

Wray, L. Randall; Tymoigne, Éric

Working Paper

Macroeconomics meets Hyman P. Minsky: the financial theory of investment

Working Paper, No. 543

Provided in Cooperation with:

Levy Economics Institute of Bard College

Suggested Citation: Wray, L. Randall; Tymoigne, Éric (2008) : Macroeconomics meets Hyman P. Minsky: the financial theory of investment, Working Paper, No. 543, Levy Economics Institute of Bard College, Annandale-on-Hudson, NY

This Version is available at:

<http://hdl.handle.net/10419/31631>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



Working Paper No. 543

**Macroeconomics Meets Hyman P. Minsky:
The Financial Theory of Investment**

by

L. Randall Wray and Éric Tymoigne

The Levy Economics Institute and University of Missouri–Kansas City

September 2008

The Levy Economics Institute Working Paper Collection presents research in progress by Levy Institute scholars and conference participants. The purpose of the series is to disseminate ideas to and elicit comments from academics and professionals.

The Levy Economics Institute of Bard College, founded in 1986, is a nonprofit, nonpartisan, independently funded research organization devoted to public service. Through scholarship and economic research it generates viable, effective public policy responses to important economic problems that profoundly affect the quality of life in the United States and abroad.

The Levy Economics Institute
P.O. Box 5000
Annandale-on-Hudson, NY 12504-5000
<http://www.levy.org>

Copyright © The Levy Economics Institute 2008 All rights reserved.

ABSTRACT

In this paper we present a theory of the financing of investment in a modern capitalist economy, following the approach developed by Hyman P. Minsky. We argue that the current financial crisis that began with the collapse of the subprime mortgage market in the United States in 2007 provides a compelling reason to show how his approach offers us a grounding in the workings of financial capitalism. Even if the spreading global financial crisis is successfully contained this time around, it is likely that analyses will incorporate a substantial dose of Minsky's ideas for many years to come. What we present is an alternative to the standard approach that was developed beginning in the early 1970s, based on the "efficient markets hypothesis" that relegates money and finance to the sidelines. Minsky vehemently denied the relevance of such a theory, at least for a modern capitalist economy with complex, expensive, and long-lived capital assets. In our kind of economy, the method used to finance positions in assets is of critical importance, both for theory and for real-world outcomes. In the first section we present the investment theory of the business cycle developed by John Maynard Keynes, and then examine Minsky's extension that added a financial theory of investment. This allowed Minsky to analyze the evolution, over time, of the modern capitalist economy toward fragility—what is well known as Minsky's financial instability hypothesis. In the subsequent section, we update Minsky's approach to finance with a more detailed examination of asset pricing and of the evolution of the banking sector. In the final section we briefly review the insights that such an approach can provide for analysis of the current global financial crisis.

Keywords: Hyman P. Minsky; John Maynard Keynes; financial instability hypothesis; debt deflation; investment finance; asset prices

JEL Classifications: E12, E22, E32, E44, G11, G12

INTRODUCTION

In this paper we will present a theory of the financing of investment in a modern capitalist economy. Our exposition will closely follow the approach developed by Hyman Minsky, arguably the most important contributor to our understanding of this topic.

While Minsky began his research in the 1950s and continued to refine his theory until his death in 1996, his approach has been largely ignored by the mainstream of the profession, even though the inclusion of some of his ideas in models similar to the New Consensus provides relevant insights (Lavoie 2008; Weise and Barbera 2008). This does not mean that his work was unknown, as it was long embraced by Post Keynesian economists and by Wall Street practitioners who recognized the real-world relevance of Minsky's arguments. Indeed, a few conventional economists—including some Nobel laureates (some of whom were personal friends of Minsky)—were influenced by his ideas. Still, as we prepare this paper, there is little doubt that interest in his theory is at an all-time peak (e.g., McCulley 2007; Chancellor 2007; Lahart 2007). Indeed, the current financial crisis that began with a collapse of the subprime mortgage market in the United States in 2007 provides a compelling reason to show how his approach provides us with a grounding in the workings of financial capitalism. Even if the spreading global financial crisis is successfully contained this time around, it is likely that analyses will incorporate a substantial dose of Minsky's ideas for many years to come.

It should be noted that what we present here is an alternative to the standard approach that was developed from the early 1970s, based on the “efficient markets hypothesis.” We will not develop a detailed treatment of that theory here. Like all approaches derived from the old neoclassical theory, it relegates money and finance to the sidelines. As basic macroeconomics presented in the mainstream principles textbooks teaches, neoclassical theory presumes “money neutrality”—the notion that at least in the long run, money only determines nominal prices. Various devices have been posited to allow money to have short-run “real” effects on relative prices, real output, levels of employment, or the composition of output. However, the market is continually striving to eliminate these non-neutralities as it seeks market clearing equilibria consistent with tastes and technologies. The primary barrier preventing market clearing is, of course, the

government. The efficient markets hypothesis extends the analysis to alternative methods of financing activity. Whereas Milton Friedman had famously argued that good neoclassical analysis might as well assume that money is dropped from helicopters, orthodox finance theory tried to show that shedding that assumption would make little difference. Whether productive activity is financed by retained earnings, debt, or equity would, on the basis of “rigorous” assumptions, be irrelevant for “real” outcomes. As one orthodox (New Keynesian) economist puts it: “prior to the introduction of informational asymmetries, the framework resembles a simple real business cycle model; financial structure is irrelevant” (Gertler 1988: 581).

Minsky vehemently denied the relevance of such theory, at least for the modern capitalist economy with complex, expensive, and long-lived capital assets. In our kind of economy, money can never be neutral—not in the short run nor even in the long run. The method used to finance positions in assets is of critical importance both for theory, as well as for real world outcomes. In particular, use of debt sets up a stream of obligations that must be fulfilled to maintain solvency. The problem is that at the time these commitments are made, neither party to the agreement can be sure that the contract for future payment will be fulfilled. Further, failure by one party to meet contractual payments can cause financial distress for the party expecting to receive payment. For this reason, one default can generate a snowball of defaults, as creditors holding bad debts fail to make good on their own debts. As defaults spread, the value of financial assets falls—since every financial asset represents a claim on an income stream or on cash expected from the sale of an underlying asset. As such, the value of each financial asset depends on the expected payments, which, if not forthcoming, causes asset values to fall.

Thus, if an unconstrained snowball of defaults affects asset prices generally, what Irving Fisher called a “debt deflation” can take hold. Both Fisher and Minsky believed that such a process occurred during the 1930s, and that this is what made the Great Depression so severe. It must be emphasized that mainstream theory rules out of existence such processes and argues in any case that deflation helps the economy by increasing real balances (and Friedman [1969] went as far as to argue that permanent deflation should be sought by central banks). As Goodhart and Tsomocos (2007) argue, “rigorous” mainstream theory assumes that defaults never occur, meaning that deflation

cannot generate a financial crisis when debtors find the real burden of debt rising because nominal prices and incomes are falling. However, Minsky and Fisher argued this is precisely what made the Great Depression so bad. By ignoring default, mainstream economists such as Friedman can claim that financial crises are solely due to policy mistakes, not to any fundamental forces operating in modern economies. For this reason, Minsky argued that mainstream theory is irrelevant and even dangerous if it is applied to the world in which we actually live.

In the next section we present the investment theory of the business cycle developed by J.M. Keynes, and then examine Minsky's extension of that theory, which added a financial theory of investment. This allowed Minsky to analyze the evolution of the modern capitalist economy over time. Indeed, the financial theory of investment plays a crucial role in Minsky's hypothesis that financially complex economies tend toward fragility—what is well-known as Minsky's financial instability hypothesis. In the subsequent section, we update Minsky's approach to finance with a more detailed examination of asset pricing and of the evolution of the banking sector. In the final section we briefly review the insights that such an approach can provide for analysis of the current global financial crisis.

THE INVESTMENT THEORY OF THE CYCLE AND MINSKY'S FINANCIAL THEORY OF INVESTMENT

Keynes's *General Theory* gave a central role to the investment decision in the determination of the aggregate level of effective demand, which, in turn, is the primary factor generating the equilibrium level of employment and output. As the undergraduate textbooks put it, investment is the *driving* variable that operates through a *multiplier* to establish total income. The size of the multiplier is rather mechanically calculated as the inverse of the marginal propensity to save, although more complicated expositions can take account of leakages to imports and taxes.¹ Hence, an increase of investment causes income and, thus, consumption to rise until saving rises to equality with the new level of

¹ More formally, $\Delta Y/\Delta I = 1/(1 - b(1 - t) + j)$ with Y the level of national income, I the level of aggregate investment, b the marginal propensity to consume, t the income tax rate, and j the marginal propensity to import.

investment. The level of investment is a function of the marginal efficiency of capital (essentially the discounted future profits) weighed against the market interest rate, which equilibrates the supply of and demand for money. When the marginal efficiency of capital is above “the” market interest rate, investment is undertaken, raising income, output, and employment through the spending multiplier. This proceeds until the marginal efficiency of capital falls, the interest rate rises, or some combination of the two eliminates the gap. As soon as the marginal efficiency of capital equals the interest rate, there is no advantage to investing so the economy returns to equilibrium.

While such an exposition *can* be found in Keynes’s book, this caricature does not come close to capturing Keynes’s theory of investment. To really understand Keynes’s theory, one must turn to chapter 17 of the *General Theory*—a rather complex exposition that is normally avoided by all but the most serious of his followers. In that chapter, the investment decision is incorporated within his liquidity preference theory of asset prices, or, to put it another way, his theory of “own rates.” He argued that “for every durable commodity we have a rate of interest in terms of itself—a wheat-rate of interest, a copper-rate of interest, a house-rate of interest, even a steel-plant-rate of interest” (Keynes 2007: 222–223). Each of these own rates can be stated in terms of money, which typically carries the “greatest of the own-rates, hence, ‘rules the roost’ because money has special, peculiar properties”² (Keynes 2007: 223; see also Kregel [1997]). The expected return on holding any asset measured in monetary terms is $q-c+l+a$, where q is the asset’s expected yield, c is carrying costs, l is liquidity, and a is expected price appreciation (or depreciation). The total return is used to calculate a marginal efficiency for each asset, including money. The composition of returns varies by asset, with most of the return to illiquid assets (such as capital) consisting of $q-c$, while most of the return to holding liquid assets consists of the (subjectively evaluated) l . Finally, changing

² According to Keynes, money has three special properties. It has a near zero elasticity of substitution, which means that when the demand for money rises, there is little substitution into alternative assets. It also has a near zero elasticity of production, which means that when the demand for money rises, labor does not get diverted to its production (since labor is not required to produce money because it is neither mined like a metal nor grown like a crop). Finally, the carrying cost of money is negligible—money doesn’t spoil (like food), doesn’t depreciate with use (like a machine), and doesn’t entail huge storage costs (most money today takes the form of electrical charges on computer tapes, but even paper money is relatively cheap to store). For these reasons, an increased demand for money can become a “bottomless sink” of purchasing power.

expectations differentially impact marginal efficiencies of different kinds of assets, depending on the composition of the returns. Increased confidence about future economic performance will raise the q s on capital assets while lowering the subjective values assigned to liquid positions (hence, the l falls), so the marginal efficiency of capital rises relative to that of assets that get much of their return from l . In that case, capital assets will be produced (investment rises, inducing the “multiplier” impact) and the full range of asset prices adjusts. Thus, expectations about the future go into determining the equilibrium level of output and employment.

For example, if entrepreneurs expect that future demand for widgets will be higher, they might expect more profits in that line of business. This raises the marginal efficiency of widget-making machines and, if this exceeds the expected returns on all other assets that can be held, they will want to order the production of widget-making machines today. Production of the widget-making machines will provide wages to workers and revenues to those firms when the machines are sold. Workers in turn will spend their incomes, inducing a “multiplier” impact on aggregate demand, leading to more employment. Some of the extra income generated will be spent on widgets, validating the expectations that led to the production of the widget-making machines. Of course, there will also be increased consumption of other kinds of output that could raise profit expectations in other lines of business, inducing even more investment in other types of machines. Logically, investment, employment, output, and consumption can continue to grow through this process until there is no marginal efficiency of any type of machine that exceeds the expected return on liquid, financial assets. Finally, we can see that the whole process of growth can be reversed if the expected returns of capital assets (the q less the c plus any a , as discussed above) fall *or* if the expected return to liquid assets (the l described above) rises.

Thus, we can see that Keynes’s liquidity preference theory of asset prices is inextricably linked to the theory of the multiplier and, thus, the theory of effective demand. Only if the marginal efficiency of *some* asset that can be produced using labor (plant, capital equipment, commercial and residential buildings, private infrastructure)

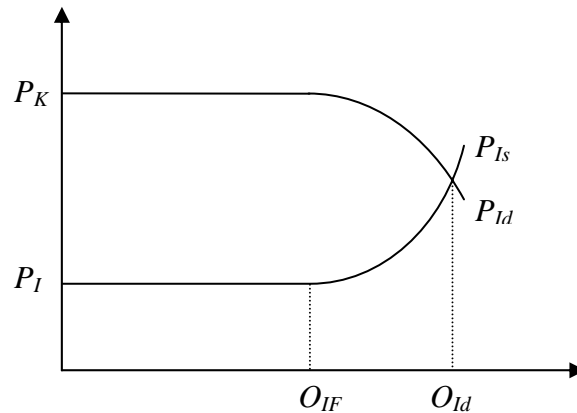
exceeds the marginal efficiency on money will investment take place.³ This then raises effective demand through the multiplier. The new equilibrium level of effective demand (and, hence, of employment, income, and output) will be reached when all own rates are equal to the standard set by money's return.⁴

Minsky believed that Keynes's investment theory of the cycle is incomplete because it does not really analyze *how* investment is financed when the marginal efficiency of some capital asset exceeds the marginal efficiency of money. There seems to be an implicit assumption in the *General Theory* that the investment project *will* get funded. While Keynes did deal with this in a bit more detail in several publications after 1936, most of his effort went toward explaining why saving cannot be a source of finance. Hence, Minsky's most important contribution was to add the "financial theory of investment" to Keynes's "investment theory of the cycle." Figure 1 provides a graphical illustration of Minsky's theory. The two key building blocks are the "two-price system" and the "lender's and borrower's risk." Following Keynes, Minsky distinguished between a price system for current output and one for asset prices. Current output prices can be taken as determined by "cost plus mark-up," set at a level that will generate profits so long as the administered price can be maintained with adequate sales. Current output covers consumer goods and services, investment goods and services, exports, and even goods and services purchased by government.

³ Orthodox interpretations of Keynes present this very simplistically as a relation between "the" interest rate and the marginal efficiency of capital. In his chapter 17, Keynes insisted that there are as many "own rates of interest" as there are assets. Hence, the comparison is not simply between one return to capital and one interest rate, but rather across a whole spectrum of expected returns on assets, with different components ($q-c+l+a$) making up the returns.

⁴ We want to emphasize here that Keynes's notion of equilibrium is not the same as that used in orthodox analysis. For Keynes, equilibrium implies a "state of rest" in which there is no further inducement to change one's behavior (in this case, a position in which firms are satisfied with the level of investment and of employment and production); it does not imply that all markets have cleared. Most importantly, Keynes's notion of equilibrium does not imply full employment of labor resources, which is the key implication of the orthodox identification of equilibrium as simultaneous clearing of all markets since involuntary unemployment is ruled out by assumption. Note also that for Keynes, equilibrium is a device used to analyze the forces that determine the aggregate levels of income, employment, and output, as well as the prices of assets. There is no expectation that we will ever observe a "state of rest" in the real world. This is why Keynes's chapter 12, which is chock full of colorful analogies—such as "whirlwinds of speculation"—is so important. Expectations play a critical role in determining asset prices (thus, also in determining effective demand) and these are liable to disappointment and to fluctuation. Thus, even if we ever achieved a position in which every member of the economy were satisfied with her portfolio of assets, it would be a fleeting instant. Attempts to adjust portfolios cause asset prices to change, which generates shifts of spending and employment from one sector to another, and also affects the total levels of spending and employment (Kregel 1976, 1986).

Figure 1. Determination of the Level of Investment



In the case of investment goods, the current output price is effectively a supply price of capital—the price just sufficient to induce a supplier to provide new capital assets (P_I). However, this simplified analysis can be applied only to purchases of capital that can be financed out of internal funds (such as sales revenue from on-going operations). If external (borrowed) funds are needed, then the supply price of capital also includes explicit finance costs—most importantly the interest rate, but also all other fees and costs—that is, total supply price (P_{Is} in Figure 1) rises above the price administered by suppliers (P_I) due to “lender’s risk” that is covered by the finance costs of borrowed funds. In Figure 1, this is represented by an upward slope in the P_I -curve once investment is expected to require external funds. The quantity of investment goods that is expected to be purchased by using expected internal funds is given by the distance from the origin to O_{IF} , while the external funds are equal to the distance from O_{IF} to O_{Id} .

There is a second price system for assets that can be held through time. Assets include capital assets, financial assets, and money—essentially anything that can be held through time as a store of nominal wealth. Except for money (the most liquid asset), these assets are expected to generate a stream of income and possibly capital gains.⁵ Here, Minsky follows Keynes’s treatment in chapter 17 described above. The important point is

⁵ Currency does not pay interest, so it does not generate any q . Other forms of money, including bank demand deposits, might pay a small interest rate (hence, q is above zero); what is important is that liquid assets, such as money of all types, are expected to pay lower yields than more illiquid assets, such as corporate bonds or capital assets. Hence, where exactly we draw the dividing line between “money” and other types of assets is not important for this analysis. We can think of a spectrum of liquidity, with currency at one end and factories with machinery at the other end.

that the prospective income stream cannot be known with certainty, thus it depends on subjective expectations. By taking the price of old capital assets (P_K) as a point of reference, we obtain a demand price for new capital assets (P_{Id}) from this asset price system: how much would one pay for the asset, given expectations concerning the future net revenues that it can generate?

Again, however, this is too simplistic because it ignores the financing arrangements. Minsky argued that the price one is willing to pay depends on the amount of external finance required—greater borrowing exposes the buyer to higher risk of insolvency. This is why “borrower’s risk” must also be incorporated into demand prices. Unlike lender’s risk, this “cost” is solely subjectively determined and is not written into any contracts. One can think of it as a “margin of safety”: if one expects an asset to generate a stream of returns with a discounted value equal to \$1 million, one would not be willing to pay more than \$750,000 for the asset. The margin of safety provides a cushion (\$250,000 in this case) to ensure that debt contracts created to finance the position in the asset can be serviced even if revenues turn out to be less than expected. That way, one will avoid bankruptcy unless the margin of safety proves to be too small. Obviously, there is no hard and fast rule governing the appropriate margin of safety because the borrower’s risk cannot be calculated precisely for a future that is yet to unfold.

The quantity of investment goods purchased (O_{Id}) is determined where $P_{Id} = P_{Is}$, not when $P_K = P_I$.⁶ The latter case is the explanation of investment developed by Tobin (1969). Tobin’s q is the ratio of the market value of existing capital assets (P_K) to their replacement cost (P_I). If $q > 1$, it is cheaper for companies to buy new capital assets, i.e., to invest rather than to buy existing capital assets (through mergers, acquisitions, or other means). If $q < 1$, investment declines as it is less costly to buy existing capital assets, so firms don’t order new capital. However, Tobin’s q assumes away the importance of uncertainty and funding structure for the determination of investment. Note that in Minsky’s version, the demand price declines with level of investment demand, whereas the supply price increases with investment. This is due to Kalecki’s principle of

⁶ Note that if these two curves are horizontal (no lender’s or borrower’s risk), then there is no intersection unless they lie on top of one another. For all other situations, investment would be either infinite or nonexistent.

increasing risk, which states that, given expected internal funds and given conventions about the appropriate leverage ratio, entrepreneurs and bankers assume that it is more and more risky to invest as the expected level of external funding increases. Thus, as the level of investment increases above O_{IF} , entrepreneurs become less willing to invest (the demand price declines as borrower's risk increases) and bankers become more and more stringent as external funding increases (the supply price increases as the lender's risk increases).

Investment can proceed only if the demand price (adjusted for borrower's risk) exceeds the supply price (adjusted for lender's risk) of capital assets. Because these prices include margins of safety, they are affected by expectations concerning unknowable outcomes. In the beginning of a recovery from a severe recession, margins are large as expectations are pessimistic; over time, if an expansion generates returns that exceed the projections, then these margins prove to be larger than necessary. This leads to a reduction in the perceived borrower's risk and lender's risk, which generates flatter P_{Id} and P_{Is} curves and so increases the demand for investment goods. This, in turn, means that, given the expected flow of internal funds, bankers and entrepreneurs expect and accept a higher proportion of external funding and greater investment. Thus, margins will be reduced to the degree that projects are generally successful.

Minsky created a famous taxonomy of financing profiles undertaken by investing firms: hedge (prospective income flows are expected to cover interest and principle with a safe margin); speculative (near-term income flows will cover only interest, although it is expected that finance costs will fall, that income flows will rise, or that assets can be sold at a higher price later—in which case revenues will be sufficient to cover principle); and Ponzi (near-term receipts are insufficient to cover interest payments so that debt increases because the Ponzi unit borrows to cover interest payments). Over the course of an expansion, financial stances evolve from largely hedge to include ever rising proportions of speculative and even Ponzi positions. Some Ponzi positions are undertaken voluntarily (due, for example, to expectations that debt can be refinanced at much more favorable terms or that large capital gains can be realized from asset price appreciation), some are fraudulent (a “pyramid” scheme is an example, in which a crook dupes ever-larger numbers of suckers to provide the funds to pay the earliest participants), and some

result from disappointment (revenues are lower than expected or finance costs rise unexpectedly).

Attempts to raise leverage and to move to more speculative positions can be frustrated at least temporarily: if results turn out to be more favorable than expected, an investor attempting to engage in speculative finance could remain hedge because incomes realized are greater than were anticipated. This is because as aggregate investment rises, it has a multiplier impact on effective demand that can raise sales beyond what had been expected. Later, Minsky explicitly incorporated the Kaleckian result that in the truncated model, aggregate profits equal investment plus the government's deficit.⁷ Thus, in an investment boom, profits would be increasing along with investment, helping to validate expectations and encouraging even more investment. This added strength to his proposition that the fundamental instability in the capitalist economy is upward—toward a speculative frenzy (as investment generates profits), which breeds more investment.

In addition, in the early 1960s, he had argued that impacts on private-sector balance sheets would depend on the stance of the government's balance sheet (Minsky 1963). A government spending-led expansion would allow the private sector to expand without creating fragile balance sheets—government deficits would add safe treasury debt to private portfolios even as it raised profits (through the expanded version of the Kalecki equation), and income and employment through the “government spending multiplier.”⁸ A robust expansion, however, would tend to cause revenues from progressive income taxes to grow faster than private-sector income so that the government budget would “improve” (move toward surplus) and the private-sector

⁷ Following national accounting identities one has:

$$W + \Pi + T \equiv C + I + G + X - J$$

with Π the gross profit of firms after corporate tax, W employees' disposable wage income, T taxes, C the consumption level (of capitalists and workers), I the level of investment, G the level of government spending, X exports, and J imports. Subtracting W and T from each side and defining C_C the consumption of capitalists (so that consumption is divided between capitalist consumption and worker consumption out of wages, C_W) one gets:

$$\Pi = C_C - S_W + I + DEF + NX$$

with S_W the saving level of wage earners ($S_W = W - C_W$), DEF the government fiscal deficit, and NX net exports. Kalecki (1971: 78–79) derived a causal relation out of the identity (thus transforming the identity into an equality) by arguing that Π is not under the control of firms, whereas variables on the right side depend on discretionary choices.

⁸ The government spending multiplier is exactly analogous to the investment spending multiplier.

balance would deteriorate (move toward deficit). Once he added the Kalecki equation to his exposition, he could also explain how this countercyclical movement of the budget would automatically stabilize profits—limiting both the upside in a boom (profits are squeezed by a declining budget deficit) and the downside in a slump (profits are boosted by growing budget deficits).

Further, with the Kalecki view of profits incorporated in his investment theory of the cycle, Minsky argued that investment is forthcoming today only if investment is expected in the future—since investment in the future will determine profits in the future (in the skeletal model). Because investment today produces profits to validate the decisions undertaken “yesterday” to invest, expectations about “tomorrow” affect ability to meet commitments that were made “yesterday” when financing the existing capital assets. While this might sound complicated, it just means that firms need to obtain profits “today” to satisfy the expectations they held in the past when they purchased capital; however, profits “today” will be lower if firms are not investing now (perhaps because they are pessimistic about the future). So to validate the decisions made in the past, we need investment today that in turn depends on expectations about “tomorrow.” There is thus a complex temporal relation involved in Minsky’s approach to investment that could be easily disturbed. By linking this to the “two-price” approach described above, Minsky made it clear that anything that lowers expected future profitability can push today’s demand price of capital below the supply price, reducing investment and today’s profits below the level necessary to validate past expectations on which demand prices were based when previous capital projects were undertaken. This also means that the margins of safety that had been included in borrower’s and lender’s risk can prove to be inadequate, leading to revisions of desired margins of safety going forward. As margins rise due to disappointments, the demand price of capital falls below its supply price (appropriately adjusted for lender’s and borrower’s risk), leading to less investment and, through the multiplier, to still lower output and employment. The economy can spiral ever downward into a deepening recession.

Minsky continually improved his approach to banking and finance, recognizing the futility of Fed attempts to control the money supply. This is because banks would try to avoid and evade constraints imposed by the Fed in order to obtain the profits available

from providing finance to firms. He also expanded the analysis so that all entities were treated like banks, acquiring assets by issuing liabilities. He argued that anyone could create money; the problem was to get it accepted (Minsky 1986: 69). He argued that while the Fed had been created to act as lender of last resort, making business debt liquid (by lending against it), the Fed no longer discounted paper (Minsky 1986: 47). Indeed, most reserves supplied by the Fed come through open market operations, which greatly restricts the Fed's ability to ensure the safety and soundness of the system by deciding which collateral to accept, and by taking a close look at balance sheets of borrowers. Instead, during the late 1970s through much of the 1980s, the Fed had come to rely on Friedman's simplistic monetarist view that the primary role of the Fed is to "control" the money supply and thereby the economy as a whole⁹—which it cannot do, as attempts to constrain reserves only induce innovative bank practices and encourage expansion of "non-bank" sources of finance, ultimately requiring lender of last resort interventions and even bail-outs that validate riskier practices (Minsky 1986: 94). Minsky believed that such interventions are necessary, but that they then encourage even more innovations that increase fragility. Together with countercyclical deficits to maintain demand, lender of last resort policy not only prevents deep recession, but also creates a chronic bias toward speculative booms by market participants that believe government intervention will always bail them out.

EXTENDING MINSKY: ASSET PRICES AND FINANCE

Asset prices play a crucial role in the determination of the investment level because the latter depends on a double arbitrage. On the one hand, following the logic of Keynes's chapter 17 presented above, it is assumed that capitalists make arbitrages among all types of assets (financial and capital assets) in order to get what is expected to be the greatest monetary return, given liquidity, maturity, and risk concerns. Contrary to the monetarist view, however, this does not mean that all assets are perfectly substitutable—the gross

⁹ Friedman argued that money is the primary driving variable of nominal output; if the central bank would keep money growth constant, nominal GDP growth would also be stabilized. This led to his famous money rule: target money growth at some low and stable rate (such as 4% per year), which the central bank could supposedly achieve by restraining growth of bank reserves.

substitution axiom does not hold—because the logic of capitalism and uncertainty creates a preference for money and its close substitutes since they are liquid. Capitalism rewards economic activities that generate a high monetary return and higher uncertainty lowers the qs and increase the ls as described earlier.¹⁰ On the other hand, there is an arbitrage between old capital assets (i.e., existing capital equipment) and new capital assets (i.e., investment goods to be newly produced), and so those existing assets matter because low prices for existing assets can depress production of new assets.

The price of existing capital equipment is determined indirectly by the market quotation of shares and bonds of the owning firms, and by the price at which mergers and acquisitions are settled. Aside from making a difference between marginal productivity theory and liquidity preference theory, one may classify the literature on asset pricing according to the assumed behaviors of individuals. This latter classification implies making a distinction among the rational, irrational, and convention approaches to asset pricing. The first two of these are adopted by most analysts, while the third is more consistent with the views of Keynes and Minsky. Some authors would say that q , c , l , and a are determined by “rational” individuals who use the guidance of *a priori* fundamentals. This theory is closely associated with the efficient market theory and requires that informational problems exist (asymmetric information, lack of computational power, or other problems) in order to explain the emergence of bubbles and over-investment. Otherwise, according to the rational view, information is optimally used, so asset prices are always at their fundamental value and the level of investment is always at its optimal value: “the primary role of the capital market is allocation of ownership of the economy’s capital stock [. It is] [. . .] a market in which prices provide accurate signals for resource allocation” (Fama 1970: 383). The irrational approach argues that asset pricing is mostly done by individuals who show little concern for the existing *a priori* fundamentals. For some of the followers of this approach (the behavioral finance camp), this is a behavioral anomaly, but for others (e.g., J.K. Galbraith) it is a

¹⁰ According to neoclassical theory, capital earns a return equal to its marginal productivity—a physical, technologically determined output. Keynes and Minsky reject this relation, arguing that in a capitalist economy what is important is the monetary return; that is, the expected money profits to be generated by owning and operating capital assets. According to Keynes, the productivity theory of asset pricing only applies to a cooperative economy—and, as Keynes argued, this is one in which money might exist, but it doesn’t matter.

normal behavior (albeit irrational). In any case, irrational behaviors are believed to generate waves of panics and bubbles, which lead to periods of over- and under-investment. The rational and irrational approaches have been used extensively in the mainstream literature (mostly in conjunction with the productivity theory of asset pricing) and do provide some insights, but they miss some important points developed in chapter 12 of Keynes's *General Theory*.

As Keynes notes, asset pricing depends on “a conventional valuation which is established as the outcome of the mass psychology of a large number of ignorant individuals” and “this behaviour is not the outcome of a wrong-headed propensity” (Keynes 2007: 154–155). In this third theory of asset pricing, the convention theory, there are no *a priori* fundamentals toward which asset prices will tend inexorably. Individuals are ignorant, not because they do not know how to behave rationally, but because the future is not written in stone; it is fundamentally uncertain. In order to reduce ignorance about an unknowable future, fundamentals are created through social interactions in order to provide a vision of the future that justifies current decisions. This has two main implications. First, as in the irrational approach, there can be a self-fulfilling process in which the socially established fundamental value tends toward existing asset prices—whatever prices are, individuals accept them as (in some sense) natural. Second, current decisions may lead to the concretization of the future contained in the convention—there may be a self-fulfilling process as the conventions cause individuals to behave in a manner such that the future unfolds as expected.

In conformity with Keynes, Minsky applied the convention approach (explicated in Keynes's chapter 12) to the liquidity preference theory of asset price (from Keynes's chapter 17) and noted that conventional behaviors and liquidity preference go hand in hand in an uncertain world that rewards monetary accumulation. A rational approach to the liquidity preference theory of asset prices (as in Tobin [1958]) applies only in a world without uncertainty; and an irrational approach to the same theory (Galbraith 1961) may apply only during the periods of frenzy and panic. One may wonder what the convention approach to the liquidity preference theory of asset prices looks like. Among the most recent authors, Wray (1992) and Orléan (1999) provide the foundation for such an approach to asset pricing. The market price of assets, as determined by q , c , l , and a , is

compared to a normal price, which provides an anchor for economic units. The normal price is socially determined through an imitation process that rests, not on following the previous behavior of individuals (irrational approach, cascade of information theory), but on anticipating the average opinion regarding the appropriate market price—as in Keynes’s famous “beauty contest.” Hence, the convention of a normal price provides an alternative to “inherent” fundamentals in determining expectations of price movements. If individuals in a market expect that structural changes have created an environment in which the “normal price” should be much higher (as they did for NASDAQ stocks during the new economy boom of the late 1990s or for real estate during the boom of the early 2000s), then a speculative boom can follow—justifying the expectations and fueling more euphoria.

Aside from the theory of asset pricing, there have been developments in the financial system in the 1980s and 1990s that must be incorporated within the financial theory of investment. Minsky conceived his theory mostly in a compartmentalized financial system in which banks followed a commitment model to banking business. Within banks, there are two well-defined desks, the loan-officer desk (whose task is to judge the quality of the project proposed by potential borrowers and to attenuate the optimism of the latter) and the position-making desk (whose task is to finance and to refinance the positions in assets taken by the bank). In the commitment model, the point of the bank is to establish a long-term relationship with borrowers based on trust and recurring lending agreements, and to make money based on interest rate spreads between deposit rates paid by banks and lending rates earned by them. This model has now been replaced by an originate-and-distribute banking model, and Minsky noted that today there are “banks without loan officers” (Minsky 1981: 15). Here, banks only originate loans that are then packaged and sold, as discussed in the next section. Most of the profit-making activities have been shifted toward the position-making desk. Indeed, banks now make most of their profits from fees obtained from selling and servicing structured financial instruments (mortgage-backed securities, collateralized debt obligations, etc.) rather than from interest rate spreads. Banks no longer look for a long-term individualized relationship with recurring borrowers; the relation is impersonal and judged in minutes through a credit-scoring method (Kregel 2008).

This new banking model adds two additional novelties to the dynamics of the margins of safety. First, development of financial fragility proceeds at an accelerated pace because banks and credit-rating agencies have an incentive to overestimate creditworthiness in order to stimulate the distribution of structured financial instruments. Since they won't hold the loans, default risk will be shifted to buyers of the instruments, so there are obvious incentive problems. Second, credit-enhancement techniques, like credit subordination, excess spread, and overcollateralization, allow structured financial instruments (like private-label, mortgage-backed securities) to have a tranche with an AAA credit rating even though it is structured on the basis of junk assets (Adelson 2006). Thus, a high proportion of Ponzi financing may exist from the very beginning of the economic expansion; that is, a prolonged period of expansion may no longer be necessary to explain the dynamics of margins of safety. All that is necessary is a favorable trend for the prices of the assets underlying the Ponzi financing process. Recent developments in the housing market provide a clear example of this kind of dynamic, as discussed next.

THE FINANCIAL THEORY OF INVESTMENT AND THE CURRENT GLOBAL FINANCIAL CRISIS¹¹

Chapter 24 of Keynes's *General Theory* had identified two fundamental flaws of the capitalist system: an inability to achieve full employment and excessive inequality. Minsky emphasized a third flaw implicit in Keynes's theory: instability is a normal result of modern *financial* capitalism (Minsky 1986: 101, 250). Further, stability cannot be maintained—even with appropriate policy—because it changes behavior in ways that promote evolution toward fragility. For this reason, Minsky rejected “Keynesian” policy that promoted “fine-tuning” of the economy—even if policy did achieve transitory stability, it would set off processes to reintroduce instability. Hence, “[t]he policy problem is to devise institutional structures and measures that attenuate the thrust to inflation, unemployment, and slower improvements in the standard of living without increasing the likelihood of a deep depression” (Minsky 1986: 295). However, success

¹¹ Note that this section draws heavily on Wray (2008).

could never be permanent; policy would have to continually adapt to changing circumstances.

Minsky argued that the relative stability of the post-war period had led to development of Money Manager Capitalism—a much more unstable version of modern capitalism. In a prescient paper written in 1987 (Minsky 2008), Minsky predicted the explosion of home-mortgage securitization that eventually led to the U.S. subprime crisis in 2007. Indeed, he was one of the few commentators who understood the true potential of securitization, or, what came to be called the “originate and distribute” model mentioned above. Rather than holding mortgages (and other types of loans), banks would simply originate the loans and then would sell them to investors, such as pension funds and hedge funds. In principle, all mortgages could be packaged into a variety of risk classes, with differential pricing to cover risk. Investors could choose the desired risk-return trade-off. Thrifts and other regulated financial institutions would earn fee income for loan origination, for assessing risk, and for servicing the mortgages. Two decades later, Minsky’s predictions were validated with a vengeance, as securitization spread far beyond mortgages to include student loans, credit card debt, auto loans and leases, and a range of other debts. By mid-2008, many of these markets were hit with rising defaults far exceeding what had been expected.

Minsky (2008) had argued that securitization resulted from two developments. First, it was due to the globalization of finance, as securitization creates financial assets sold to foreign investors with no direct access to American real assets. Minsky argued that the long depression-free period that followed WWII created a global glut of managed money seeking returns (previous to WWII, depressions had been associated with debt deflations that wiped out financial wealth). Packaged securities with risk weightings assigned by respected rating agencies were appealing for global investors trying to achieve the desired proportion of dollar-denominated assets. When problems began in U.S. subprime securities, the financial crisis quickly spread to the rest of the world because these were included in many global portfolios.

Second, over the post-war period, the importance of banks (narrowly defined as financial institutions that accept deposits and make loans) was rapidly eroded in favor of “markets” (the bank share of all financial assets fell from around 50% in the 1950s to

around 25% in the 1990s). This development, itself, was encouraged by the experiment in monetarism (1979–82, that decimated the regulated—bank and thrift—portion of the sector in favor of relatively unregulated “markets,” mostly large Wall Street investment banks), but it was also spurred by continual erosion of the portion of the financial sphere that had been ceded by rules, regulations, and tradition to banks. The growth of competition on both sides of banking business—checkable deposits at non-bank financial institutions that could pay market interest rates and the rise of the commercial paper market that allowed firms to bypass commercial banks—squeezed the profitability of banking. Minsky (2008) observed that banks appear to require a spread of about 450 basis points between interest rates earned on assets less that paid on liabilities. This covers the normal rate of return on capital, plus the required reserve “tax” imposed on banks (reserves are non-earning assets), and the costs of servicing customers.

On the other hand, financial markets can operate with much lower spreads because they are exempt from required reserve ratios, regulated capital requirements, and much of the costs of relationship banking. At the same time, the financial markets were freer from the New Deal regulations that had made financial markets safer. Not only did this mean that an ever-larger portion of the financial sector was free of most regulations, but that competition from “markets” forced policy makers to relax regulations on banks. As bank competitiveness was damaged, firms turned directly to managed money for finance of activities. The managed money owned by pension and hedge funds was subject to far less oversight and did not have the same capacity to assess credit worthiness. Further, managed funds operated with far greater leverage ratios (a bank can typically leverage its own equity by a factor of about 10, while hedge funds operate with leverage ratios of 30 and sometimes much more; this means they use one dollar of their own funds and borrow \$29 to increase the size of bets). All of this greatly increased fragility of the financial system. In normal expansions, high corporate profits mean that firms can rely more on relatively safe internal funds to finance activities. However, over the expansions of the 1990s and 2000s, firms greatly increased their use of external funds, so that debt ratios grew. While the 1980s are well-known for leveraged buy-outs and use of “junk bonds,” there was actually much more “junk” issued during the G.W. Bush expansion after 2005.

By the time of the real estate boom in the United States from the mid-1990s through 2007 that eventually led to the subprime mortgage crisis, there was no longer any essential difference between a “commercial bank” and an “investment bank.” Minsky (1986: 45) argued that the New Deal reforms related to home finance had been spurred by a common belief that short-term mortgages, typically with large balloon payments, had contributed to the Great Depression; ironically, the “innovations” in home mortgage finance leading up to the speculative boom largely recreated those conditions, running the U.S. housing sector like a huge global casino.

As we write, the U.S. financial sector remains in a crisis that is spreading around the world. Many commentators have referred to the crisis as a “Minsky moment,” questioning whether we have become a “Ponzi nation” (e.g., Whalen 2008). At this point, we can surmise that the financial innovations of the past decade greatly expanded the availability of credit, which then pushed up asset prices. That, in turn, not only encouraged further innovation to take advantage of profit opportunities, but also fueled a debt frenzy and greater leveraging. The Greenspan “put” (belief that the Fed would not allow bad things to happen, with evidence drawn from the arranged Long Term Capital Management rescue, as well as the quick reduction of interest rates in the aftermath of the dot-com bust), plus the new operating procedures adopted by the Fed (the New Monetary Consensus), which include gradualism, transparency, and expectations management (meaning, no surprises), tipped the balance of sentiments away from fear and toward greed. The Clinton mid-1990s boom and the shallow 2001 recession led to a revised view of growth according to which expansions could be more robust without inflation and that recessions would be brief and relatively painless. All of this increased the appetite for risk, reduced risk premia, and encouraged ever more leverage. Much of the rosy analyses conducted during the boom relied on modern orthodox finance theory, incorporated into complex models of market behavior based on past experience. These models appeared to show that risk was systematically reduced and shifted to those best able to bear it. With the benefit of hindsight, we can now say that risks were neither shifted nor reduced.

It is no surprise that many analysts have looked back to Minsky’s writings in order to understand the nature of the current crisis. It is now commonplace to find references to Minsky’s financial instability hypothesis. It is also easy to find many

commentators blaming mainstream efficient markets theory for the complacency that led to the systematic underpricing of risk over the past decade. One even finds mainstream economists pronouncing that “stability is destabilizing”—a statement that runs contrary to the whole stream of neoclassical economics, which emphasizes the supposed equilibrium-seeking nature of the market economy. Minsky argued that there *could* be forms of capitalism that would tend toward a stable equilibrium, but he insisted that modern financial capitalism, with complex and expensive capital equipment, would tend toward fragility, with bouts of instability. In order to understand our form of capitalism, it is necessary to recognize how investment is financed and how this can generate cyclical behavior—that can degenerate to a debt deflation and great depression in the absence of government intervention and apt policy making.

REFERENCES

- Adelson, M. 2006. "MBS basics." Research Paper, March 31. New York: Nomura Securities International Inc.
- Chancellor, E. 2007. "Ponzi Nation." *Institutional Investor* 32(1): 71–78.
- Fama, E.F. 1970. "Efficient capital markets: A review of theory and empirical work." *Journal of Finance* 25(2): 383–417.
- Friedman, M. 1969. "The optimum quantity of money." in M. Friedman (ed.) *The Optimum Quantity of Money and Other Essays*. Chicago: Aldine.
- Galbraith, J.K. 1961. *The Great Crash*, 3rd edition. Cambridge, MA: The Riverside Press.
- Gertler, M. 1988. "Financial structure and aggregate economic activity: An overview." *Journal of Money, Credit, and Banking* 20(3), Part 2: 559–588.
- Goodhart, C.A.E., and D.P. Tsomocos. 2007. "Analysis of financial stability." Working Paper Series 2007fe04. Oxford, UK: Oxford Financial Research Center.
- Kalecki, M. 1971. "The determinants of profits." in M. Kalecki (ed.) *Selected Essays on the Dynamics of the Capitalist Economy*. Cambridge: Cambridge University Press.
- Keynes, J.M. 2007 [1936]. *The General Theory of Employment, Interest, and Money*. Basingstoke, UK: Palgrave Macmillan.
- Kregel, J.A. 1976. "Economic methodology in the face of uncertainty: The modeling methods of Keynes and the Post-Keynesians." *Economic Journal* 86(342): 209–225.
- . 1986. "Conceptions of equilibrium: The logic of choice and the logic of production." in I. Kirzner (ed.) *Subjectivism, Intelligibility, and Economic Understanding*. New York: New York University Press.
- . 1997. "Margins of safety and weight of the argument in generating financial crisis." *Journal of Economic Issues* 31(2): 543–548.
- . 2008. "Minsky's Cushions of Safety: Systemic Risk and the Crisis in the U.S. Subprime Mortgage Market." *Public Policy Brief No. 93/2008*. Annandale-on-Hudson, NY: The Levy Economics Institute of Bard College.
- Lahart, J. 2007. "In time of tumult, obscure economist gain currency." *Wall Street Journal*, August 18.

- Lavoie, M. 2008. "Taming the New Consensus: Hysteresis and Some Other Post-Keynesian Amendments." Forthcoming.
- McCulley, P. 2007. "The plankton theory meets Minsky." *Global Central Bank Focus*, PIMCO Bonds, March. Available at: www.pimco.com/leftnav/featured+market+commentary/FF... accessed 3/8/2007
- Minsky, H.P. 1963. "Discussion." *American Economic Review* 53(2): 401–412.
- . 1981. "Financial markets and economic instability, 1965–1980." *Nebraska Journal of Economics and Business* 20(4): 5–16.
- . 1986. *Stabilizing an Unstable Economy*. New Haven: Yale University Press.
- . 2008. "Securitization." *Policy Note No. 2008/2*. Annandale-on-Hudson, NY: The Levy Economics Institute of Bard College.
- Orléan, A. 1999. *Le Pouvoir de la Finance*. Paris: Odile Jacob.
- Tobin, J. 1958. "Liquidity preference as behavior towards risk." *Review of Economic Studies* 25(2): 65–86.
- . 1969. "A general equilibrium approach to monetary theory." *Journal of Money, Credit, and Banking* 1(1): 15–29.
- Weise, C.L., and R.J. Barbera. 2008. "Minsky meets Wicksell: Using the Wicksellian model to understand the twenty-first century business cycle." Forthcoming.
- Whalen, C.J. 2008. "Understanding the credit crunch as a Minsky moment." *Challenge* 51(1): 91–109.
- Wray, L.R. 1992. "Alternative theories of the rate of interest." *Cambridge Journal of Economics* 16(1): 69–89.
- . 2008. "Lessons from the subprime meltdown." *Challenge* 51(2): 40–68.