. This article, in mounting this task, avoids two common practices. First, it escapes a reductionist view of Fisher's theory that lessens it to a single-minded study of its two fundamental variables, debt and the price level. Second, it considers Fisher's *Booms and Depressions* (1932) – not *The Debt-Deflation Theory of Great Depressions* (1933) – as its foundational text since, by Fisher's own words, the latter only aims at "embodying, in brief," the former (1933, p. 337).

THE DEBT-DEFLATION THEORY OF GREAT DEPRESSIONS

Defunct economists' words form fractious terrains for their modern counterparts. Do Adam Smith's writings lend support to present-day free markets advocates? What is the essence of Keynes' general theory? Fisher's theory is no outlier; its author himself, after all, described it as "quite tentative" (1933, p. 337). While this complexity is acknowledged, it matters still for the purpose at hand to delineate what I have observed to constitute the Debt-Deflation Theory. The following arguments are summarized in Figure 1. In *Booms and Depressions* (1932), Fisher enumerates nine "main factors" in depressions:¹ over-indebtedness; the volume of currency; the general price-level; net worths; profits; production, trade, and employment; pessimism; the velocity of circulation; and the rate of interest.

The economy starts in a state of over-indebtedness, defined by widespread balance sheet solvency issues (p. 9). When economic agents awake to this state of affair, assets are voluntarily sold off by debtors in deleveraging efforts or seized by creditors and liquidated; this is distress selling (p. 14). The resulting excess supply directly decreases the price of assets. Yet, Fisher argues that this "excessive eagerness on the selling side [...] is not the fundamental influence" on the price-level (p. 14). Rather, the *general* fall in the price-level is engendered by a reduction in the volume of deposit currency. As debtors settle loans with

¹ "Depression" is Fisher's term for business cycle slumps and is used in this article despite the 2008-2009 crisis being widely designated as a recession. Note that citations in this section are from the book unless they are cited as from "1933."



banks and withdraw deposits in doing so, the circulating medium contracts; in times of distress selling, “new borrowings will by no means suffice to restore the balance” (p. 15). It follows that the price-level tumbles as “with less funds, less buying can be accomplished” (p. 16). Here enters the *money illusion*: agents fail to realize that money *itself* is swelling and, as such, nominal debt contracts remain fixed (p. 18). Accordingly, net worths deteriorate as liabilities hold steady and assets plunge.

Crippling balance sheets entail that the initial over-indebtedness problem is further exacerbated. This cycle from over-indebtedness to price-level and back is the core of Fisher’s theory. Crucially, it exhibits positive feedback; this tendency to drift away from equilibrium inspired Fisher’s famous analogy to a capsizing ship (1933, p. 339).

The falling price-level is the fulcrum upon which the debt problem reaches the real economy. As prices sink, profits follow because expenses – taxes, rent, wages, and salaries – are somewhat inflexible in the short-run (p. 30). Profits are further diminished by the deflation-induced rise in the real rate of interest hampering demand and increasing real costs (p. 38). Decreasing profit is falling income and thus inhibits debt repayment and further contributes to incentivizing distress selling. More importantly, lower profits lead to diving production, trade, and employment as businesses cut “current output” and “construction” (investment). Fisher writes: “in a capitalistic [...] system, it is the profit taker who usually makes the decision as to the rate at which his enterprise is to be run. Therefore, variations in profits [...] lead the business man to vary correspondingly the general policy of his enterprise” (p. 30-31). As the slowdown propagates, job losses induce further distress selling. The economy is in depression.

Finally, Fisher argues that pessimism causes currency hoarding, and, accordingly, a reduction in the velocity of circulation (p. 34). This accelerates the fall in the price-level. The reader may notice that pessimism has been modeled as a box that encompasses all other factors. As Fisher indicates, “all of the down movements thus far mentioned – [...] net-worth, profits, and employment – have psychological effects (p. 33).

EMPIRICAL ANALYSIS

To assess Fisher’s contribution to our understanding of the Great Recession, this article presents an empirical analysis and a literature review. This section highlights broad macroeconomic metrics to determine if Fisher’s nine main factors indeed varied as he had predicted. The approach hopefully will remind the reader of the graphing exercise offered in conclusion of Fisher’s 1933 article. Its focus is placed on the US, the patient zero. An assessment of the appropriateness of the debt-deflation positive feedback loop is included.

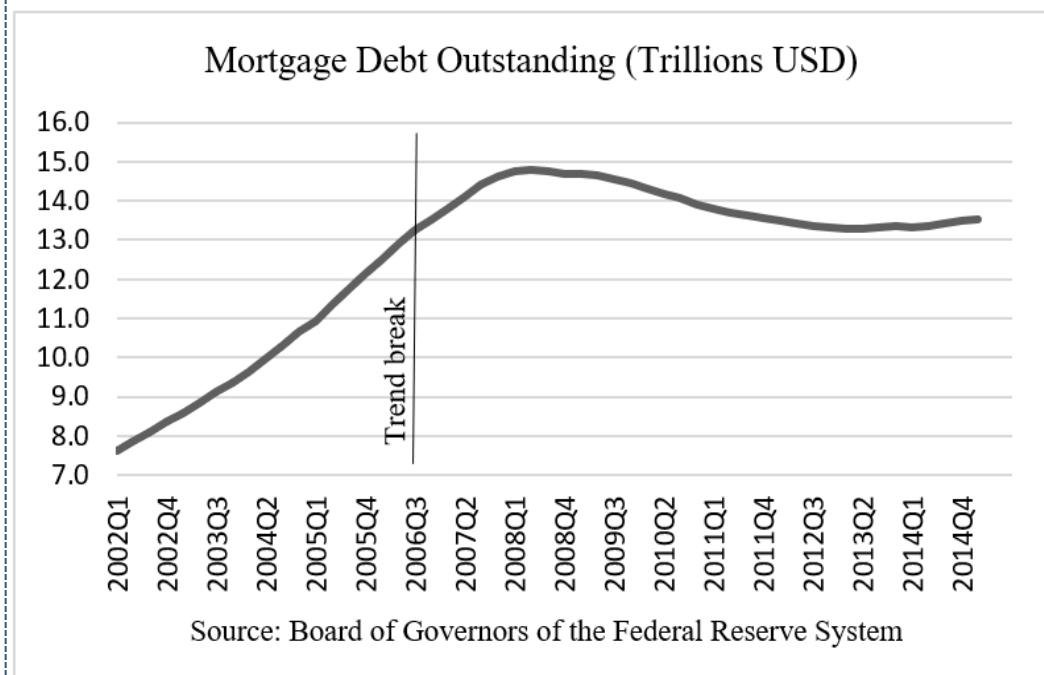
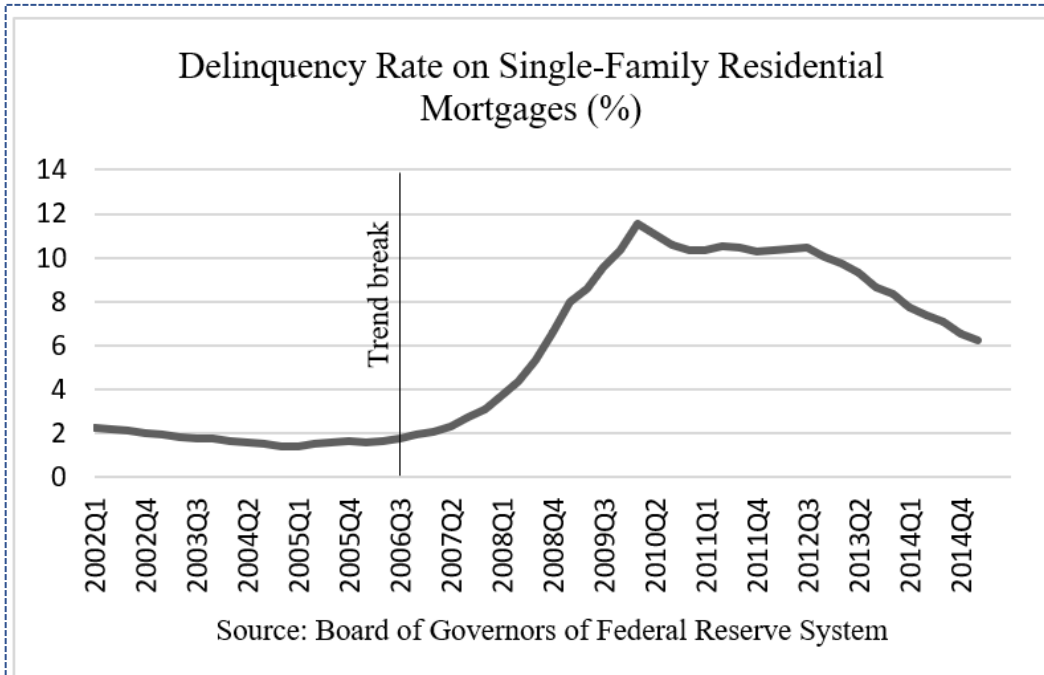
The *initial* condition of Fisher’s theory is over-indebtedness. As such, we would expect to find a build up in debt *before* distress selling and other problems unfolded. To avoid

pinpointing this juncture arbitrarily, a trend break analysis is carried out on the time series of delinquency rates on residential mortgages. Stata identifies the break to happen in Q3 of 2006; the associated Wald test returns a p-value of 0.000 on the null hypothesis that the data is continuous. In the four years before, the empirical data (Panel 1) shows clear and steep increases in mortgage debt outstanding (63.9%), mortgage debt payments as a percentage of disposable income (17.7%), and household debt to GDP (8.4% in previous 6 quarters). These indicate that American households' ability to finance their debt – especially mortgages – was indeed deteriorating. The data also exhibits the expected harbingers of distress selling: delinquency rates shot up after 2006 and nominal mortgage loan debt started falling in Q2 of 2008 hinting at deleveraging (Panel 1).

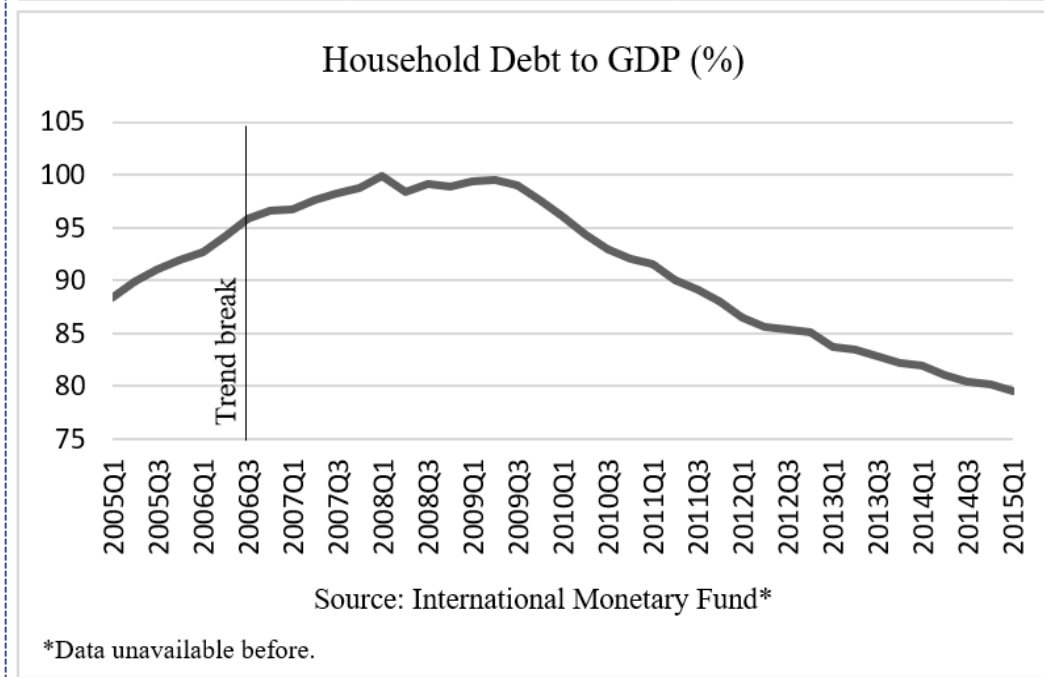
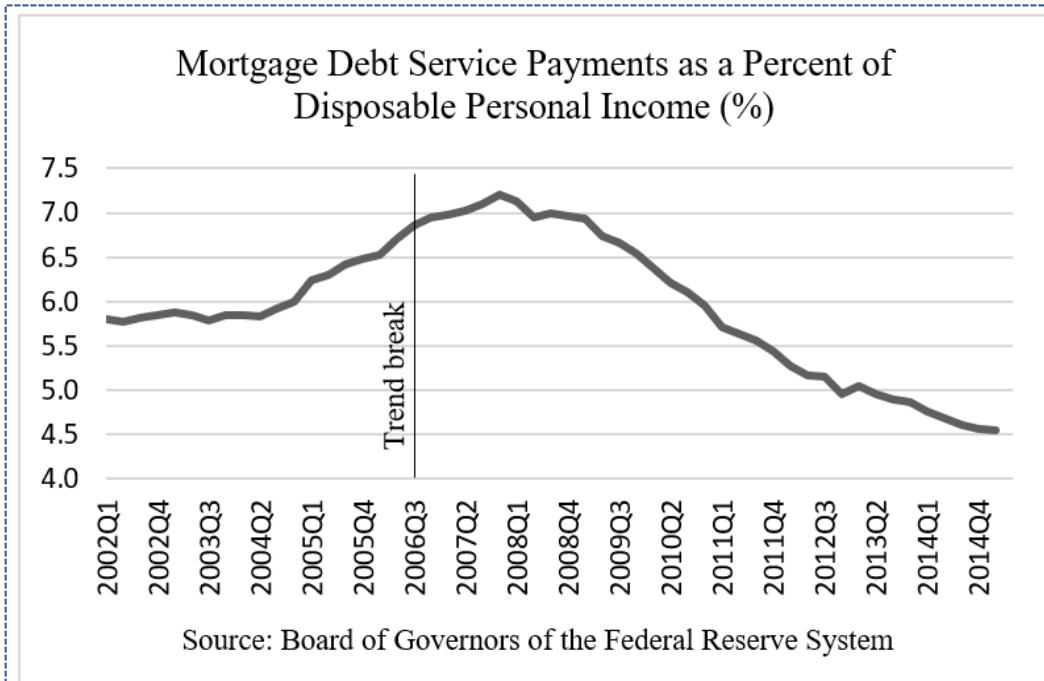
For monetary measures, velocity acted like Fisher had expected but not aggregates (Panel 2). M1 velocity fell starting in Q2 of 2008. The concomitance with the fall in nominal mortgage debt lends credence to Fisher's argument that pessimism slows velocity. The M1 stock, however, rises throughout the recession. Fisher's analysis does not endogenize monetary policy; in the real world, on the other hand, the Fed began to cut its policy rate as early as Q3 of 2007. Whereas the M1 stock reflects this expansionary policy, there is evidence that "deposit currency" would have shrank *ceteris paribus*: starting in Q4 of 2008, commercial bank loans to commerce and industry dove. Regardless, by Fisher's own transaction quantity theory of money (1911), a fall in velocity alone could engender the subsequent projected fall in prices (Panel 3).

CPI inflation slipped in Q4 of 2008 and was negative in the first three quarters of 2009. Interestingly, housing prices fell much earlier (from Q1 of 2006) and much more (39.8% in two years). It seems that market supply and demand (the loop's inner arrow in Figure 1) were more important in depressing asset prices than monetary variables were in engendering general deflation, especially since Shiller argues that CPI deflation was mainly a result of diving commodity prices in 2009 (2011). Once again, this is only inconsistent with Fisher's theory if not allowing for reactive monetary interventions. As predicted, asset deflation yielded decreases in wealth (Panel 4). Household net worths began decreasing in Q3 of 2007. Market capitalizations (proxied by the S&P 500) came tumbling down in Q4 of 2007.

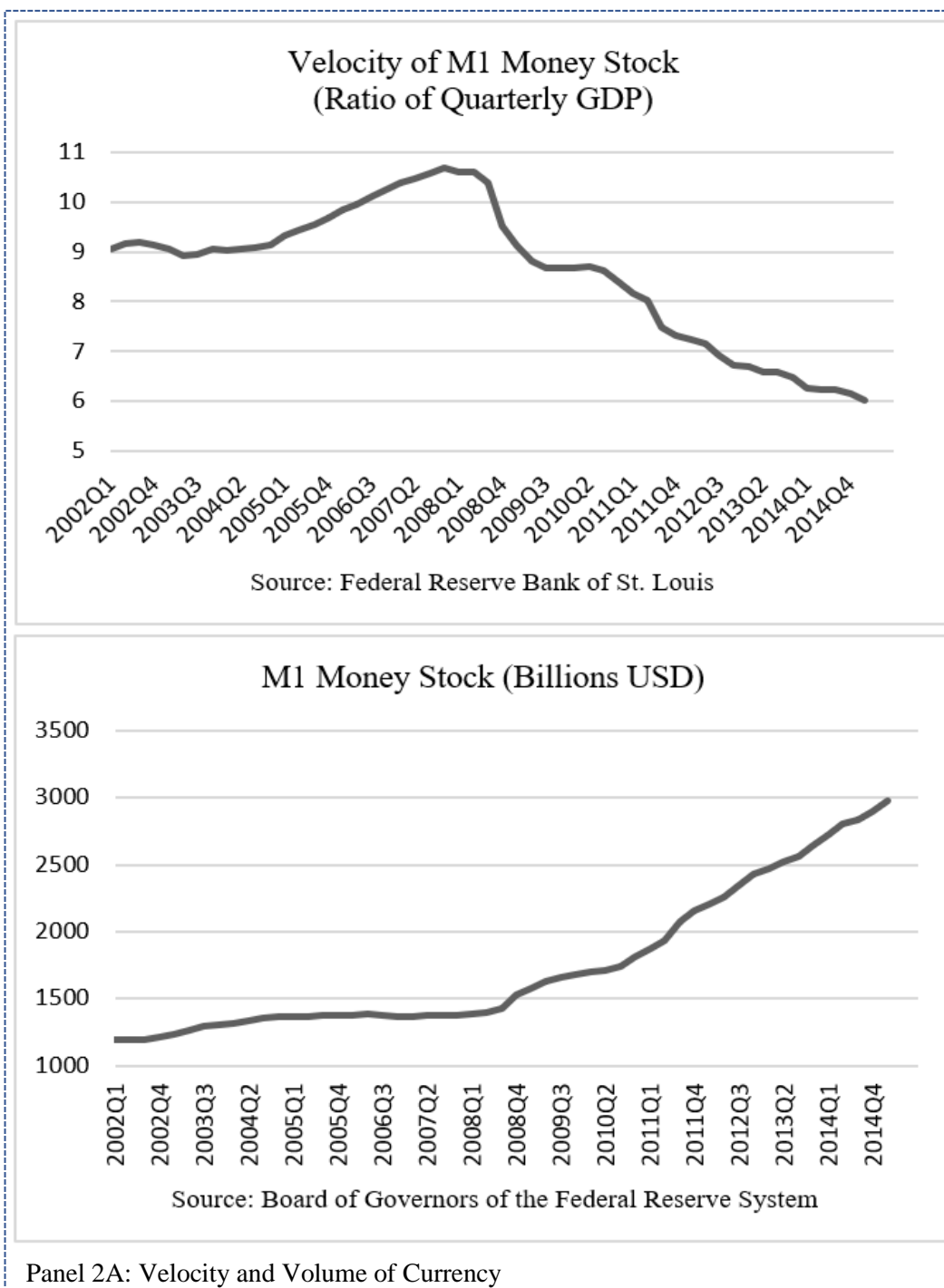
So far, it has been shown that the four main factors constituent of the debt-deflation loop moved in the chronology and direction that Fisher had foreseen (Figure 2). There is also evidence of positive feedback or that the "dollar disease" reignited the "debt disease." From Q2 of 2006, total mortgage debt quarterly percent change, at 3.2% initially, diminished to reach -0.5% in Q3 of 2008. In the same span, however, nominal residential prices were falling by a quarterly average of 2.7%. For this period, I calculated the differences between the former and the latter (Figure 3). A difference of zero indicates that mortgage debt changed by the same factor as nominal housing prices while a positive (negative) value indicates an increase (decrease) in the ratio of housing debt-to-equity in the period taking

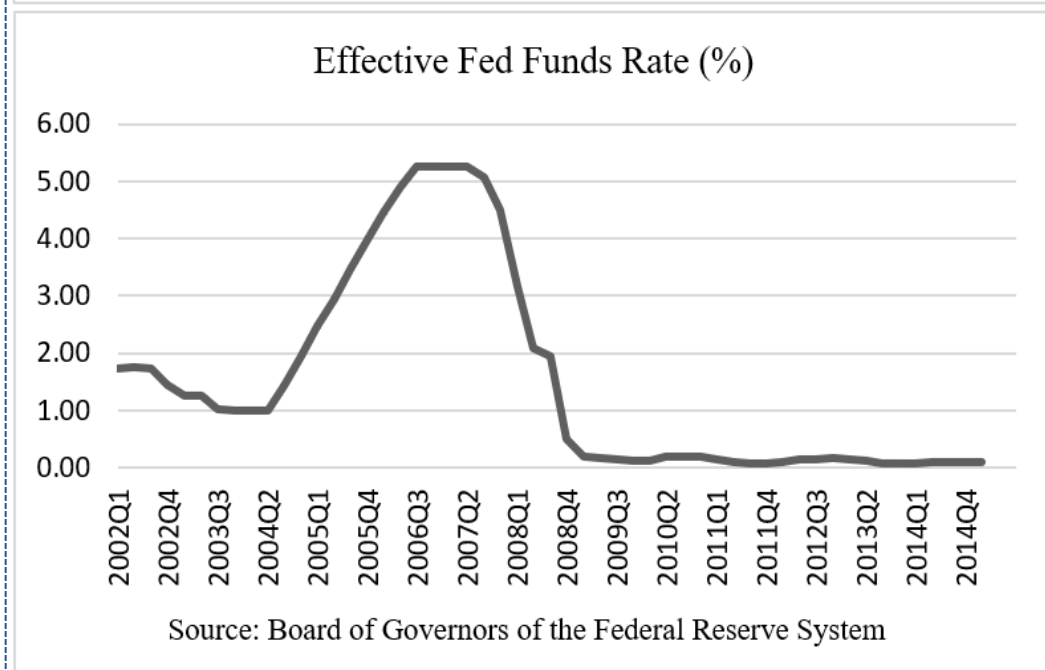
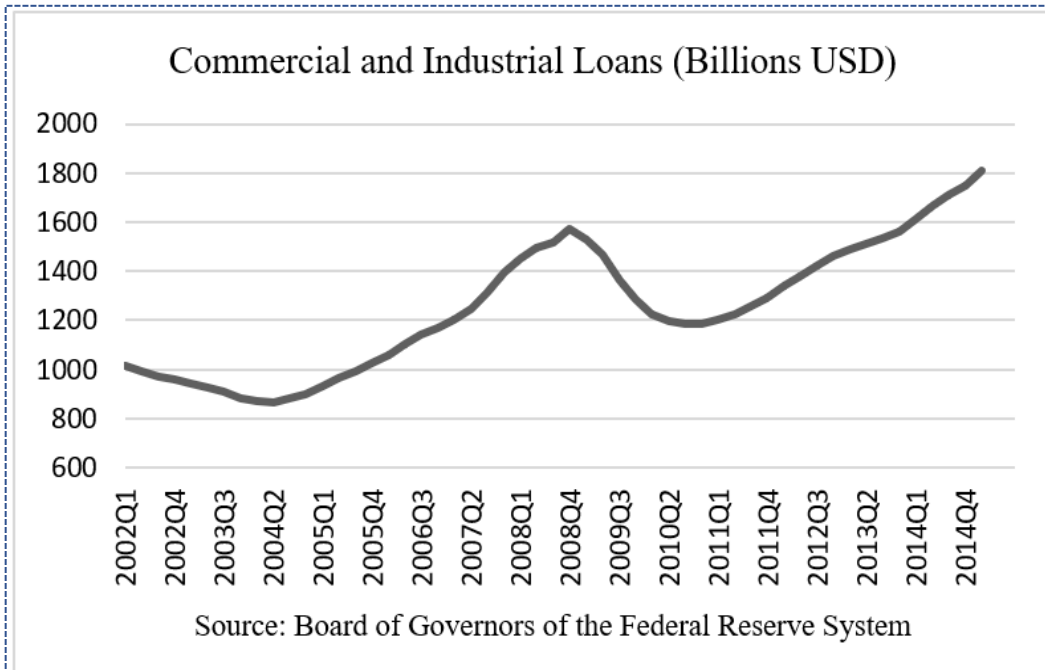


Panel 1A: Over-Indebtedness and Distress Selling

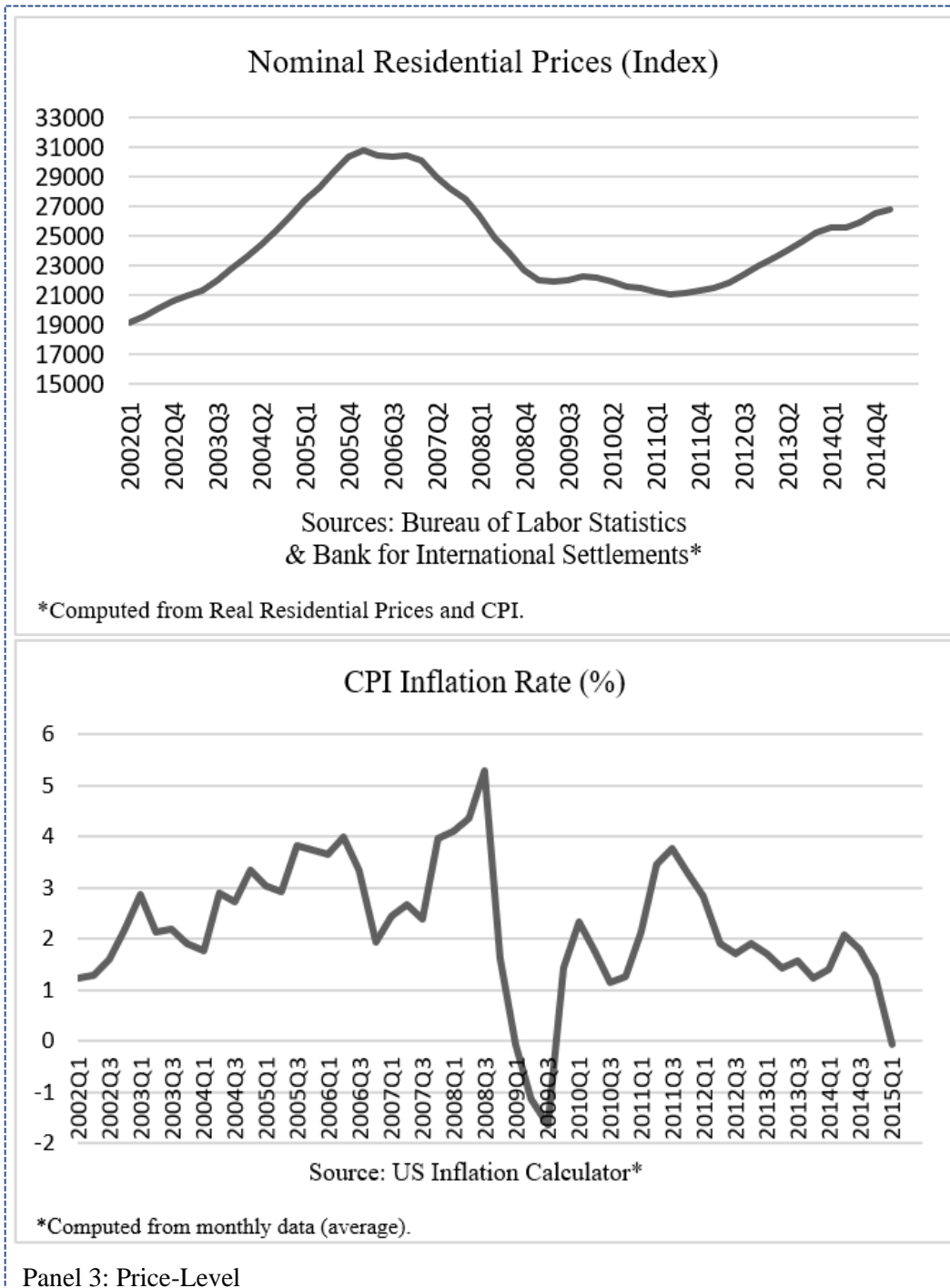


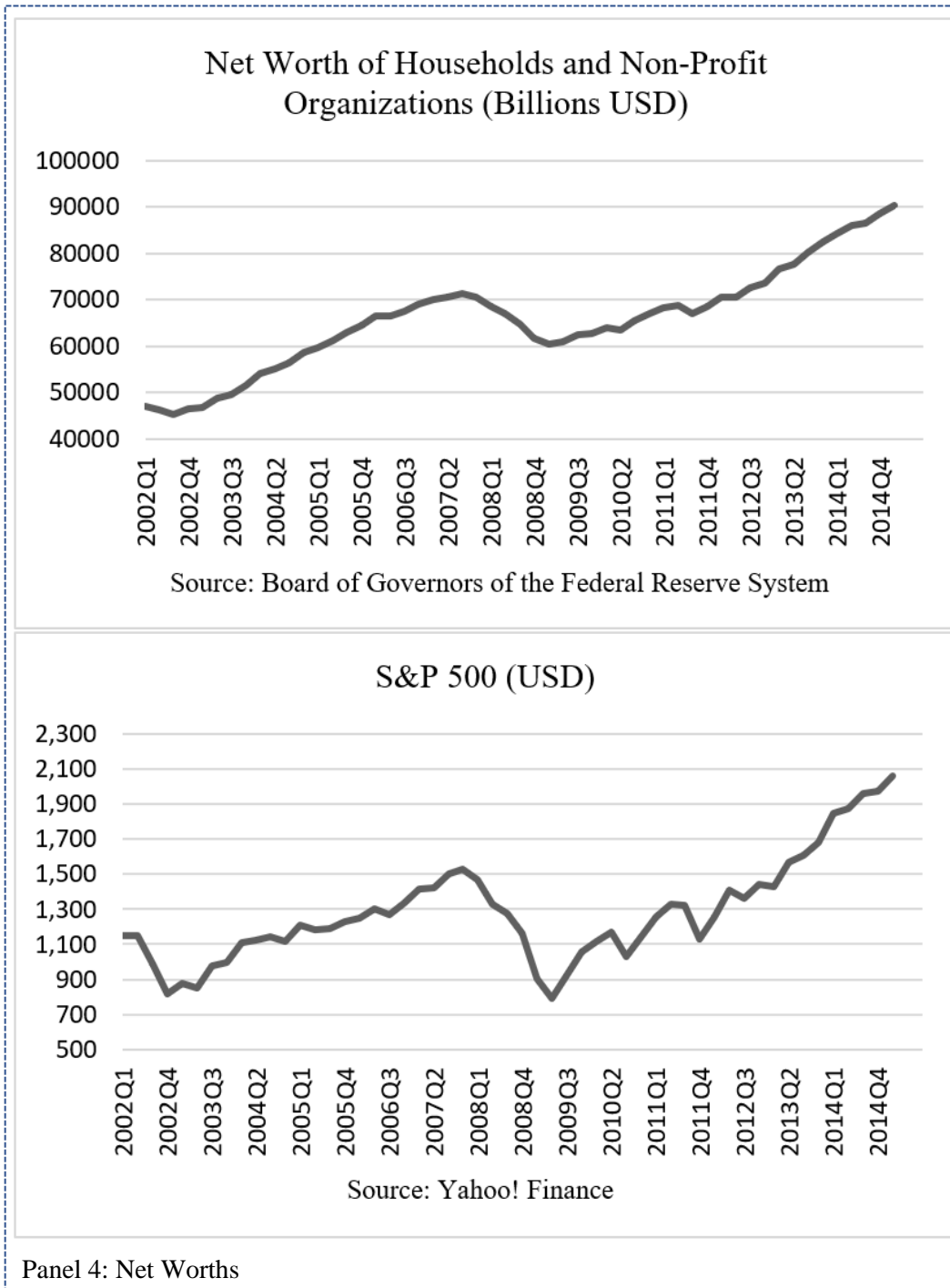
Panel 1B: Over-Indebtedness and Distress Selling

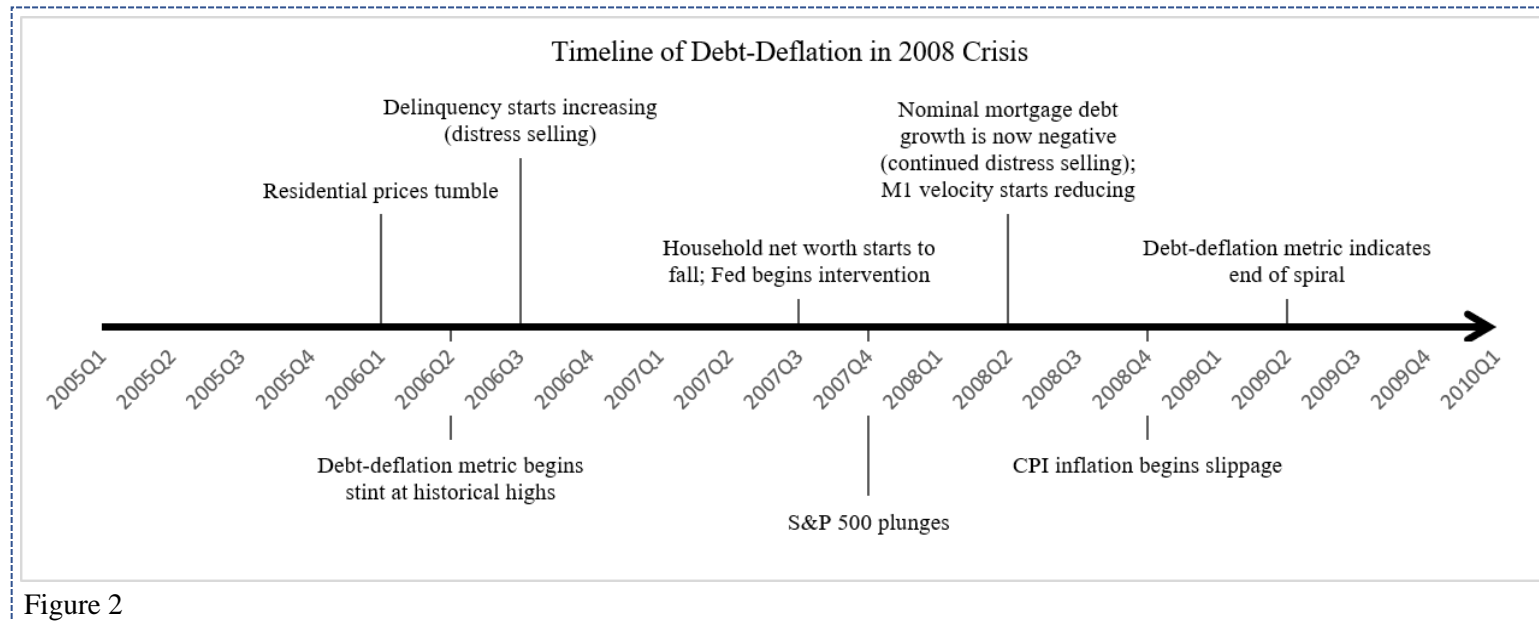




Panel 2B: Velocity and Volume of Currency







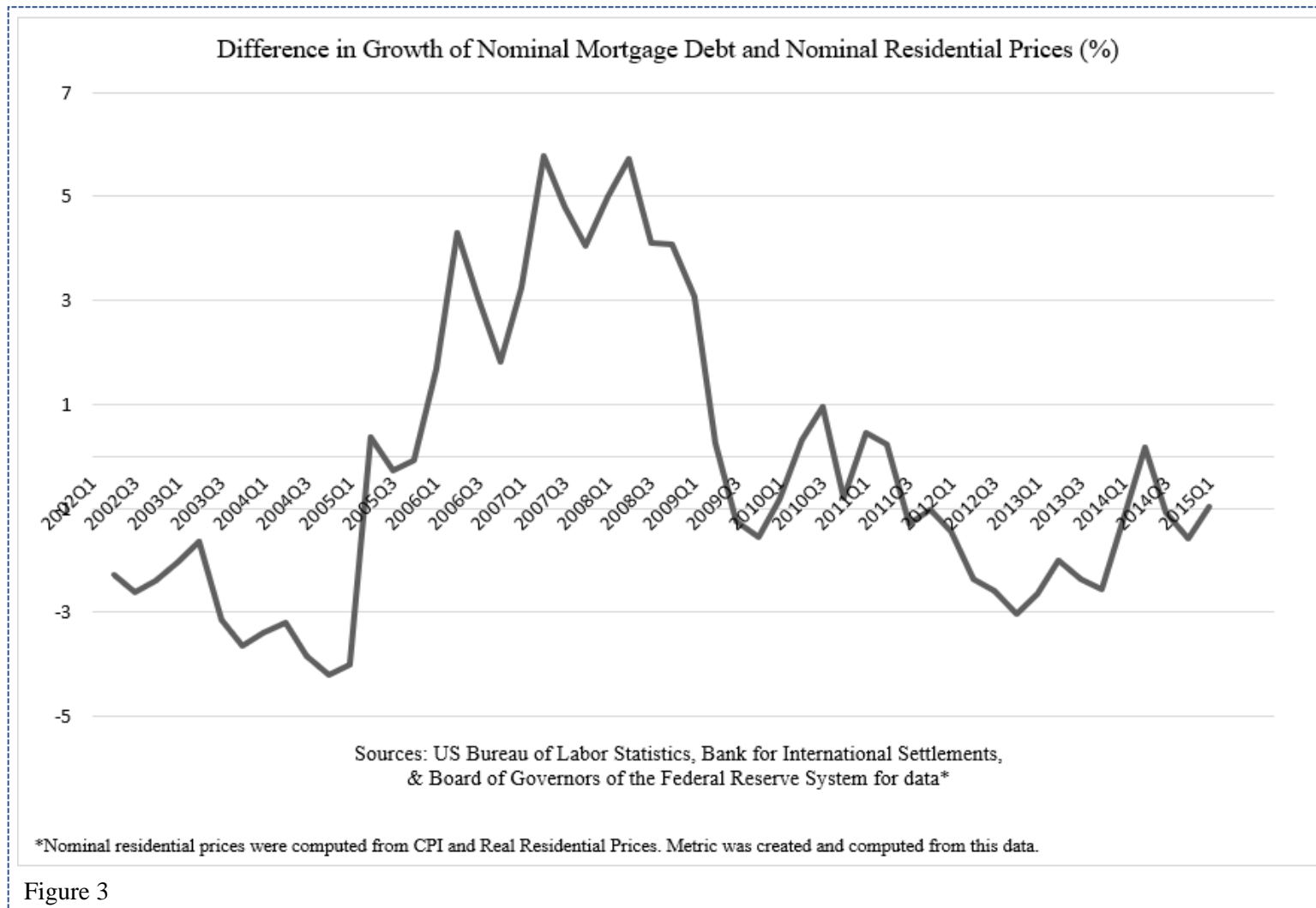
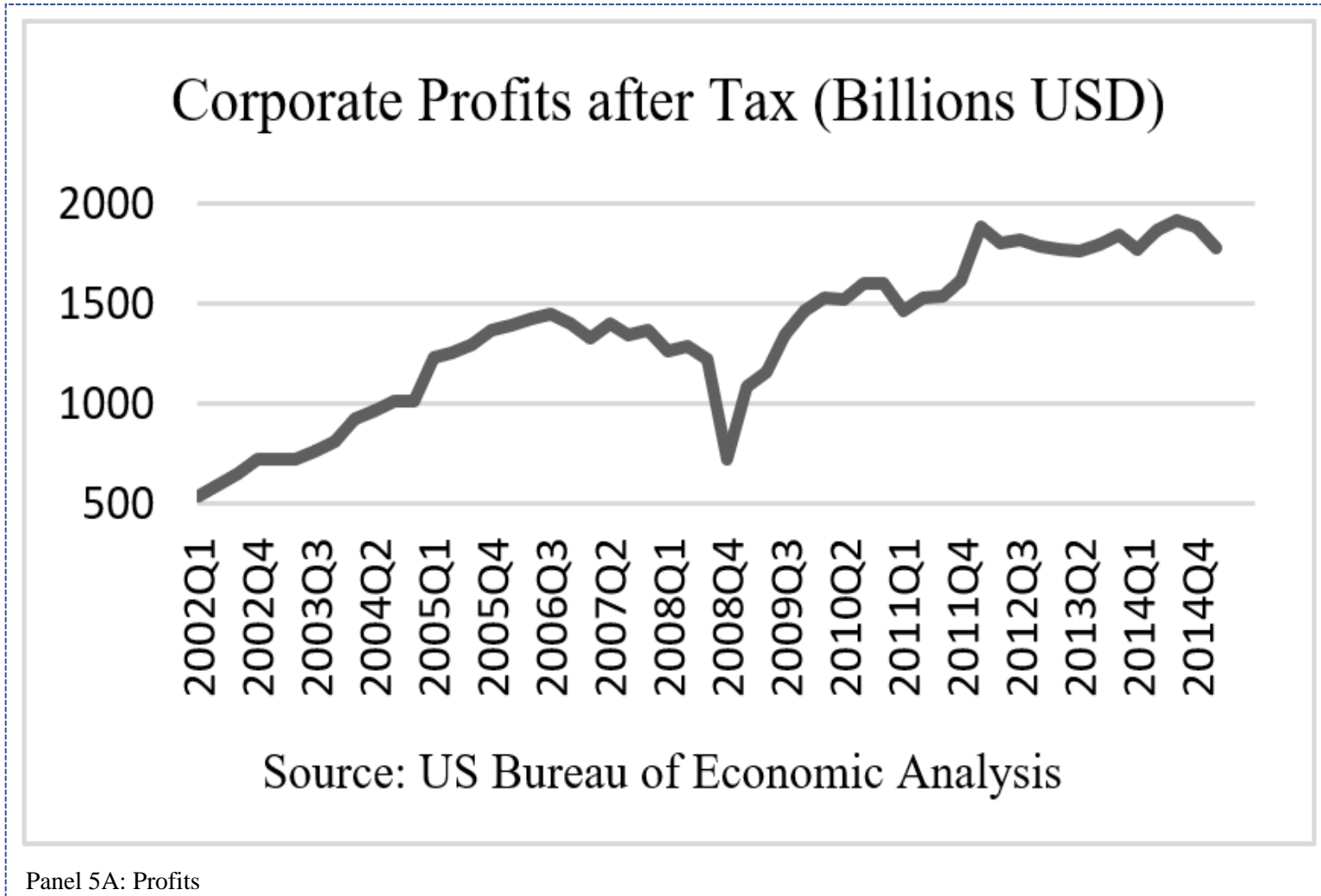
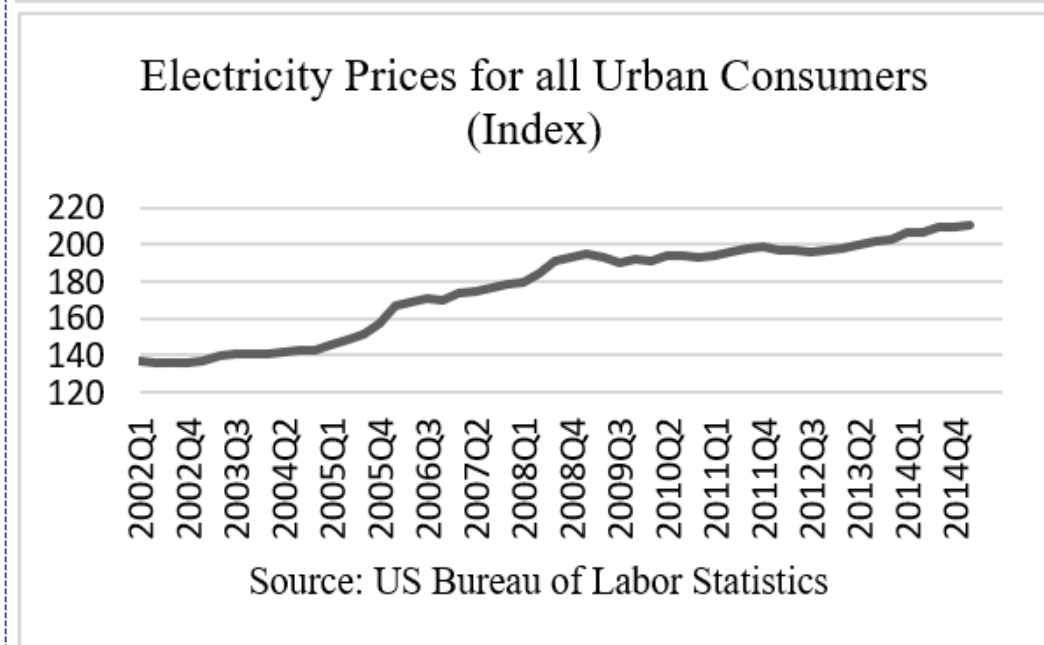
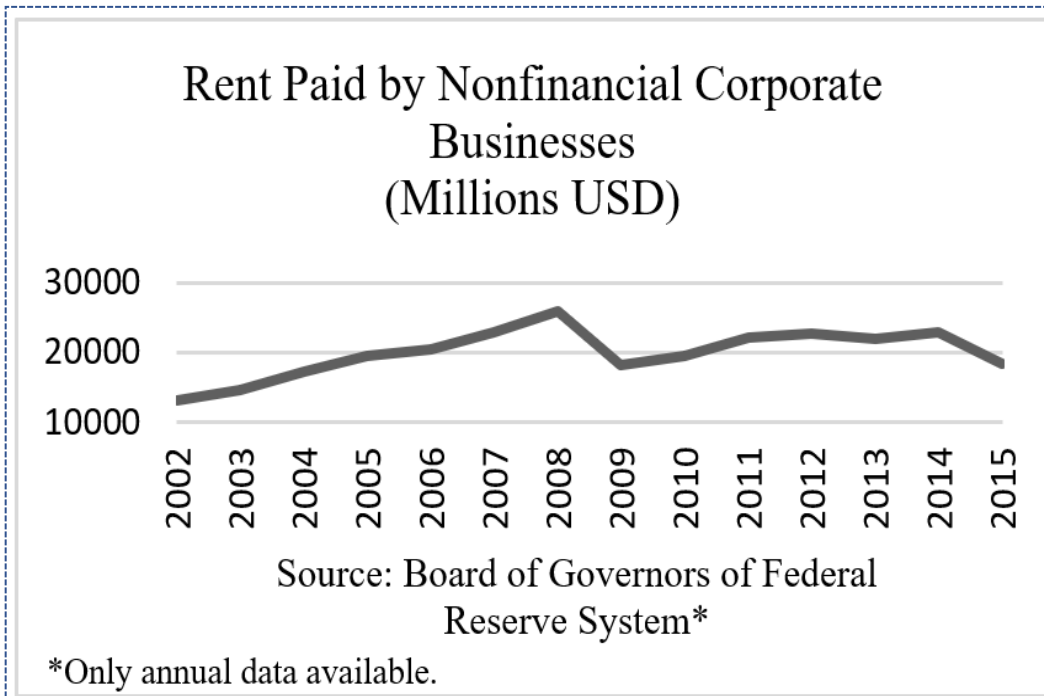
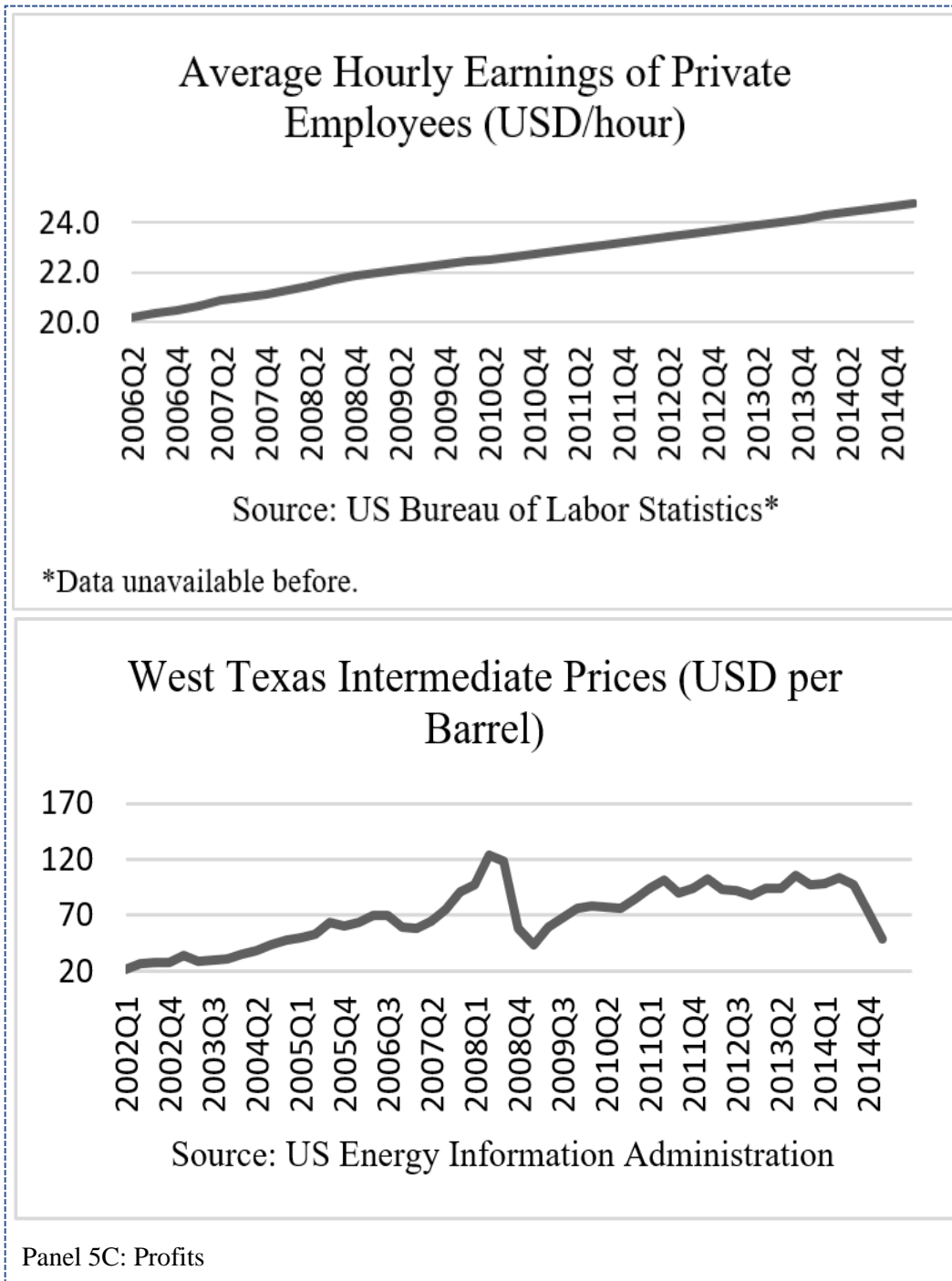


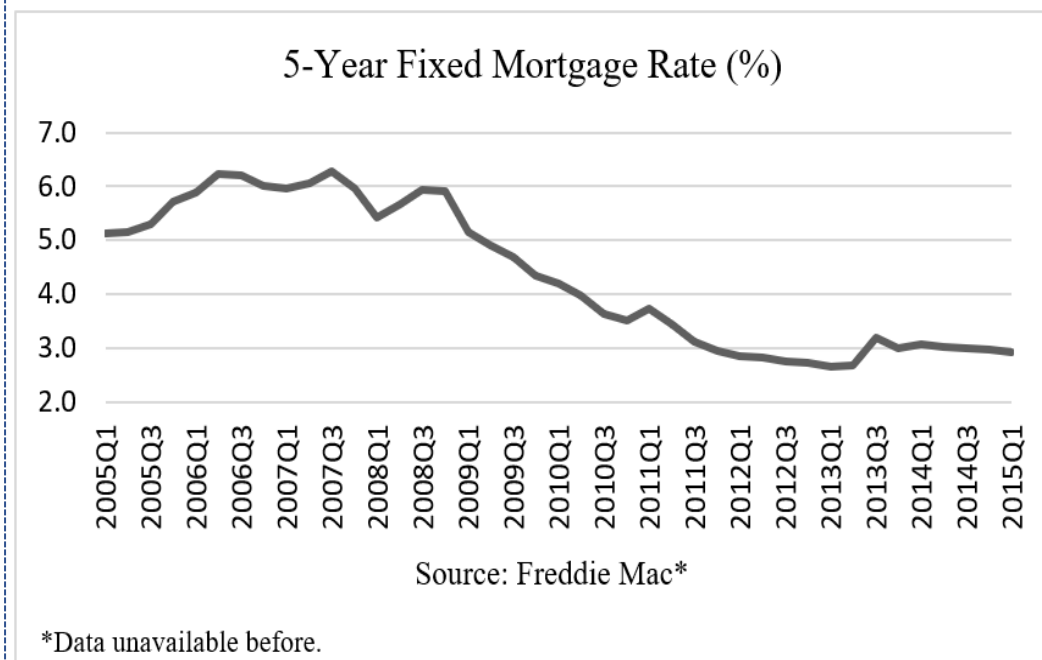
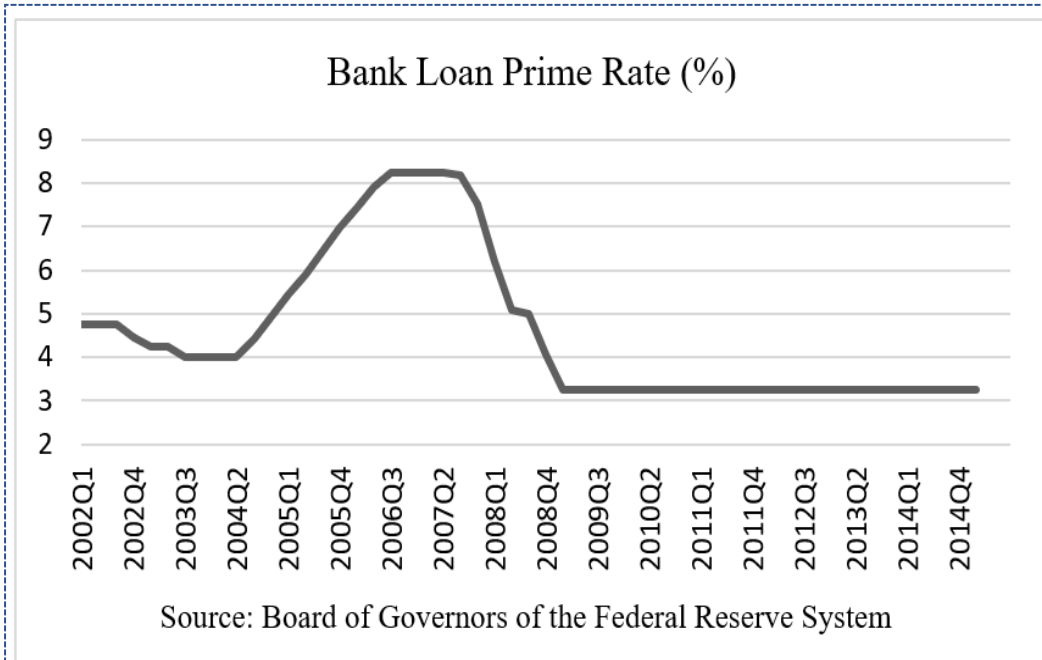
Figure 3



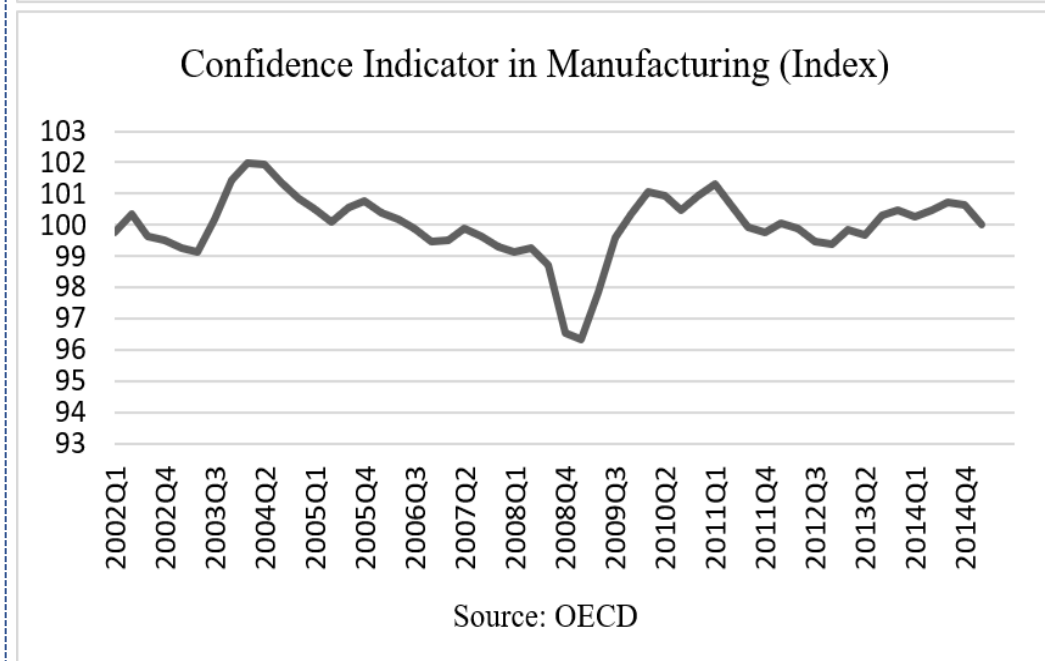
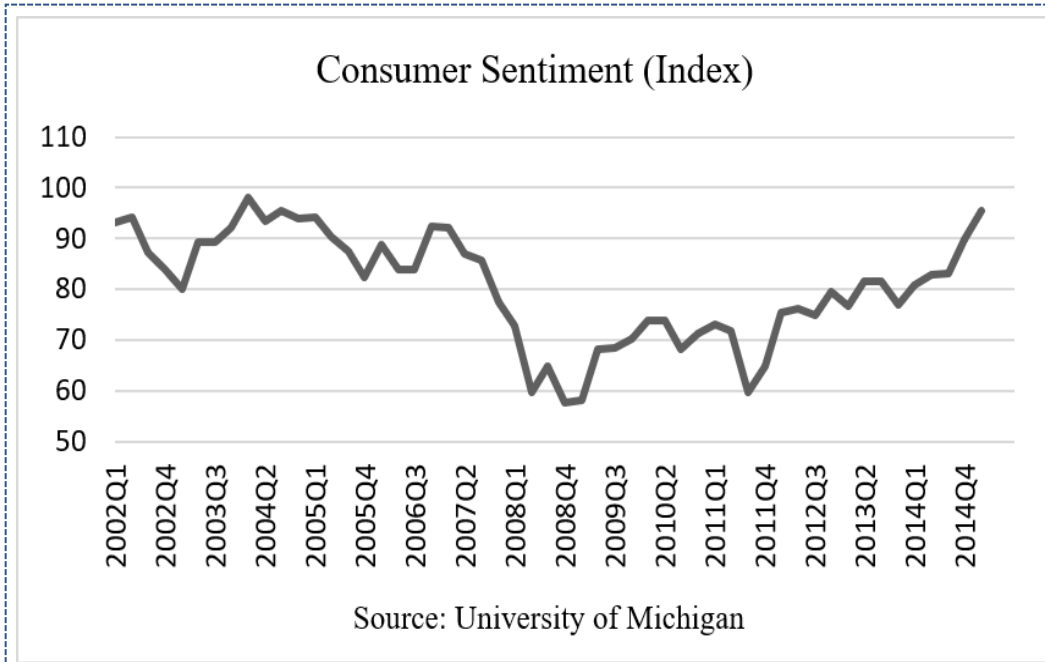


Panel 5B: Profits

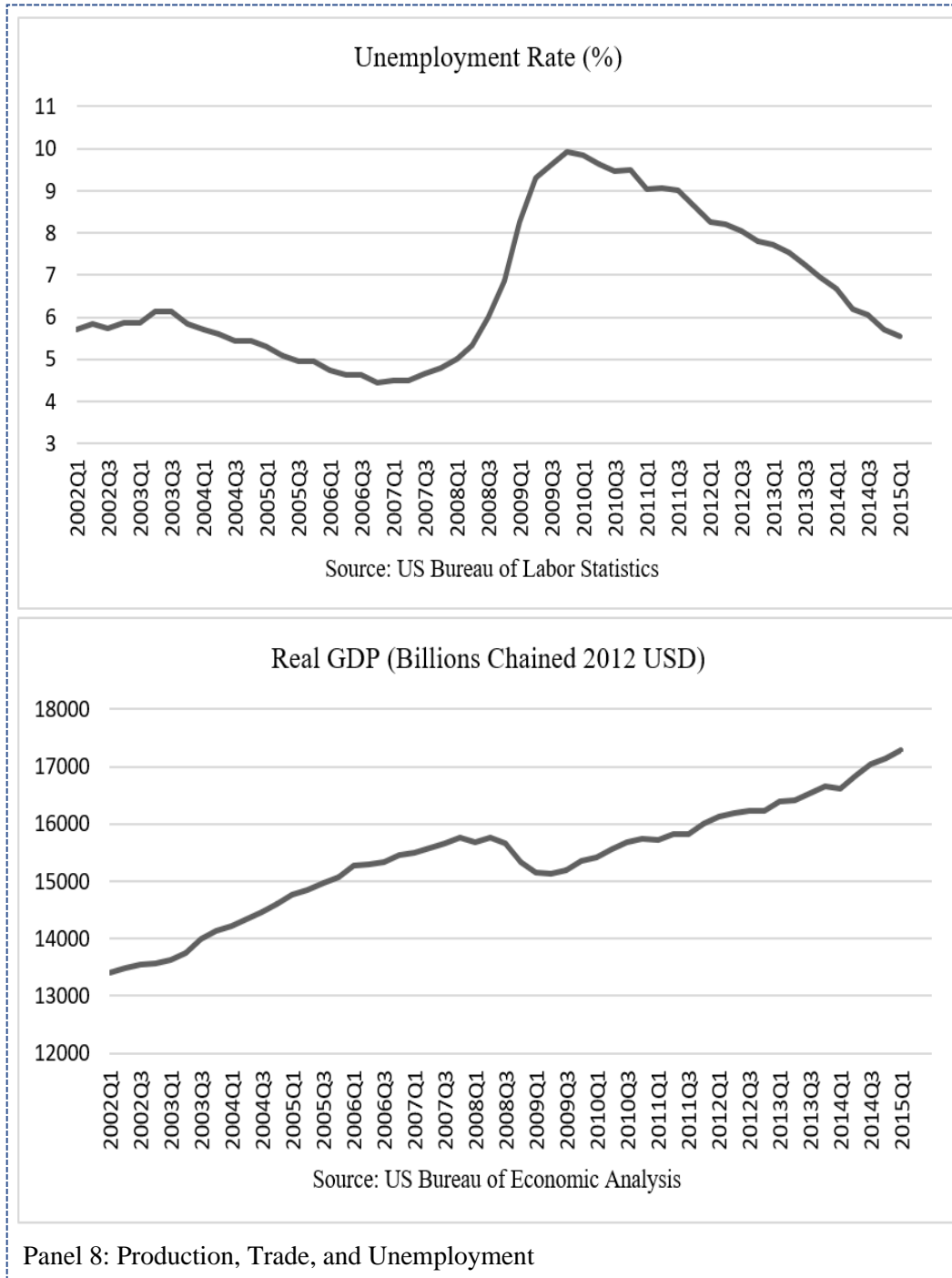




Panel 6: Rate of Interest



Panel 7: Pessimism



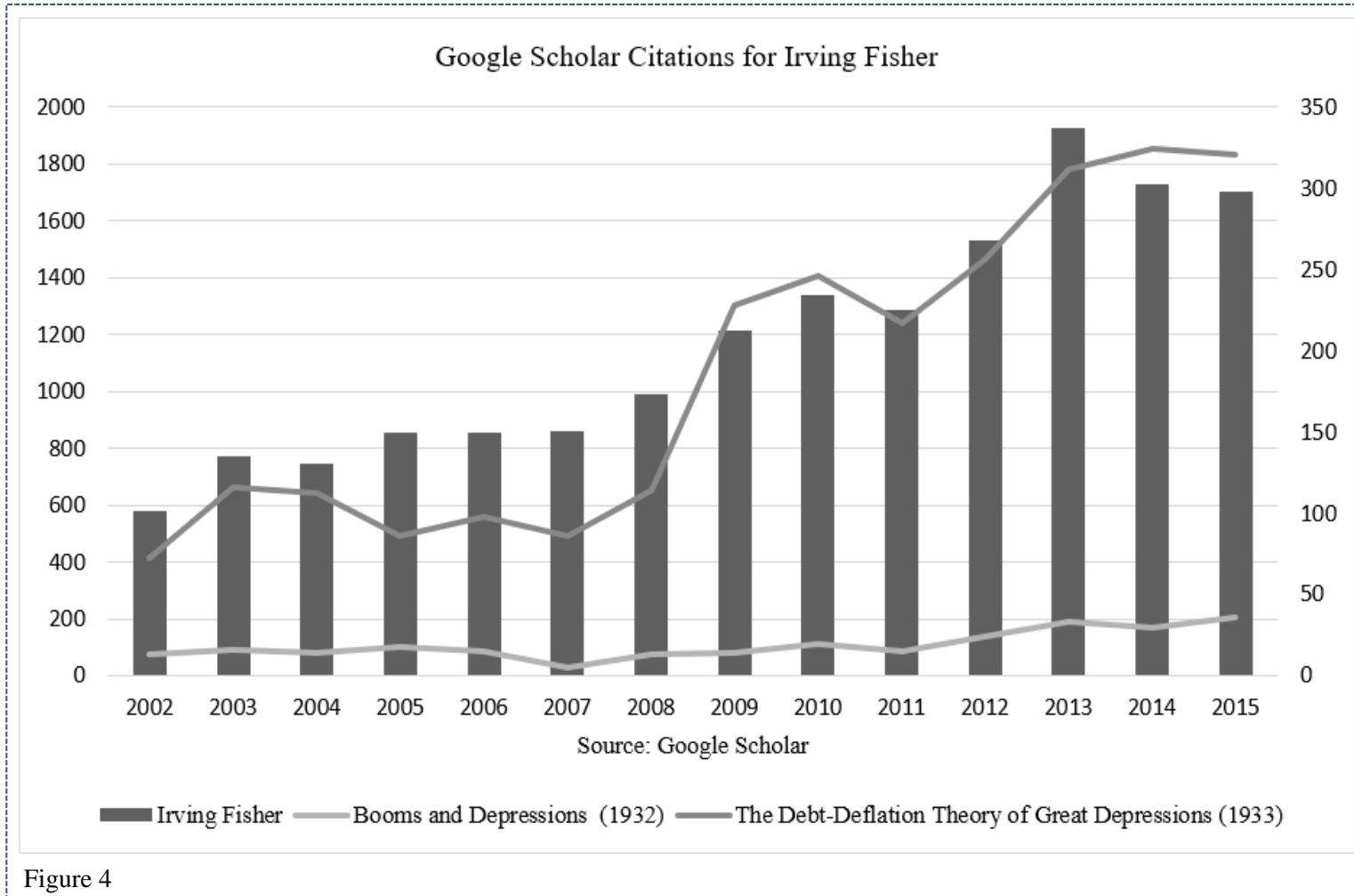
both prices and nominal debt into account. The values computed were indeed historically high corroborating that attempts to deleverage were self-harming at first, though the measure came down in Q2 of 2009. This is a rough metric too: decreases in mortgage debt include defaults which indicates that the statistics would have been even higher for the population of non-defaulters only.

Close attention was paid to chronology until now because it was imperative to demonstrate the functioning of the debt-deflation loop. Fisher, however, clarifies that the other variables are not subject to strict chronological order because “a depression may be said to be full of tangles and cross-currents” (1932, p. 41). Corporate profits fell drastically (Panel 5) starting in Q2 of 2007. There is evidence, as Fisher was arguing, that profits might have fallen in part because costs did not adjust to slowing inflation. Average hourly earnings did not fall. Tax rebates were included in the Bush and Obama stimuli, but the statutory corporate rate of 35% remained. WTI prices nearly doubled in the year following the dawn in the plunge of profits. Electricity prices kept on a positive secular trend. Rents paid increased in 2007. Relatedly, while the Bank Prime Loan Rate (for the dwindling creditworthy borrowers) decreased with the Fed funds rate, other commercial rates initially did not budge (Panel 6). For example, at Q4 of 2008, the five years fixed mortgage rate stood only a meager 39 basis points lower than 5 quarters before when the Fed began bolstering M1. Pessimism was rampant both among consumers and producers (Panel 7).

Through this complex web of interactions, the recession had arrived: employment and real GDP were both sinking (Panel 8). Thus, all nine of Fisher’s main factors co-moved as he had theorized with the necessary addition, at times, of endogenous monetary policy. Further, the investigation also found evidence for the chronology of the debt-deflation loop including a build-up of indebtedness before the crisis and positive feedback between debt burden and distress selling.

LITERATURE REVIEW

There have been many interesting modern re-interpretations of Fisher’s work. A look at citations per year indicates that his contributions had begun resurfacing in the 2000s and returned in force after the crisis (Figure 4). I share here some writings that shed more light on the extent to which Fisherian theories can help us understand 2008-2009. Nakamura (2013) argues that Fisher’s institutional approach, most emphasized in his 1911 book *The Purchasing Power of Money*, can help us understand the leading up to the crash, especially on the supply side of the mortgage market. In the 1960s and 1970s, when Freddie Mac and Fannie Mae could not unload their long-term fixed mortgages on investors, government officials created



mortgage-backed securities. This was the birth of mortgage securitization which led to the infamous CDOs. Often, SEC credit requirements could only be met with ratings provided by Nationally Recognized Statistical Rating Organizations enhancing the importance of the fraudulent Standard & Poor's, Fitch, and Moody's. Nakamura also writes that limitations on depository banks (e.g. the Glass-Steagall act), while arguably beneficial by themselves, led to the growth of unregulated parallel institutions as the economy was financializing. Similarly, Betz (2014) argues that Fisher's theory of financial crises had been well internalized by lawmakers. Rather, the inability to prevent the crash resulted from regulators' lack of visibility into a complex layered financial structure.

Fazzari & Caskey (1989), Wolfson (1996), and Shiller (2011) all agree that Fisher was wrong to focus strictly on deflation and that *unexpected* "decline in the rate of inflation would serve the same analytic purpose" (Wolfson, p. 317). This insight clarifies how Fisher's mechanism took hold in 2008 despite only a short stint of deflation. By the Fisher equation, ailing inflation increases real rates exacerbating the debt disease. It also works to reduce profits as firms remain locked in nominal cost contracts negotiated when they held higher inflation expectations. Shiller reminds us of Fisher's support for indexation schemes to combat this "money illusion."

Bordo (2008) and Bhattacharya et al. (2015) credit Fisher for his comments on the psychology of borrowers in times of debt build up. Bhattacharya et al., specifically, construct a model of financial instability in which borrowers are Bayesian learners that update their beliefs about future returns by observing the sequence of past ones. This conceptualization is helpful in analysis of the bubbling up in mortgage debt in the 2000s and is indeed similar to Fisher's description of the debtor: "his psychology is not that of the unfortunate. His mood is not fear, gloom, or caution. It is enthusiasm and hope" (1932, p. 45). It might however more closely resemble Keynes' argument that "the facts of the existing situation enter, in a sense disproportionately, into the formation of our long-term expectations" (1936, p. 75).

There have also been attempts at including Fisher's insights into paradigmatic Walrasian DSGE models. King (1994) uses heterogeneous agents to model debt-deflation in an RBC setting to show it could lead to falling aggregate demand and output. Bianchi & Mendoza (2010) construct a model with collateral constraints on debt. When the constraint is binding, they show exogenous productivity shocks lead to fire sales, debt-deflation amplification, and financial crises. This is an attempt to formally define Fisherian over-indebtedness and to reconcile Fisher with RBC theory by postulating productivity shocks as the trigger of distress selling. The paper also fills holes in Fisherian theory: as Minsky remarked, "Fisher does not identify any systematic properties which will transform 'bearable debt' into 'over-indebtedness'" (1982, p.382). Assous uses Tobin's

disequilibrium model (1975) to argue that “the process of price adjustment in Fisher’s 1933 analysis remains unstable as long as government does not intervene” (2013, p. 320). This further contributes to our understanding of how mild deflation triggered Fisherian mechanisms in 2008.

These inclusions, however, are naturally reductionist and often limited to simplified debt-deflation processes. In fact, Fisherian theory does not mix well with DSGE models: debt-deflation is fundamentally a study of disequilibrium and unilaterality; it entails non-neutral money unlike RBC models; it has no microeconomic foundations; it considers psychological factors that are difficult to mathematicise; and it favours accuracy over precision. These efforts are also symptomatic of what Caballero has coined “bringing the periphery [of economics] into the core” (2010, p. 8). He contends that the rational expectations assumption of DSGE models “becomes increasingly untenable as we continue to add the realism of the periphery into the core” (p. 8). In other words, Caballero would insist that this approach – the inclusion of insights from Fisher into paradigmatic DSGE models – is doomed from the start in its alleged attempt to capture the full richness of Fisher’s contributions.

CONCLUSION

As this paper has tentatively claimed, the data of the 2008 crisis fits Fisher’s Debt-Deflation Theory well. It could be argued that Fisher’s enthusiasm for monetary intervention was excessive – this could be tied to his belief that deflation, and not only slowed inflation, was needed for his theory to take hold. It is also true that Fisher’s contribution is best understood as a treatise on how depressions start; little is said of subsequent slumping once debt-deflation elapses (Q2 of 2009 according to the metric of this paper). Keynes’ General Theory provides better answers here. What has been shown, however, is that, during the Great Recession, all main factors outlined in *Booms and Depressions* moved according to Fisher’s prognosis. Crucially, this paper unearthed evidence that debt-deflation spiraling occurred and that Fisher’s chronological claims were followed.

Fisher can inform the discipline of economics today, both in content and method. This article has advocated that this is best accomplished not by focusing on narrow aspects of the Debt-Deflation Theory, but by dusting off the whole model. If Fisher fails to gain a foothold in 21st century macroeconomics, historians of economic thought might at least find solace in the 2008 crisis confirming the grandeur of his contributions to the science of the 20th century.

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