

MODELING EXTREME INSTABILITY

James Annable & Shani Schechter

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ABSTRACT

We construct a coherent theory of extreme macro instability, an important macro phenomenon most recently experienced in the United States in 2008-09. The model is then used to identify important policymaking lessons from the Great Recession. The analysis is part of the ongoing GEM Project that focuses on the generalization of rational price-mediated exchange from the marketplace to the workplace, uniquely microfounding causation from adverse nominal disturbances to involuntary job loss. It draws upon two recent contributions to the literature that have received inadequate attention. In the first, Nancy Stokey (2009) demonstrates that, as investors/lenders become uncertain about macro prospects, inaction becomes rational. In the second, Roger Farmer (2010a, 2010b) has usefully repackaged an old idea: Independent of economic fundamentals, investor confidence can influence, and is influenced by, the behavior of prices on asset exchanges.

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Extreme macro instability put the ironic “great” into the Great Recession by producing huge welfare loss, featuring 6 million lost jobs, while threatening the much bigger calamity of a 1930s-class depression. The alarming episode provoked a politically charged scramble to put in place policies to prevent such losses in the future. Unfortunately, the vigorous response has been largely misdirected, revealing a poor policymaker grasp of the causes and mechanics of the acute instability. Analytic deficiency has gravely damaged the effectiveness of the reform program.

Broad misunderstanding of the lessons of the Great Recession should not surprise. Modeling acute instability is complex, differing substantially from the more familiar macroeconomics of

garden-variety business cycles. Even at its best, the coherent modeling that occupies the macroeconomic mainstream today provides no effective explanation.¹ This paper explains why.

Some background. Severe banking crises are always propagated by contracting total demand. Shrinking nominal spending induces same-direction changes in employment and output as a result of robust pricing rigidities that have been derived from axiomatic model primitives in the GEM/Project. The overall process features systemic liquidity breakdowns and a high incidence of institutional mark-to-market insolvency, both of which are characteristic of acute macro instability. The role of banks in such disruptions largely results from their function as recyclers of saving into (broadly defined and inherently volatile) investment. Stabilization policies in response to the virulent class of market breakdown that occurred in the latter half of 2008 and the first half of 2009 are rooted in a single idea. As argued by Ben Bernanke during the emergency, authorities must intervene in total spending with sufficient size and speed to promptly reverse the demand contraction, an outcome that necessitates a functioning banking system. Successful crisis stabilization requires some degree of financial-institution (temporary) recapitalization. (See below.) The belief, which turns out to be spurious, that such capital injections harm taxpayers has motivated much of the problematic political and regulatory response to the Great Recession.

Understanding the effective response to acute instability requires understanding total-spending macrodynamics. Here is the first important insight. A necessary condition of any extreme weakening of aggregate demand, regardless of the originating macro shock, is the loss of investor-perceived credibility of the real-side (employment) objective of stabilization authorities. In acute instability, demand contraction and investor confidence combine in a destructive feedback system, the cumulative effect of which overwhelms the capacity of markets, automatic stabilizers, and orthodox management of short-term interest rates to stabilize the economy.²

¹ Many analysts have noted the failure of mainstream modeling to explain the most salient 2008-09 facts. See, for example, Ohanian (2010). Stabilization policymakers, including Kocherlakota (2010) and Trichet (2010), have been even more disappointed.

² See the analysis of nonstationary demand disturbances in the next section. Also, investor confidence is used as shorthand for a larger concept that variously includes investors, lenders, and households.

Standard operating procedures will not suffice. More powerful stabilization-authority intervention, quickly and in size, is needed to halt and reverse collapsing total spending.³

Within the banking system, broad liquidity breakdowns and spiking incidence of mark-to-market insolvency are predictable companions to damaged central-bank real-side credibility. If the monetary authority is successful in a timely reversal of contracting demand, the funding and solvency challenges facing banks quickly dissipate, implying no net recapitalization bill to taxpayers.⁴ If the stabilization effort fails, the existential threats confronting banks (as well as other enterprises) become self-fulfilling as the economy gives way to product/asset price deflation, high unemployment, widespread private and public debt default, chronic depression, and the broad destruction of wealth and living standards.

Plan of the paper. In the first section, the paper's main body summarizes recent developments in the macroeconomic modeling of highly stressed economies, incorporating them into a coherent generalized-exchange theory. In the second, the more robust aggregate-demand framework is used to analyze issues, including the effectiveness of recent regulatory initiatives, arising from the acute instability of the Great Recession. The third part is a conclusion.

I. MODELING EXTREME MACRO INSTABILITY

A key to understanding the macrodynamics of extreme instability is the large gap such disruptions open between many mark-to-market financial asset prices and the notional pricing implied by economic fundamentals. The mismatch reflects a breakdown in the baseline efficient-market hypothesis, in which security prices are determined by expected profitability in a fully employed economy. It is an important clue that high-stress macroeconomics is characterized by a class of spending contraction that unmoors market asset pricing from its fundamental determinants.

³ Public intervention is needed to manage meta-externalities, broad market breakdowns generating lost jobs and incomes that occur despite firms and households behaving rationally.

⁴ This paper focuses on the monetary authority, which is the particular interest of the authors and was the principal source of effective remedial action during the Great Recession.

This section presents the macro analysis, which is divided into two parts. The first elaborates on the nature of demand disturbances, including the class that embodies acute instability and most recently occurred in 2008-09. The second summarizes two recent innovations in macro modeling that enhance our understanding of the role of mark-to-market asset pricing in circumstances of collapsing spending and consequent extreme macroeconomic stress.

Demand Disturbances

Nominal demand disturbances (DD) are usefully separated into two analytic classes. Each produces distinctive instability. In the first and most usual, macro shocks are promulgated by *stationary demand disturbances* (DD→SDD), which yield familiar, contained business cycles. In this class, adverse shifts in total spending are fully corrected, after a relatively short period, by automatic stabilizers augmented by standard central-bank “lean-against-the wind” intervention. The stabilizers include lower interest rates and increased public deficits, income-support programs triggered by involuntary job- and income-loss, and other counter-cyclical transfer payments. Meanwhile, confronted by adverse SDD, the central bank undertakes actions tasked to speed up cyclical recovery, using open-market purchases of short-term Treasury debt to increase system liquidity and further reduce interest rates. Greater liquidity and lower rates encourage investment and consumer-durables spending.

The second category of nominal propagation of macro shocks, much less frequent but generating much greater welfare loss, resolves into an unchecked *nonstationary demand disturbance* (DD→NDD). NDD features contracting aggregate spending sufficient to overwhelm both automatic stabilizers and orthodox central-bank interventions. If not contravened, NDD’s extreme instability will induce rapidly cumulating job and income loss, collapsing profits, price deflation, broad debt default, wealth destruction, and chronic depression – all adding up to massive welfare loss.⁵ NDD is necessarily associated with a breakdown in the credibility (denoted below by C) of

⁵ 1930s-class depressions are characterized by substantial price deflation that cannot be accommodated by nominal (especially debt-related) contracts and only slowly accommodated by nominal wages. Bankruptcy and other forms of debt default are rampant, government debt increases dramatically and unsustainably, the safety net shrinks, and excess economic capacity becomes sizeable and chronic. If that scenario is assigned a nontrivial probability, how can investors be anything but uncertain? How can macro policymakers be anything but totally focused on avoiding such a collapse?

stabilization authorities' real-side (employment) objective. The emergence of a broadly held assessment of a nontrivial likelihood of depression will be shown to restrict the willingness to invest in residential and nonresidential construction, equipment, and software and to purchase consumer durables, while simultaneously driving substantial losses in asset markets. Characteristic NDD circumstances, which also impair the funding for and lending by banks and nonbank financial institutions, require much more aggressive aggregate-demand management to prevent welfare loss that greatly exceeds more typical SDD business cycles.⁶ The two stabilization problem classes are fundamentally different.

Modeling NDD Instability

Nancy Stokey (2009) made a significant contribution to our understanding of the Great Recession by demonstrating that, as investors/lenders become less certain about macro prospects, simple *inaction* becomes increasingly rational. In particular, buyers of financial assets respond to uncertainty inherent in NDD instability by moving to the sidelines, waiting for the emergence of a credible floor under prices. (A maxim of veteran traders is not to try catching a falling knife.) In the second contribution, Roger Farmer (2010a, 2010b) has revived an old, intuitive idea. Independent of economic fundamentals, investor confidence can influence, and is influenced by, the behavior of prices on asset exchanges.⁷ In the simple feedback model used below to capture both Stokey's and Farmer's ideas, asset prices are increasingly motivated by self-referential confidence as investor assessment of future macro (i.e., aggregate demand) prospects is increasingly governed by uncertainty.⁸

⁶ In such circumstances, orthodox central-bank "lean-against-the wind" monetary intervention has been famously described as "pushing to a string". Moreover, if and when the nominal demand contraction induces price deflation, the interaction of falling prices and existing nominal debt further speeds collapsing total spending, creating powerful problems for stabilization authorities.

⁷ Notable support for an independent role of confidence came from Alan Greenspan in 2009 (writing in the *Financial Times*): "... a significant driver of stock prices is the innate human propensity to swing between euphoria and fear, which, while heavily influenced by economic events, has a life of its own. In my experience, such episodes are often not mere forecasts of future business activity, but major causes of it."

⁸ Increasingly uncertain expectations are, by definition, decreasingly governed by priceable risk. In modeling extreme instability, investor anticipations are more complex than just effectively using all available information. Expectations also depend on the nature of relevant information. A critical macroeconomic issue concerns the degree to which effective probabilities can be assigned to future states of the macroeconomy. Frank Knight (1921)

In garden-variety SDD business cycles, the credibility of stabilization authorities' real-side (employment) objective remains robust, significantly containing the welfare loss from the spending disturbance. By contrast, in NDD circumstances inherently featuring a breakdown in such credibility, investor uncertainty and consequent inaction become the driving force in collapsing investment and overall spending that, if not somehow effectively contravened, produce vast welfare loss.

Rational inaction. Prospects of cataclysmic depressions distort cost-benefit decisionmaking. Even a small likelihood of depression translates into such a large expected loss that any plausible return from most investing or lending, especially if reasonably postponable, is overwhelmed. The rational response to acute instability, generating a nontrivial likelihood of deflation/depression, is (i) to stop acquiring financial assets, preserving cash, until a convincing market floor has been established and (ii) to postpone investment in capital goods and construction.⁹

As modeled by Stokey (2009), strategic inaction broadly postpones investment and lending and is centrally characteristic of NDD (total-spending) crises with their breakdown in stabilization authorities' credibility (C) and its associated uncertainty. Uncertainty also provokes low-risk opportunities for short-sellers. Nonstationary demand disturbances impose, as a result, outsized downward pressures on mark-to-market asset pricing. Moreover, if stabilization policymakers are successful or the NDD threat otherwise dissipates, the rebound in asset prices will be correspondingly large.¹⁰

famously analyzed the distinction between priceable risk, requiring informed priors on outcome likelihoods, and unpriceable uncertainty, arising from unknown probability distributions.

⁹ During the extreme 2008-09 instability in the United States, many agents assigned a nontrivial possibility to a 1930s-class collapse in total spending. The assessment was not an unreasonable response to frozen financial markets, the virulent crumpling of asset prices and wealth, forced job loss measured in many millions, and doomsday comments from the most powerful stabilization policymakers (as they attempted to motivate action from a badly ill-prepared Congress). Depressions are infrequent, poorly understood, and largely idiosyncratic in their origins, implying that investor priors on the severity of brewing instability are governed more by uncertainty than predictable risk.

¹⁰ In a stock-market collapse, many uncertain, risk-adverse households will panic, selling near the bottom, swearing off equities, missing the rebound, and suffering sizeable losses of wealth. Macro crises are inherently accompanied by reduced signal to noise in generally available information, especially to small investors, placing a welfare responsibility on stabilization policymakers, especially in a economies dominated by defined-contributions retirement plans.

BRIEF HISTORY OF THE MACROECONOMICS OF ACUTE INSTABILITY

It is not surprising that the extreme instability of the 1930s Great Depression and its associated huge welfare cost stimulated substantial modeling of the meltdown. It is surprising how incomplete the research program remains today. Most famously, Keynes (1936) and the subsequent Keynesians (who founded macroeconomics as a separate field of economic theory) organized their efforts to explain the broad market failure around reversing the causality that long dominated economics. Keynesians centrally, and correctly, argued that changes in total nominal spending induced same-direction changes in employment and output, making rapidly contracting demand synonymous with acute real-side instability. Moreover, having identified a liquidity trap when the operative interest rate is near zero, early Keynesians set aside relying on monetary policy in crisis, concluding that fiscal policy was the only effective means of discretionary total-spending intervention.

Milton Friedman (1963) shifted economists' thinking on the effectiveness of money with his massive empirical study of the Great Depression. The data showed close correlation between the contractions of employment (or output) and the money supply, which Friedman then asserted to be the causal force in the broad market failure. Twenty years later, Ben Bernanke (1983) looked inside Friedman's simple correlations. He concluded that the substantial breakdown banks' capacity to recycle saving into investment, not the money supply, was the central driving force in the 1930s contracting demand, acute instability, and consequent welfare losses. Bernanke's improved perspective served him, and the rest of us, well in 2008-09.

The macro narrative, however, was far from complete. Recently, the GEM/Project has coherently modeled the channel through which contracting nominal demand induces involuntary job loss (a chronic omission in mainstream thinking that greatly worried Bernanke) and has usefully introduced technological change, uncertainty, and confidence into the saving-investment process:

- Technical change has greatly altered the financial system from the Great Depression to the Great Recession. Banks today are much less important. Nonbank securitization, in its many manifestations, is playing an ever more crucial intermediary role. By 2008-09, breakdowns in the commercial-paper market, the GSE mortgage market, money-market mutual funds, nonbank asset-backed lending, CDO conduits, hedge funds, etc. greatly restricted the economy's capacity to maintain total spending. The conclusion is indisputable. Policies to contain financial disruptions, if they are to be effective, can no longer focus on the federally regulated banking system.
- Macro theorists are beginning to introduce the related phenomena of uncertainty and confidence into explanations of the Great Depression and Great Recession. The modeling so far makes clear that both factors are needed to explain the characteristic substantial separation of mark-to-market asset prices and notional prices implied by economic fundamentals. Uncertainty and confidence are also necessary to explain the distinctive speed and virulence of acute instability.

Investor confidence. Farmer (2010b, p.18) argues that confidence matters, exerting a “separate, independent” influence on economic behavior.¹¹ In particular, he asserts that revealed investor confidence (\mathcal{C}) is an increasing, nonlinear function of mark-to-market financial asset prices. \mathcal{C} is then critically rooted in a positive feedback relationship with those prices, represented by a notional index (V). An illustrative version of Farmer’s feedback mechanism is:

$$(1) \quad \mathcal{C}(t)=f(V(t-1),\Delta V(t-1)) \text{ such that } \Delta\mathcal{C}/\Delta V>0, \Delta\mathcal{C}/\Delta(\Delta V)>0, \text{ and}$$

$$(2) \quad V(t)=f(H(t),\mathcal{C}(t), C'(t)) \text{ such that } \Delta V/\Delta H>0, \Delta V/\Delta\mathcal{C}>0, C'\in[0,1],$$

where \mathcal{C} denotes investor confidence, V represents composite asset prices, Δ denotes change, H represents discounted, inflation-adjusted expectations of future profits (subject to a known probability distribution), and C' ($0\leq C'\leq 1$) notionally measures investor perceptions of the real-side credibility of the stabilization authority.¹²

The first equation implies that investor confidence is positively related to asset prices.¹³ The second makes asset values a positive function of expected profits and investor confidence, using C' to mediate the relative strength of H and \mathcal{C} in the determination of V . Stabilization authorities’ real-side credibility, if damaged, introduces uncertainty into the valuation process. When credibility is high ($C'=1$), investors’ expectations of the macro future are governed by known probabilities; and asset pricing is wholly driven by profit fundamentals. As credibility erodes ($0\leq C'<1$), investors become uncertain; and asset-price dynamics are increasingly driven by investor confidence. An instructive linear version of the feedback system is:

$$(3) \quad V(t)=C'(t)H(t)+(1-C'(t))[c_1V(t-1)+c_2\Delta V(t-1)], \text{ such that } c_1+c_2=1.$$

¹¹ See also, for more formal expositions of his argument, Farmer (2010a, 2010b).

¹² In the model, \mathcal{C} (Farmer’s definition of investor confidence) and C' (increasing in the real-side credibility of the stabilization authority) are distinct concepts.

¹³ It makes sense that investor confidence is lifted by rising asset prices; consider the alternative. However, outside of highly uncertain macro circumstances, it also makes sense that such confidence plays second fiddle to investor assessment of economic fundamentals that drive the future path of discounted real profits. That is an important message, supported by the evidence, of Eugene Fama’s work on efficient (full-information) markets.

It is easy to extend \mathcal{C} - V feedback from asset pricing to total nominal spending, the focus of the acute-instability analysis. In the enriched framework, investment outlays are also determined by H , \mathcal{C} , and C^e , with policymaker credibility again mediating the relative influence of profit fundamentals and confidence.¹⁴ In addition, consumption spending is influenced by household wealth and is, therefore, sensitive to mark-to-market equity and home prices as well as current income. Meanwhile, in episodes of contracting aggregate demand, incomes throughout the economy are destabilized by powerful macrodynamic multipliers. Putting the pieces together, broad macro uncertainty produces a second, more extensive destabilizing feedback, this time between confidence (\mathcal{C}) and aggregate demand. This larger feedback system, given uncertainty about future total spending, motivates NDD instability.¹⁵

The feedback model implies conditional dependence of demand and employment dynamics on self-referential confidence. In the 2008-09 financial crisis, investors used existing information to negatively assess the credibility of real-side stabilization policies. In question was government's capacity to manage nominal demand, halting and reversing the rapid contraction in total spending and hemorrhaging job loss. From the confidence perspective, investors' distrust of monetary/ fiscal competence is manifest in the 50% collapse in equity prices, a deterioration that cannot reflect economic fundamentals. (See the Box.) Some sort of confidence feedback is needed to explain the sharp collapse, and quick rebound, of equity prices in 2008-09. The proper design of measures to prevent acute instability must take the evident feedback mechanisms into account.

¹⁴ Economic fundamentals reflect the available levels of capital, labor, and technology. Once efficiently utilized, those factors produce output and mean living standards at the economy's potential.

¹⁵ To reiterate, C^e mediates the relative influence of expected fundamental profitability (H) and investor confidence (\mathcal{C}). As investor expectations become more uncertain, decreasingly governed by credible stabilization authorities and priceable risk, the influence of economic fundamentals on asset value and total spending is diminished. The model helps explain the sometimes extreme volatility of investment relative to other components of total spending.

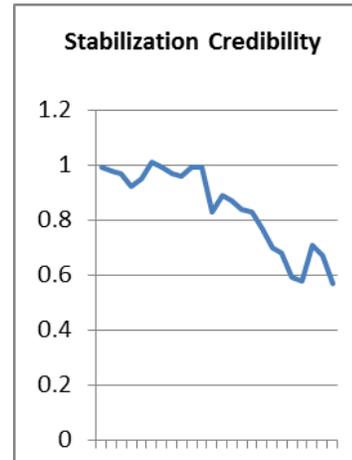
BOX 6.6: THE FEEDBACK MODEL AND STABILIZATION CREDIBILITY

Consider a simple dynamic exercise in which the linear feedback model is plausibly calibrated:

$$V(t) = C'(t)I_1(t) + (1 - C'(t))[c_1V(t-1) + c_2\Delta V(t-1)], \text{ such that } c_1 = c_2 = 0.5.$$

The model, where V now represents the S&P 500 equity-price index, was simulated over the month (24 trading days) that followed the Lehman bankruptcy on September 15, 2008. Discounted profit expectations (I_1) were reduced by 5% on the first day and subsequently held constant. The timepath of C' (the measure of the real-side credibility of stabilization authorities) was determined by the sequence of values that minimized the difference between the actual behavior and the linear-model estimate of the S&P index.

The timepath of C' produced by the linear model is presented in the Chart. It is remarkably intuitive. The S&P Index dropped by nearly 30% in the month after the Lehman bankruptcy, much more than can be reasonably attributed to the impact on future profits from the financial crisis. While the direct damage was indeed significant (e.g., the inefficient regulation likely to be imposed on the financial industry), it was surely insufficient to reduce longer-term discounted profits (I_1) of the entire economy more than 5%. The assessment of a relatively modest role in the equity crash played by the fundamental reduction in I_1 is supported by the sharp S&P 500 rebound that occurred once the contraction in total nominal demand was reversed in the first half of 2009. What had, of course, disappeared (pushing C' back up) was the fear that the financial crisis would morph into a depression, not the real effects of the crisis itself.



The huge reduction in equity prices in the 30 days after the Lehman bankruptcy must be, as the simple model suggests, mostly attributable to a substantial loss of confidence that stabilization authorities would be able to contain and turn around the breakdown in total spending. Recall the widespread, much debated fear of another 1930s-class depression. There is no other plausible candidate for the starring role in the perilous 2008-09 macrodynamics and its consequent outsized welfare loss. If the real-side credibility of the Federal Reserve, the U.S. Treasury, Congress, and the White House had been robust, i.e., if investors had been convinced that stabilization authorities had the means and the will to effectively stabilize aggregate demand, the stock-market breakdown as well as most of the overall 2007-09 welfare loss would have been avoided. Real-side confidence is a big deal that stabilization authorities must closely monitor and manage.

II. FOUR IGNORED LESSONS FROM THE GREAT RECESSION

In this section, the largely ignored lessons from the Great Recession are summarized in four points. First, the recent contraction, like all economic downturns, is usefully separable into an originating macro shock and its propagation by weakening total spending.¹⁶ That decomposition identifies the two classes of policy that appear available to prevent a recurrence of the huge welfare loss, estimated in the many trillions of dollars, resulting from the 2008-09 extreme instability: (i) prevent future financial crises via effective regulation and (ii) prevent their propagation via effective interventions in total spending.¹⁷

Second, policymakers have chosen to emphasize the regulatory-response option and to focus that effort on the existing federally regulated banking system. The effectiveness of the approach is inherently limited. Financial risk easily migrates to and becomes concentrated in the shadow banking system, which has proven difficult to regulate. It is much easier to impose higher capital, product restrictions, and size penalties on already closely controlled banks, even if those institutions were much less implicated in the originating macro shock than their shadow-system counterparts.¹⁸ Despite Dodd-Frank, the hard fact is that financial crises in various forms will continue to occur.

Moreover, the regulation program supplies no help in the most critical macro task of reversing extreme demand instability when it does occur. The positive feedback mechanics between collapsing total spending and collapsing investor/lender confidence provide no means for higher bank capital, penalized size, and product restrictions to mitigate the destructive self-referential

¹⁶ In 2008, the shock that triggered acute instability in the United States was the stabilization authorities' mismanagement of the Lehman bankruptcy that was associated with the improper underwriting, rating, and distribution of relatively small classes of residential mortgages and, more generally, with the broader bubble in home prices.

¹⁷ While banks sometimes play a significant role in macro shocks, they are always a critical part of their propagation. Their most mild participation is reflected in the rational tightening of non-price credit terms, conditions, and availability that accompanies SDD in standard, inherently contained recessions. Much more damaging NDD participation features significant, broad breakdowns in bank funding.

¹⁸ Leading up to and during the Great Recession, investment banks were lightly regulated by the SEC, a situation reflected in extraordinarily low required capital. In the aftermath of the crisis, those institutions have been effectively transferred to the federally regulated commercial-bank system. This paper has not directly considered the too-big-to-fail debate. Its economics will be summarized in a future *Backgrounder*.

process. Limited scope and irrelevance to acute-instability macrodynamics imply that the post-crisis regulatory program will not prevent future Great Recessions or, worse, Great Depressions.

Third, policymaking to contain welfare losses from future financial crises, if effective, must concentrate on demand management. In particular, the Federal Reserve should, building on Bernanke's virtuoso performance in 2008-09, carefully identify the tools made available by its unique balance sheet to help reverse collapsing total spending. The Fed should also make a concerted effort to convince Congress of the necessity of such contingent interventions in the central bank's stabilization toolkit. In an important related task, global investors and lenders should be convinced of the power of the expanded toolkit and the institutional resolve of the Federal Reserve to use it to contain NDD-propagation of any future financial crisis or other macro shock. Both campaigns of persuasion would be natural companions to the earlier successful effort of central banks to convince market participants of their commitment to low inflation.

Fourth, an important benefit (beyond effectiveness) from relying on demand management in stabilization efforts is that the design and execution of bank regulation could return to its proper roots as a means of balancing social costs and benefits. Critically, efficiency and international competitiveness, with their positive effects on living standards, could resume their place as important regulator concerns.

The final word goes to Stanley Fischer (2013, p.5), prominent macroeconomist, former Vice Chairman at Citigroup, former Governor of the Bank of Israel, and recently nominated to be Vice Chair of the Federal Reserve Board of Governors: "No one who has read Bagehot on panics can think that understanding of the potential for systemic crises is a new problem. However, its importance has been reinforced by the dynamics of the most recent crisis, in which a problem initially regarded as manageable – the subprime crisis – gradually developed into the worst financial crisis since the Great Depression, involving financial instruments built on mortgages, and after the Lehman bankruptcy which revealed interactions among financial institutions to be much stronger than policymakers must have thought at the time." The acute-instability modeling

provided above critically motivates both the SDD→NDD metamorphosis and the surprisingly strong, cumulating interactions.

III. CONCLUSION

Financial crises, themselves inherently idiosyncratic, are generally propagated by adverse total-spending disturbances. Welfare costs of the two-part process are analytically separable. Losses uniquely associated with the originating financial disruption are a small fraction of those that result from its propagation. The decomposability is illustrated by the existence of substantial financial disturbances that were not propagated by contracting spending and consequently did not generate much macro cost.¹⁹ Only the few financial disruptions that have been NDD-linked damaged overall welfare sufficiently to become infamous.

By its nature, extreme instability is always associated with a separation of rational investor/lender decisionmaking from the economy's fundamental endowments. How else, in the 1930s, could an economy with the productive potential of the United States, rooted in its vast physical, organizational, and human capital, produce such a prolonged period of substantially depressed spending and living standards? Textbook macro theory is unable to coherently explain such broad, persisting, devastating market failure and typically treats the Great Depression as an anomaly. The reemergence of acute instability in the Great Recession has encouraged a renewed emphasis on modeling the important phenomenon. The best of that research has focused on self-referential confidence-spending feedback in conditions of uncertainty.

Effectively modeling extreme instability informs macroprudential analysis, providing substantial implications for stabilization and regulatory policymaking.²⁰ Understanding the nature of acute

¹⁹ For example, the 2001 crash of NASDAQ internet-related stocks, with direct losses estimated in the neighborhood of \$1 trillion, did not trigger extreme instability or much in the way of macro market-failure costs (involuntary lost jobs, etc.). Other notable examples include the 1980's collapse of the S&L banking system and the 1990s Asian Tiger crisis.

²⁰ From Stanley Fischer (2013, p.4): "There is not yet an accepted definition of macroprudential policy or supervision, but the notion involves two elements: that the supervision relates to the entire financial system [!]; and that it involves systemic interactions. Both elements were evident in the global financial crisis, with analyses of the crisis frequently emphasizing the role of the shadow banking system and of the global effects of the Lehman bankruptcy."

instability broadly helps in the design of institutional and market reforms to better ameliorate/prevent future Great Recessions (or worse). In particular, the nature of the most critical policy initiative, i.e., strengthening the real-side credibility of stabilization authorities, has been identified. Moreover, high capital requirements and product/size restrictions for banks, no matter how aggressive, are indicated to be inadequate to the task of reversing collapsing demand and preventing depression. That inadequacy, however, does not mean that well-founded financial regulatory reform, especially responding to the challenges of an increasingly complex financial space and interconnected world, would not be useful.

Fischer sees macroprudential analysis as a merger of the goals of safety-soundness and financial-system stability. The Council has taken a somewhat more general view, combining safety-soundness and overall economic stability.

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