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“Systemic Fragility in the Global Economy”¹

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ABSTRACT: The divergence between contemporary economic theory and the real trajectory of the global economy has been growing since the 2008-2009 crisis. Anomalies have continued to appear and develop. A short list of the more important are noted. Queries and commentaries suggested by the anomalies are raised. A brief comment on insights from Keynes, Marx and Minsky, pointing to the possibility of a new conceptual framework for economic analysis, follows. Systemic Fragility is offered as a start point for the development of a new conceptual framework for analysis of the economy in the 21st century. The material bases for a theory of Systemic Fragility is summarized in the identification of nine key variables. The presenter then briefly summarizes key elements associated with the concept of ‘Systemic Fragility’. Preliminary equations associated with the key variables of Systemic Fragility are thereafter provided in an appendix.

In the past decade an increasing number of economists have been growing disenchanted with the theories, models, and elements of the conceptual apparatus associated with much of mainstream economic analysis. Anomalies have appeared in the global economy with increasing frequency in recent decades, but have been left insufficiently answered, or even unaddressed, by either of the two main perspectives in contemporary economics—the ‘Hybrid Keynesian’ and the ‘Retro-Classicalist’ traditions of contemporary economic analysis.²

A short list of some of the more significant anomalies include:

- Despite more than \$20 trillion in global central bank liquidity injections since 2008, disinflation and drift into deflation in goods and services prices is gaining momentum;

¹ The following presentation is an outline of the major themes associated with the presenter’s ‘Theory of Systemic Fragility’, and a further commentary on those themes as raised in the presenter’s book, ‘*Systemic Fragility in the Global Economy*’, by Clarity Press, 2016.

² See chapter 16 of *Systemic Fragility in the Global Economy* for its author’s definition of these traditions and terms, their major propositions, and critique.

- After 7 years of near zero, and even negative, interest rates, after trillions of dollars in corporate debt issuance and trillions more in equities price appreciation, and after record corporate profits, cash hoarding, and shareholder payouts exceeding \$15 trillion since 2008—real asset investment nonetheless continues to slow globally;
- After \$9 trillion in central bank quantitative easing (QE), more than \$5 trillion in non-performing bank loans still sit on AE-China bank balance sheets, with unknown additional amounts in emerging market economies;
- Global total debt levels have surged by almost \$50 trillion since 2008, according to international research institutions—concentrated especially in the corporate sector and in particular in emerging market economy corporate debt;
- The chronic collapse of global oil and commodity prices has had virtually no effect on household consumption. Meanwhile, wage income gains in the advanced economies continue to stagnate despite seven years of ‘official’ recovery;
- Despite record deficits, since 2009 advanced economies (AEs) of north America, Europe, and Japan continue to experience historically sub-normal recovery; the robust, but brief recovery in China and emerging markets from 2010-2013 has slowed rapidly since 2014;
- The shift to contingent, and now ‘gig’ economy employment, in the AEs is correlated with millions leaving their labor forces, as new labor force entrants find employment in predominantly low paid service work associated with that shift. A chronic problem of both quantity and quality of employment increasingly characterizes the AEs;
- Fiscal multipliers and interest rate elasticity effects have weakened, with no clear explanation as to why by mainstream economic analysis;
- Financial asset bubbles and busts are reappearing and developing beneath the surface with greater frequency once again, despite financial regulatory initiatives since 2009;

The anomalies raise fundamental questions—and suggest that not only new theories and models, but a new conceptual framework as well, are necessary in order to better understand the endogenous forces that continue to destabilize the global economy in the 21st century.

Fundamental Queries & Commentaries

The foregoing anomalies lead in turn to the following fundamental questions:

- *Why has contemporary economic theory performed so poorly in predicting financial instability events and crises that follow, and why has it consistently underestimated the impact of that instability on subsequent real economic recovery?*

This predictive failure, and subsequent underestimation, has been the case whether the event in question was the 2007-09 credit markets crash, the tech stock bust of 2000-02, Asian currency crisis of the late 1990s, Japan's financial crash of 1991 and aftermath, repeated sovereign debt crises since the 1980s, more recent events associated with China property and stock market booms and busts, the collapse of global oil prices since 2014, and latest emerging instabilities involving corporate high yield bonds, emerging market private debt, equity market derivatives like ETFs, leveraged loans, bond liquidity and repurchase agreements (repos), rising global forex price instability, and so on.

Instead of explaining the consequences of the continued expansion of liquidity, debt, and leverage in relation to the above instabilities, contemporary economic analysis and media friends continue to fixate on this or that minor basis point adjustment to central bank short term interest rates, or whether some central bank will buy X-billion more bonds for a few more months.

At the same time, with regard to the non-financial, real side of the economy, global research institutions like the IMF, World Bank, OECD, global central bank and private consultancy research departments continue to over-estimate global real economic growth—as they have before, during, and after past contractions. Meanwhile, policy makers and bureaucrats in more national economies continue to 'tweak' and manipulate their GDP numbers—as in India, Nigeria, China, and even more subtly among advanced economies like Japan and even US and Europe.

- *Why does contemporary theory does not explain very well how financial variables negatively interact with the real side of the economy—specifically why and how financial asset prices, massive central bank liquidity injections, inside credit, private sector debt, and excessive leverage together play an increasingly destabilizing role today in the global economy.*

To the minimal extent explanations of how real asset and financial asset investment interact exist, they lack an integrated theoretical and conceptual framework. Both 'Hybrid' and 'Retro' wings of contemporary theory have been relatively more preoccupied with real asset investment than financial. Notwithstanding the limitations of GDP and its growing unreliability as an indicator of economic growth and stability, there still remains no equivalent aggregate financial variable expression of similar aggregate dimension—despite the obvious growing importance of financial variables on the stability of the real economy. Given that, one is led to

ask if this conceptual shortcoming is due to economists' traditional training primarily in NIPA variables and thus their insufficient understanding of financial variables; the failure of the profession to pay appropriate attention to the new anomalies; some other ideological bias or other causes? Whatever the reasons, the conceptual framework of contemporary economics does not lend itself well toward integrated and dynamic analysis of the two forms of investment—real asset and financial asset investment—i.e. a dichotomy of investment that is of increasingly importance to understanding the trajectory of the global economy in the 21st century.

- *What is the relationship between slowing real asset investment and escalating financial asset investment in recent years, and are there identifiable causal relationships behind their diverging curves?*

Global CAPEX, gross domestic investment, and related real asset investment have all been slowing since 2000, in response to both secular and cyclical events. The data raise important questions: is that slowing causally responsible for the rise in financial asset investment, as some economists—both mainstream and Marxist alike—argue? Is slowing real asset investment the consequence of a relative shift to financial asset investment? Or is there some complex mutual determination occurring? Are the inverse trajectories merely correlative or causal? If causal, are the relationships linear and unidirectional, or multi-directional? Is financial asset investment crowding out or diverting capital from real asset investment to financial? Large corporations in particular are increasingly hoarding money capital, distributing it to shareholders in ever greater magnitudes, or diverting it into liquid financial asset markets. Are these behaviors due to just a lack of consumer demand for goods and services, attributable to weak household income growth or is something more fundamental occurring, driven by greater relative, and less uncertain, rates of return from short term financial asset investing compared to longer term real asset alternatives? Such questions are seldom raised, let alone answered, however, by mainstream economic analysis.

- *As a policy related corollary, is the relative shift to financial asset investing resulting in a weaker positive real investment response to central bank interest rate cuts since 2008? Conversely, will the shift result in a negative real investment response to forthcoming rate changes in 2016? In other words, has financial investment changed the interest rate elasticities for real investment? Is that same relative shift also contributing to weaker fiscal tax and government spending multiplier effects?*

Real asset investing continues to slow despite seven years of the advanced economies' central bank policies of near zero, or even negative, interest rates and the historically unprecedented injection of central bank liquidity by various means. Disinflation in real goods and services has become the norm and an observable drift toward goods deflation has emerged. Nevertheless,

much of the economic establishment continues to debate the Hamlet's ghost of inevitable money supply-induced inflation, even as the historical record since 2008 shows the undeniable negative correlation between money and real goods inflation. Even more ignored is the prospect that an imminent rise in central bank rates may have the opposite elasticity effect: a small short term rise may have a disproportionate, large negative effect on real asset investment, just as the previous sustained collapse of rates had a virtual inelastic positive effect.

Mainstream economic theory does not distinguish between a dichotomy of investment. Investment is real, not financial, so far as growth and business cycle theory is concerned. Nor does mainstream analysis address whether the relative shift to financial asset investing is somehow reducing fiscal multipliers, in particular tax multiplier effects on real investment or spending multipliers on consumption. The typical explanation for why fiscal multipliers are weakening is that debt overhang is responsible. But is debt overhang relevant, when the historical record shows after the 2008-09 crisis the central problem is not a reduction of the level of debt but rather the further escalation of private sector debt, in particular corporate debt and especially emerging market corporate debt?

- *What is the relationship between the deep restructuring of the global financial system in recent decades? What are the consequences for global instability due to the expanding of 'shadow banking' and the growing displacing of functions of traditional commercial banking by 'capital market' finance? What is the significance for investment analysis in general of the rise of a new class of global professional investors—the new finance capital elite?*

To understand better the growing importance of financial asset investing, economics needs also to develop a better institutional analysis of the growing role of shadow banking, its ascendance and soon eclipsing of traditional commercial banking, its penetration of non-financial corporate forms, and its growing dominance in the rapid development of capital market sources of financing.

Similarly, contemporary economic analysis has not adequately addressed the key variable behind the façade of the markets—i.e. the collective behavior of the 200,000 or so global very- and ultra-high net worth individual investors (HNWIs) who are the driving force behind financial asset investing—both as individual investors and as owners-managers of shadow banking institutions.

- *In parallel with the restructuring of financial markets, necessary to enable the shift to financial asset investing, labor markets have experienced a similar basic restructuring in recent decades. The consequence for advanced economies has been stagnating and*

declining real income for most of wage earning households and a corresponding shift to credit-based (debt) to finance consumption. How has the relative shift to financial investing induced labor market restructuring? How has the trend in turn contributed to the financial shift? What are the consequences for global instability?

The destruction of unions and decline of collective bargaining has become a generalized phenomenon across advanced economies. Real wage incomes have stagnated or declined. Not just primary wage payments, but 'deferred' wages and 'social wages'. Wage differentials have narrowed. Contingent labor employment is becoming the norm in hiring and soon the dominant characteristic throughout the general labor force. What offshoring did to high wage manufacturing employment in the advanced economies, the 'sharing' or 'gig' economy is about to do to remaining professional and personal services. Traditional demarcations between non-work and work time are disappearing. Labor exploitation is shifting, from traditional means for extracting greater productivity from labor to newer, 'secondary' and even 'tertiary' forms. Nevertheless, mainstream analysis continues to underestimate the magnitude of the negative trends gaining momentum. Marxist economics remains preoccupied with primary forms of exploitation. The conceptual framework of each prevent a thorough reconsideration of the more fundamental labor market trends underway, as well as how they contribute to the new dichotomy of financial vs. real asset investment and to systemic fragility.

- *Given the structural changes in the global economy in recent decades, are the positive contributions of Debt and Income to real investment now being increasingly offset by their negative effects? Why is financial asset investment more prone to debt accumulation, as well as to price and income volatility?*

Mainstream economics has tended historically to over-emphasize the positive effects of income and debt on real asset investment and economic growth. Insufficient analysis has been given to the negative consequences of their interaction. Nor has sufficient analysis been given to why and how debt accumulates faster in financial asset investing, and how income available for servicing financial asset related debt is more unstable and volatile, when compared to real asset investing.

Excessive central bank liquidity provision results in faster and relatively greater magnitudes of debt flowing to financial asset investment than to real asset investment. The spread of available 'inside credit' based on financial asset price appreciation also flows largely to financial investment. Both 'money credit' and 'inside credit' tend to accelerate private sector debt accumulation associated with financial asset investment. Leveraging of Debt also occurs more frequently in association with financial investing, thus still further redirecting credit more toward financial asset investing. Financial asset prices, and therefore income from financial investing, are also more volatile and tend to collapse more rapidly.

Given the greater relative debt accumulation and potential for income decline with financial assets, a greater tendency to default follows in the wake of financial asset investment. Financial asset investment thus increases aggregate fragility in the global economy and therefore its tendency toward financial instability. Positive effects of debt associated with real investment is offset increasingly by the potential negative effects of greater debt redirected into financial investment. Contemporary economic analysis fails to consider such net effects, and thus ignores the destabilizing potential of financial investment on the real economy.

Negative effects of household debt are also inadequately addressed by contemporary. Debt is viewed as contributing to consumption by enabling financing and spending on 'big ticket' items like homes, autos, higher education, etc. But Debt that occurs thus in present 'time t', becomes a drag on real income and consumption in future time periods, as households must make interest payments. As total household debt accumulates over time, the combined interest payments offset potential consumption from wage income gains, especially when the latter prove minimal or even decline in absolute terms. Household debt in the long term eventually reduces household consumption more than it generates it.

Government debt is increasingly the consequence of debt accumulation in the private sector, rising as a result of efforts to stabilize the destabilizing conditions wrought by financial investing and real economic contractions. Government is becoming a 'bad bank' for the private sector. The Hybrid Keynesian school views government deficit spending always stimulates growth regardless of the composition of the spending that creates the deficit. But composition of spending matters. The Retro Classicalist school erroneously sees government debt as 'crowding out' private real asset investment. But there is no evidence this correlation is causal. Thus, both main wings of contemporary theory fail to consider the negative consequences of debt—in particular debt accumulation in the private sector and misunderstand the negative consequences of debt accumulated by government units as well.

- *The policy anomaly of our time is that, throughout the advanced economies since 2008, monetary policy and money liquidity injection by central banks has been the virtual sole policy choice to generate economic recovery. Why does monetary policy continue as the policy of choice by policy elites after more than seven years since the previous economic crisis? And why do those same policy elites continue with fiscal austerity, when it too clearly doesn't work? Contemporary economic analysis fails to adequately explain this continuation of policy that doesn't work.*

The logic justifying central bank liquidity provision is that it will lead to escalating financial asset values, which will increase investor wealth effect and expectations that will lead to commitment of the income from capital gains to more real asset investment, and thus to more employment, wage income, household consumption, economic growth and, in turn, a virtuous

cycle of more business income. However, data show this chain of causal relationships to be faulty economic logic. Massive central bank liquidity injections have instead led to: diversion to real asset investment offshore to China and emerging markets for a temporary period, 2010-2013; to hoarding of cash and cash equivalents on balance sheets; and to diversion of the capital gains from financial asset investing enabled by the liquidity into even more financial asset markets.

Marx, Keynes and Minsky & Conceptual Innovation

If contemporary economics requires a major overhaul today, including a fundamental revision of its conceptual framework, there is no better start place than a consideration of the economists who have made significant contributions to conceptual innovation.

Marx was embedded deeply in the framework of classical economics. He expanded and broke from that framework by creating innovations in the labor theory of value and the importance of exploitation theory to capital and investment. His Organic Composition of Capital was innovative in the assessment of the negative consequences of productivity growth. His triad of equations—rate of exploitation, organic composition and falling rate of profit tendency together led to an assessment of the possibility of long run slowdown of capitalist economies that was far more developed than Smith's 'steady state' or Ricardo's 'Stationary State'. By focusing in his earlier work on the production side primarily, however, these innovations had their limits. It wasn't until Marx's considerations of the role of banking and credit in greater depth in his unpublished volume 3 of Capital that his explorations of the implications of credit and banking, and the exchange value side of capital's full circuit of reproduction, raised the potential for even further conceptual innovation. Albeit undeveloped, concepts like fetish capital, joint stock companies, capital financial forms, financial speculation, and the notion of secondary exploitation in the realm of exchange were suggested. Those seminal explorations have remained largely undeveloped for more than a century, however. Only today are Marxist economists beginning to re-examine and, importantly, develop further Marx's potential contributions in the sphere of banking and credit, exchange value relationships, and the multiple forms capital assumes in the post-production of value process. The sphere of exchange values remains a fertile ground of Marxist analysis still largely undeveloped.

Keynes' contributions to conceptual framework innovation were many: marginal propensities to consume and invest, consumption functions, liquidity trap, money demand functions, the substitutability of different forms of assets, expectations theory in general, and so on. Many of these innovations were subsequently dropped, redefined, and otherwise 'bastardized' by the contemporary economic analysis in the decades following his demise.

Some of the most potentially fruitful suggested conceptual innovations are to be found in his chapter 12 of his *General Theory*—a strangely aberrant chapter on financial speculation, out of place to the general flow of the otherwise ‘real’ investment analysis of that work. Chapter 12 may perhaps be viewed as Keynes foray into distinguishing financial asset from real asset investment, and the dangers of the growth of the former at the expense of the latter. The rise of the professional investor is also suggested in the chapter, although barren of an institutional context. When considered with his 1930 *Treatise on Money*, chapter 12 suggests Keynes was considering moving toward a deeper conceptual exploration of how financial and real cycles interact. Unfortunately, the *Treatise* and *General Theory* were never unified in a more truly ‘general’ theory.

Nor did Keynes unfortunately elaborate upon the closing messages of the *General Theory*: namely, that capitalist economy tends to greater unemployment and inequality of income and wealth. How so—and how might financial investment, speculation, liquid financial markets, and so on play a role in that ultimate capitalist outcome—Keynes never developed. To do so would have required him to break more thoroughly from the conceptual framework that his *General Theory* attacked, but by itself never conquered.

The economist, Hyman Minsky, writing in the 1970s through early 1990s, represented yet another major attempt to reconstruct a new conceptual framework. His concept of ‘financial instability hypothesis’, and related notions; the idea that instability was endogenous and not a product of external shocks to an otherwise stable system; the idea of a ‘two price theory’ differentiating between goods prices and financial asset prices; how financial cycles are capable of driving real cycles; how a ‘financial theory of the investment cycle’ was missing from contemporary analyses of investment theory; and many other pregnant notions suggest Minsky—like Marx and Keynes before—was moving toward further conceptual innovations.

In the tradition of Marx, Keynes, and Minsky, therefore, the following represents a contribution to conceptual innovation in economic analysis by proposing a start point for such innovation beginning with the concept of Systemic Fragility. But before diving directly into that task, it is important to note that the concept and analysis of Systemic Fragility has its origins in real conditions that represent the key developments and trends in the global economy—trends that are associated closely with the anomalies noted previously above.

The Material Origins of Systemic Fragility

Just as the anomalies suggest the queries and commentaries previously raised, so too do those queries lead to the identification of at least nine fundamental developments, or trends, that represent the material bases upon which, at the most general level, Systemic Fragility in the global economic system are derived. The nine key trends are:

- the decades-long massive infusion of liquidity by central banks worldwide, especially the US central bank, the Federal Reserve, along with the increasing availability of ‘inside credit’ from the private banking system;
- the corresponding increase in private sector debt as investors leverage that massive liquidity injection and credit for purposes of investment;
- the relative redirection of total investment, from real investment to more profitable financial asset investment;
- a resultant slowing of investment in the real economy, as a shift to financial securities investment diverts and distorts traditional investment flows;
- growing volatility in financial asset prices as excess liquidity, debt, and the shift to financial asset investing produces asset bubbles, asset inflation, and then deflation;
- a long run drift from inflation to disinflation of goods and services prices, and subsequently to deflation, as real investment flows are disrupted and real growth slows;
- a basic change in the structure of financial markets as new global financial institutions and new financial markets and securities are created, and an emerging new global finance capital elite arises, to accommodate the rising liquidity, debt, and shift to financial asset investment;
- parallel basic changes in labor markets resulting in stagnation and decline of wage incomes and rising household debt;
- growing ineffectiveness of fiscal and monetary policies as debt and incomes from financial assets rise, incomes from wages and salaries stagnate and household debt rises, and debt on government balance sheets increases while government income (taxes) slows—which together reduce the elasticities of response of investment and consumption to interest rates and multiplier effects from government fiscal policies.

Systemic Fragility is therefore a dynamic condition that is first and foremost the consequence of the interaction of the above nine real factors or trends.

Systemic Fragility—A First Approximation Definition

Beginning with the basic triad of variables determining the more limited concept of ‘financial fragility’ developed originally by Minsky—debt, cash flow and terms and conditions of debt repayment, or T&C—each of these three primary concepts are necessarily developed further in the theory of Systemic Fragility.

The concept of debt is expanded beyond Minsky’s analysis. It is not just a matter of business debt and business financial fragility, as in Minsky. Debt must be considered as equally important for household and government unit sectors. It is not just financial fragility that leads to financial instability events and financial crises and cycles. Household and government unit debt play major roles in terms of aggregate fragility development. Systemic fragility does not simply originate and then propagate from the financial side to the rest of the sectors of the economy. It is the development of simultaneous fragility conditions in the three sectors—business, households and government units, as well as the mutual feedback effects between them—that is the focus of Systemic Fragility analysis.

The sources and kinds of debt are important as well, not just total debt levels or rates of change in debt levels. On the business side of debt, whether debt is accrued in the form of corporate junk bonds vs. bank commercial loans vs. some form of securitized asset is important, due to the terms and conditions associated with repayment that differ with the type of debt incurred. Debt that is incurred from ‘inside credit’ issued based on collateral values of other financial assets is also obviously potentially more fragile, compared to debt based on physical assets that can be sold in the event of default. Whether the debt in question is highly ‘leveraged’ or not is critical as well, as is debt that is associated with greater risk due to ‘maturity transformation’—i.e. incurred short term and reinvested long term. Business fragility may be greater where there is a greater proportion of short term securities in the total debt portfolio, for example when ‘repos’ or ‘junk bonds’ or equity EFTs make up a greater proportion. Similar composition of debt consideration applies to households’ consumption fragility and government units’ fragility. Composition is an important consideration factor whether the debt consists of mortgages vs. credit cards, or student vs. payday loans. And similarly for government units when debt is associated with derivatives like interest rate swaps vs. debt in other more stable forms. What all this suggests strongly is that, while debt analysis is integral to Systemic Fragility, it must be segmented and differentiated for purposes of analysis, since it interacts differently with the other two strategic variables—i.e. income for repayment of debt and terms and conditions for how income repays debt.

Systemic Fragility as proposed expands on Minsky’s concept of cash flow as well. Fragility depends not just on the availability of cash flow necessary to make payments on principal and interest on debt. Cash flow is too narrow a concept. Other forms of ‘near liquid’ assets compared to cash flow are relevant and important. A broader concept of income available for

debt repayment is required for analysis. Cash flow is but a subset of income that may be available with which to 'make position', as Minsky would say. Income more broadly defined is more appropriate as a variable, in particular when one considers household 'consumption fragility' and 'government unit fragility' essential to a broader analysis of fragility and instability.

In the case of household or consumption fragility, the analog of cash flow is disposable income—i.e. consisting of wage income plus transfer payments and supplemented by other forms of household income. This variable should also adjust wage income to exclude households that earn the majority of their income from capital forms of income. The 'bottom' 80% or 90% of households' wage income would thus be relevant (to use a cut off for the US economy, varying with other economies). Capital incomes of the wealthier households is more properly a consideration for financial fragility instead of consumption fragility.

For government units the definition of income relevant to ensure repayment of debt differs as well. It includes tax revenue as income, supplemented by additional income sources, from which government units 'make position'. In the case of the latter, at the national level, income may assume the form of creation of fiat money as well, by means of QE or other forms of electronic 'printing' of money. State and local government unit 'fragility' potential is properly distinguishable from government national unit for this reason. The former therefore contributes to overall Systemic Fragility differently than does national unit government fragility.

The concept of T&C, 'terms and conditions' under which debt repayments are made, is also expanded beyond Minsky's original definitions in the 1980s-1990s. T&C is interpreted more broadly, and once again considered across the three forms of fragility—financial, consumption, and government units. T&C is composed of various 'elements', which affect debt repayment with different 'weights' and in different ways. Moreover, the elements may affect repayment positively or negatively. Which do so is an important aspect of T&C analysis with regard to fragility development 'within' any of the three basic fragility forms. Typical negative and positive elements may include: level of interest, term structure of debt, fixed or variability of the payments, penalties, definition of default, post-default obligations, covenants permitting missed payments or other exceptions, payments in kind, refinancing conditions, and other potential factors. T&C is thus a group variable and defined differently in different time, place, industry, etc.

To partially sum up, therefore, the Theory of Systemic Fragility begins with nine main determinants, each of which and together interact mutually on the three key variables within each form of fragility—i.e. debt, income, T&Cs—and across three primary forms of financial fragility, consumption fragility, and government units fragility. This 'three times three' initial framework strongly suggests that Systemic Fragility is determinable by means of three

simultaneous equations, for dynamic and mutual interaction on various levels is an important characteristic of a theory of Systemic Fragility.

Systemic fragility is dynamic not only **within** a given form—i.e. the financial, consumption, and government—but also **between** them. Not only may the level of fragility grow as real trends raise the magnitudes of debt, reduce income and add limits and restrictions on T&C, but the interactions between the three variables within a particular form may grow the level of fragility within the particular form as well—thus adding to Systemic Fragility in the aggregate. Furthermore, the feedback effects between the three forms of financial, consumption, and government fragility can result in a still further rise in the level and intensity of fragility on a system-wide level.

Dynamic interaction occurs at the system level as well. That is, not just within a form of fragility and between fragility forms, but between the financial and real sectors of the economy at a more general level. Because of the global nature of today's financial system as well as the high integration of production and distribution with regard to real goods and services, Systemic Fragility is necessarily a global concept and approach to analysis.

Fragility is not a linear process, proceeding from one level to the next higher as debt or income rise and/or fall, respectively. It is a process with multiple feedback effects within and between its primary forms. Nor is Systemic Fragility estimated by a simple adding up of levels of fragility that develop within financial, household, and government units. How fragility between those sectors mutually determine each other and raise fragility at a systemic level is central to its analysis.

The focus on dynamic interactions and feedback effects requires identifying and explaining the 'transmission mechanisms' (TMX) that function within, and between, the three fragility forms. Some of the more important TMX include the price systems associated with both financial assets and real goods, government monetary-fiscal policy shifts, as well as the psychological expectations of various agents—in particular the investor-finance capital elite but also household as well as government policy makers at central banks, legislatures, and executive agencies. Moreover, the intensity of 'feedback effects' and the effectiveness of the transmission mechanisms may vary with the phase and condition of the business cycle.

Systemic Fragility is therefore more than just the sum of its three parts. It is a dynamic process with a historical trajectory that is the outcome of real conditions as well as subjective, psychological expectations of actor-agents. Because fragility is the product of internal trends and variables, it develops and grows endogenously. It should be noted, moreover, that 'Systemic Fragility' is not a 'balance sheet model'. It implies no equilibrium analysis, the departure from which is restored either naturally by means of price system adjustments (Retro

view) or as a consequence of policy actions (Hybrid view). Systemic Fragility is not about ‘external shocks’ but a concept that is both endogenous to the economy and more appropriately associated with disequilibrium analyses. Financial asset prices in particular function as a major destabilizing force the greater the development of Systemic Fragility. Government policy responses and expectations of economic agents, especially professional investors, additionally serve as destabilizing mechanisms the greater the magnitude of Systemic Fragility.

Systemic Fragility—A Measurable Index?

The ultimate objective of establishing an alternative conceptual framework based on the concept of systemic fragility is to develop a quantitative index that measures the degree of system fragility in today’s global economy. The objective is to quantify the interactions between the key forces that determine systemic fragility, in order to reflect numerically the development of the degree of fragility in the system. The following equations that follow are preliminary to that goal of developing a Systemic Fragility Index and consequently represent a work in progress.

APPENDIX: Preliminary Equations

Within each of the three fragility forms—financial, consumption, government balance sheet—are three key variables: debt, income with which to service principal and interest on debt, and other terms and conditions that may affect debt and income. How the three forms themselves interact, mutually determine each other, and how the transmission mechanisms between the forms transmit the mutual determinations, is not addressed in the preliminary equations that follow. That future task requires the further development and restatement of the three basic equations that follow, expressed as a set of simultaneous equations.

EQUATION #1: FINANCIAL FRAGILITY

Financial fragility applies to both financial institutions and non-financial institutions. The weights given to the different variables in the equation will necessarily differ depending on whether the institution is financial or non-financial. The same qualification applies to financial institutions that are ‘shadow’ banks or commercial banks. So too does it apply to whether the corporation is a hybrid shadow bank, such as typical of multinational corporation with a high degree of ‘portfolio’, or financial, investment mix to their total investment activity. Financial fragility is a concept that should also apply to individual agents, like professional investors acting as financial speculators, who are not directly employed by a shadow bank, bank, or hybrid corporation—i.e. the majority of the global ‘finance capital elite’ of very and ultra-high net worth individuals.

The **basic equation** for financial fragility is represented as:

$$\mathbf{FF} = I'_f + \frac{(rl_f + icrl_f + liql_f)}{D} \frac{(P_f^e - P_f)}{d^{t+1} - d^t} + (X) + (Z) \text{ where}$$

I'_f plus I_f represent total financial asset investment, where

I'_f represents the level of *autonomous* financial asset investment, and

I_f represents the level of *non-autonomous* financial asset investment composed of rl_f , $icrl_f$, and $liql_f$,

Where,

rl_f is an appropriate basket of short term and long term central bank interest rates, key private bank rates (e.g. federal funds rate), corporate bond and loan rates, and sensitivity of I_f to changes in those rates,

$icrl_f$, is the sensitivity of I_f to change in 'inside credit' provided by shadow and other banks,

$liql_f$, is available income for potential financial asset investment in the form of cash-flow, near-cash liquid assets, and available open lines of credit to investors,

D , the level of total debt to be serviced—financial and, if applicable, real asset;

And Where financial asset investment responds to financial asset inflation and changes in debt generating that investment and inflation when:

P_f represents financial asset prices in Time, t , and

P_f^e is the expected rate of *future* financial asset price appreciation from Time t to Time, $t + 1$,

$d^{t+1} - d^t$, the percentage change in debt—from the level of debt, d , at time t , to the level of debt, d' , at future time $t + 1$;

The two previous elements of the **FF** equation, the one representing current income levels and accumulated prior debt levels and the second representing future changes in income from financial asset inflation (or deflation) and changes in debt levels, are further determined by the variable, X —Terms & Conditions—representing factors potentially further affecting debt variables and the variable, Z —Government Policy—further affecting debt and/or income,

Where **X** is composed of the following sub-elements:

X₁ covenants, PIKs, debt moratoria, default trigger suspensions

X₂ debt refinancing, ease of debt roll-overs, debt-equity swaps, default period extensions

X₃ ratio of short to long term debt, variable to fixed debt, and term payment structure

And where **Z** is composed of the following sub-elements:

Z₁ government bad debt purchases (via QE, GSEs, 'bad bank', etc.) and direct bailouts (TARP)

Z₂ government increase in corporate subsidies and tax reduction during crises

Z₃ government accounting rule suspensions (e.g. 'mark to market') during crises

EQUATION #2: CONSUMPTION FRAGILITY

Consumption Fragility applies to households whose income is composed more than 90% of wage, salary, and transfer forms of income. It excludes households whose income is more than 10% composed of forms of capital incomes, including capital gains, interest, dividends, rents, royalties, and inheritance income.

The **basic equation** for consumption fragility is represented as:

$$CF = C' + \frac{y(wC_f + tC_f + rC_f)}{D} \frac{1}{d^t - d^{t-1}} + (X) + (Z), \text{ where}$$

C'_f plus **C**_f represent total household consumption by the bottom 90% households, where

C'_f represents the level of *autonomous* household consumption, and

C_f represents the level of *non-autonomous* household consumption, composed of **wC**_f, **tC**_f, and **rC**_f, where

wC_f is consumption from wage income, where wage income is determined by net job creation, nominal wage changes, and changes in earnings due to hours of work;

tC_f is consumption from transfer income, including 'in kind' payments such as food stamps, and tax refund income; and

rC_f is consumption from additional credit income extended, in Time t , to households for purchases, in Time t , of mortgages, autos, credit cards, personal installment loans, and student loans and the responsiveness of household debt addition to interest rates; and

D is the level of total debt to be serviced

And Where household consumption is influenced both by real goods and services as well as changes in debt:

y is an adjustment for inflation in *consumer goods and services*, and

$d^t - d^{t-1}$, is the response of household consumption to *the most recent period* change in households' debt levels—from the level of debt, d , at time $t-1$, to the level of debt, d , at time t ;

The two previous elements of the CF equation, the one representing current income levels and accumulated prior debt levels, and the second representing future changes in income from goods & services inflation (or deflation) and changes in debt levels, are both further determined by the variable, X —Terms & Conditions—representing factors potentially further affecting debt variables and the variable, Z —Government Policy—further affecting debt and/or income;

Where X is composed of the following sub-elements:

X_1 deferment of debt principal payments, debt interest reductions, debt payment moratoria
 X_2 debt refinancing, debt consolidation, debt write offs, debt term structure extensions
 X_3 changes in composition of short-long term interest and/or fixed-variable interest payments

And where Z is composed of the following sub-elements:

Z_1 reduction in household taxes (sales, payroll, tax refunds or one time rebates)
 Z_2 government increase in subsidies or direct hiring of unemployed
 Z_3 mortgage or other debt assistance (HAMP, HARP-like programs)

EQUATION #3: GOVERNMENT (Balance Sheet) FRAGILITY

The **basic equation** for government balance sheet fragility is represented as:

$$GF = \frac{(T - G - t|g + I + E)}{D_g} + \frac{(T|g + t|g - G|g)}{D|g} + \frac{r(B-iB) + M^{yz}}{D_{cb}}, \text{ where}$$

GF represents general government fragility, including federal-central government and state and local government, affiliated government agencies with revenue raising and spending functions, and central banks of federal-central governments with bond issuance and direct money creating capabilities;

Where,

(T-G-tlg+I+E) is federal-central government revenues from Taxes (**T**)—excluding revenues from government bond issuance; government spending (**G**) represents spending on goods and services—but excluding transfers to local governments (**tlg**) and revenues from government bond issuance; Interest income (**I**) from sources other than bonds; and (**E**) revenues from sales of government production, sales and auctions of public goods and assets, and all other non-tax, non-interest income.

Where,

(Tlg + tlg –Glg) is state, provincial, and local government revenues from Taxes (**Tlg**), and receipt of transfers from central government (**tlg**) minus local government spending.

Where, **Dg** and **Dlg** represent accumulated debt at, respectively, the federal-central government and state-provincial-local government levels.

Central bank income is represented by the remaining elements of the equation, where

r(B-iB) debt raised on central bank balance sheets from traditional central bank bond and shorter term bills sales (e.g. US Treasury bond-bills from ‘open market operations’ and other special auctions. The ‘**r**’ factor represents interest rate level incentives to bond offerings, **B** represents net income raised from sales/purchases of bonds, and **i** represents interest income received from bond transactions;

M^{Yz} is money created by central banks by non-traditional ‘quantitative easing’ (QE) programs, funding of government ‘bad banks’ to offload bad assets from commercial financial institutions, and other bond buying from liquid assets not obtained from tax revenues or other government sources of income or borrowing;

Y represents the amount of M created to achieve a targeted natural rate of unemployment,

Z represents the amount of M created to achieve a targeted annual 2% general price level,

Dcb is the total accumulated debt on the central bank’s balance sheet

