Falling into the liquidity trap: Notes on the global economic crisis

Thomas R. Michl[1]
Colgate University
Department of Economics
Hamilton, New York, 13346
tmichl@mail.colgate.edu

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Abstract

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This paper examines the underlying structural imbalances leading up to the Great Recession of 2007-2009 from the vantage point of Hyman Minsky's theory of the liquidity trap. The traditional approach to the liquidity trap focuses on the zero interest rate boundary while Minsky's theory focuses on three conditions that make investment spending unresponsive to monetary policy: low underlying ex post profitability of capital, weak expectations about future profitability, and uncertainty about prospective yields. The paper structures an empirical investigation of profitability and accumulation around these three factors. The Great Recession was preceded by an unbalanced recovery in which residential investment led demand while business fixed investment was structurally weak, given the strong ex post profitability of capital and the low interest rate environment. It is hypothesized that increased import penetration and concerns about the sustainability of profitability eroded both expectations and confidence about prospective yields. The Great Recession appears in this and several other dimensions to be a crisis of disproportionality.

> *Today and presumably for the future the schedule of the marginal efficiency of capital is, for a variety of reasons, much lower than it was in the nineteenth century. The acuteness and the peculiarity of our contemporary problem arises, therefore, out of the possibility that the average rate of interest which will allow a reasonable average level of employment is one so unacceptable to wealth-owners that it cannot be readily established merely by manipulating the quantity of money.* —John Maynard Keynes (1964 [1936], pp. 308-309)

> *There is the possibility . . . that after the rate of interest has fallen to a certain level, liquidity-preference may become virtually absolute in the sense that almost everyone prefers cash to holding a debt which yields so low a rate of interest. In this event, the monetary authority would have lost control over the rate of interest. But whilst this limiting case might become practically important in the future, I know of no example of it hitherto. Indeed, owing to the unwillingness of most monetary authorities to deal boldly in debts of long term, there has not been much opportunity for a test.* —John Maynard Keynes (Op. cit., p. 207)

According to the *Economist* (2009) magazine, on January 8, 2009 the official policy rate set by the Bank of England reached the lowest level since its founding in 1694. The U.S. Federal Reserve Board lowered its policy rate to a range of zero to twenty-five basis points in December 2008. And both the Bank of England and the Fed have initiated unprecedented programs of buying long-term financial instruments. The "test" to which Keynes refers in the second epigraph has arrived, and whether this will be the limiting case now generally known as a liquidity trap is sure to be the subject of academic debate and discussion for years to come.

This paper attempts to provide some analytical and empirical perspective on the financial and economic crisis that began in the U.S. in late 2007 and that now envelops the global economic system. It proceeds from the observation made by Keynes in the first epigraph. The precondition for descent into a liquidity trap lies in the real conditions that govern business investment, and in particular, in the profitability of capital (which is what Keynes means by the marginal efficiency of capital). The financial aspects of the current crisis have gotten plenty of attention from writers better qualified

than this one; the paper focusses more on the nexus of forces governing profitability, saving and investment on the grounds that they created the conditions for the financial crisis.

The first part of the paper argues that Minsky provides a better platform for understanding the liquidity trap than Hicks because he puts the investment decision at the center of the analysis rather than liquidity preference. His analysis isolates three main factors which could initiate a liquidity trap: a decline in the underlying profitability of capital itself, a decline in expectations about future profitability, and an increase in the uncertainty with which those expectations are held. The second part of the paper uses these three factors to structure an empirical investigation into profitability and accumulation. The particular form which the current crisis has taken—a burst housing price bubble causing the collapse of the market for mortgage backed securities–makes more sense when it is located within a larger historical context. To translate into Marxian terminology, the price of averting a 1970s-style profitability crisis turns out to be the disproprortionality crisis of the 2000s.

1 The liquidity trap: Keynes, Hicks, and Krugman

Keynes and his interpreter, Sir John Hicks (1937) are responsible for the modern theory of the liquidity trap (although the second epigraphic quote makes it clear that for Keynes this was merely an hypothesis whose empirical testing, we might add, is only now under way). This is usually explained in modern discussions as a pathology of the credit markets characterized by an inability of the monetary authority to reduce the rate of interest below some minimum.[1] Since the monetary authorities control or regulate the very short-term interest rate (strictly speaking, the overnight rate), that minimum is generally taken to be the zero interest rate bound (ZRB). The official policy rate (OPR), however, is an economic variable that has virtually no influence in itself over any economically relevant behavior, such as the consumer and business investment spending that drives aggregate demand. Business in-

[1]Hicks represents the liquidity trap by an LM curve (showing the money market equilibrium combinations of income and the interest rate) that has a horizontal region at low levels of interest and income.

vestment (capital accumulation) and household spending on housing (called residential investment in the national income accounts) are sensitive to long-term interest rates on bonds and mortgages. These are related to the OPR through expectations of future short-term rates. In the expectations theory of the term structure of interest rates, the long rate is simply the arithmetic average of short rates expected to prevail until the long bond (or other credit instrument) matures. This theory remains incomplete and has not been empirically successful (Campbell, 1995) but because it is based on an arbitrage condition that makes good sense, it does remain a useful starting point.

What Keynes, and Hicks, saw is that once the short rate has hit bottom, there will be a strict limit on how low the long rates can go. In a world of perfect certainty, of course, the long rate could approach zero if the monetary authority committed itself to the ZRB for a sufficiently long period. But in the uncertain and turbulent world of really-existing capitalism, investors worry about the capital loss on a long bond if the interest rate should go up in the future. (Bond prices and their yields, or interest rates, move in opposite directions by definition.) Once interest rates get close to zero, bond prices can't go any higher. But they can go down. So holding a bond with a zero interest rate is like a one-way losing bet that no investor will consider.[2] As a result, when the monetary authority gets down to the ZRB, the whole complex of interest rates, representing different maturity and risk classes of credit, will likewise bottom out.

And this is exactly what has been observed in recent episodes that qualify as possible liquidity traps. Even at the height of the zero interest rate policy in Japan, from 2002-2005, the long-term rate never fell below one hundred basis points. During this period, the short-term rate averaged only six basis points, while the long-term rate averaged around 129 basis points, using data from Eurostat's AMECO data set for the 3-month and 10-year rates. This 123 basis point spread is not particularly low historically for Japan. Similarly, the spread on constant maturity Treasuries (10-year versus 3-month) in the U.S. averaged around 280 basis points from January to June in 2009 (when the policy rate was hard against the ZRB), which is also not historically atypical.[3]

[2]As Hicks puts it, "... the shortest short-term rate may perhaps be nearly zero. But if so, the long-term rate must lie above it, for the long rate has to allow for the risk that the short rate may rise during the currency of the loan, and it should be observed that the short rate can only rise, it cannot fall"(Hicks, 1937, p.154).

[3]In Japan, Eurostat uses the yield on a seasoned 10-year government bond, not the

It is at this point that Keynes's suggestion engages: let the monetary authority adopt a non-traditional policy of open market operations at the long end of the yield curve. By actively buying long-term bonds, the authority might be able to convince investors to discount the danger of capital losses on their long bond holdings, and by doing so, bring the whole complex of rates down to the levels that are required to achieve their employment objectives. Modern macroeconomists who have not abandoned the basic Keynesian framework, such as Paul Krugman or Gregory Mankiw, are divided about the prospects of escaping from a liquidity trap through non-traditional open market operations, with Krugman taking the traditional view that fiscal policy represents the only reliable solution while Mankiw continues to believe[4] that more can still be achieved with monetary policy. (To be fair, Mankiw does not advocate relying solely on monetary policy in practice, but his conservative political views make the non-fiscal option attractive.) Roger Farmer (2008) has even proposed that the Fed buy up equities in order to revitalize the stock market.

Krugman's skepticism about the ability of the Fed to move the whole complex of interest rates reduces to the empirical observation that while the Fed's actions are large relative to the monetary base, "when the Fed tries to support the credit market more broadly, by contrast, it's doing something private actors also do—which means that the credit it pumps into the system may be partly offset by private withdrawals—and it's also trying to move a much bigger beast, the $50 trillion or so credit market" (Krugman, 2009, p. 176). Even after an unprecedented expansion of its balance sheet over 2008, the Fed, now with around $2.0 trillion in assets, is comparable in size to a large bank holding company like Bank of America ($2.3 trillion), JPMorgan Chase ($2.1), or Citigroup ($1.8).

Moreover, the Fed's ability to compress the yield curve must be constrained as well by the overall Fed-Treasury (or Treasury-Fed) "plan" to recapitalize the banks, which now seems to involve letting them build up Tier 1 capital from retained earnings. As Epstein and Ferguson (1984) pointed out with respect to the Depression-era Fed, any substantial decline in the

constant maturity rate that is imputed to 10-year bonds by the Fed. As a result, the spreads in the U.S. and Japan are not strictly comparable.

[4]I have been unable to track down any instances in which Mankiw says this in print, so I am relying on my memory of his verbal answer to my question on whether we have entered a liquidity trap at the January 2009 "The Fed in the 21st Century" Conference held at the New York Fed.

interest rate spread on longer term lending risks squeezing bank profits on their deposit and loan business. Even though banks today make a far smaller proportion of earnings through the maturity transformation from short-term deposits into long-term loans (about half the earnings of commercial banks are now gained from fee income for various financial services), this political economy point remains salient.

Nor are constraints from the balance sheets of private financial institutions the Fed's only worry; it also has its own net worth to consider. Non-traditional open market operations in which the Fed acquires private assets also require the Fed to take on risk that blurs the line between fiscal and monetary policy. The Fed relies on the performance of its assets to cover operating expenses, turning back any surplus to the Treasury. But if it were to experience losses, it would not face insolvency (as would a private bank) but the need to draw on the fiscal powers of the state. And no Fed chairman wants to go hat in hand to Congress. To preserve its fiscal independence, the Fed must protect its equity. After over eighteen months of financial crisis, the Fed's credit easing (sometimes called quantitative easing) policies to address specific financial problems have already weakened its balance sheet to an unparalleled degree. Here is a thumbnail picture of the financial position of the Fed reconstructed[5] from the Consolidated Statement of Condition for All Federal Reserve Banks:

July 1, 2009
(billions of $)

Assets			Liabilities
Government securities	1151.5	Currency	871.3
Private claims	654.2	Reserves	726.3
Foreign reserves	129.5	Deposits	289.0
Total assets	1935.2	Total liabilities	1886.6
		Net worth	**48.6**

Like all banks, the Fed is highly leveraged; its assets are over 40 times equity. And its liability structure is unique, including currency and captive

[5]Foreign reserves includes modest gold holdings and fairly large swaps with foreign central banks. Repos (a liability of $72 billion) have been subtracted from government securities. Miscellaneous assets and liabilities have been swept into private claims and deposits.

deposits from the Treasury, most of which are now held as a sterilization tool. But risk exposure from its large accumulation of private sector liabilities (roughly one-third of its assets) through TAF loans and a menagerie of new credit facilities must be a concern. For perspective, the Maiden Lane LLC's that hold the moldering remains of Bear Stearns and AIG total $62 billion. Roger Farmer's proposal to buy common stocks is unlikely to reach an enthusiastic reception at the FOMC.

This discussion has been predicated on the assumption that a particularly low real rate of interest would be required to restore employment and growth.[6] The real rate of interest is the nominal rate minus the inflation rate expected to prevail over the term of the credit instrument. It is the real, not the nominal, rate of interest that is generally thought to be more significant regulator of investment spending and aggregate demand. The real interest rate required to achieve high or "full" employment, called the natural rate of interest, might even become negative. In this case, the monetary authority can only achieve the natural rate of interest if it can get traction from widespread expectations of on-going inflation, and even then, only if the expected inflation rate itself exceeds the natural rate of interest. (In other words, the real rate of interest can only be brought down to zero minus the expected inflation rate and no further.)

That is why the decline in inflation to zero and beyond is now widely seen as such a danger. Deflation increases the likelihood of falling into a liquidity trap, or, in this case, a deflation trap, as was dramatically shown by Japan during its Lost Decade. The Japanese example played a key role in the Great Recession. Fear of deflation led the Greenspan Fed to pursue unusually low interest rates during the post 2001 recovery (by their own admission), and this helped set up the imbalanced growth that culminated in the Great Recession, as we see below.

On the other hand, the ability of higher inflation expectations to bring down the real rate of interest even if monetary policy is hard against the ZRB opens the door to yet another monetary solution to a liquidity trap: increase inflation expectations. While this was the main policy advice offered by Paul Krugman for Japan during its Lost Decade, he has so far been unwilling (on

[6]In more technical terms, the assumption is that the IS curve, which shows product or goods market equilibrium combinations of income and the interest rate, is positioned so that the achievement of "full employment" requires an interest rate that lies below the ZRB.

his blog) to publicly advocate a similar response from the Fed.[7] The central bank could, in fact, adopt a public, explicit inflation target that exceeds its current implicit target[8] and cash in on its hard-won credibility to influence expectations. Given its political conservatism, even Krugman has evidently decided that efforts to persuade the FOMC to adopt such a sensible policy would be pointless.

Thus, we see that monetary policy could in principle be pushed to do more to combat a liquidity trap that arises from a pathologically low natural rate of interest, but numerous constraints, as much political as economic, stand in the way. A deeper question, well beyond the scope of this paper, is whether financial innovation has made the focus on the term structure more or less irrelevant in a world of securitization, structured finance, and financial layering; see Mehrling (2009). The interesting question within our scope is adumbrated in the first epigraph from Keynes: how could this pathological state of affairs arise? For this we turn to Minsky.[9]

2 The liquidity trap: Minsky

In this connection, Hyman Minsky's (1975) masterly exposition of Keynesian macroeconomics provides a revealing vantage point that calls into question the conventional obsession with the ZRB.

[7]Unfortunately, public discussion of using monetary policy to achieve negative real interest rates has been mainly confined to Gregory Mankiw's resurrection (on his blog at http://gregmankiw.blogspot.com and in his *New York Times* column) of Silvio Gesell's time-stamped money scheme, at best an academic exercise.

[8]The FOMC began publishing a survey its members in January 2009, the central tendency of which is generally thought to represent its implicit inflation target of just below 2% per year.

[9]There are some hypotheses about Japan that do not involve profitability directly. Krugman's celebrated Brookings Paper (Krugman, 1998) presents what he elsewhere calls a "buttoned-down" model of intertemporal choice in which a demographic shock makes high saving optimal today, and drives the natural rate of interest below zero. As in many New Keynesian models, there is no investment (to be fair, Krugman does briefly consider it), which both raises the question of what can be learned from these models about capital accumulation and why anyone would want to call these models "Keynesian" given the central role investment plays in the *General Theory*. Nakatani and Skott (2007) argue that Japan represents in effect a classic Harrodian trap, driven by the demographic shock of running out of surplus labor in the 1980s. Harrod (1942), recall, argued that when the natural rate of growth falls below the warranted rate it paradoxically ushers in secular stagnation because it tends to draw the actual rate below the warranted rate.

Minsky proceeds from a disagreement with Keynes over the best expositional strategy for the theory of investment. As is well known, Keynes's theory takes as given the state of long-term expectations about the future prospective yields of capital investment. These yields, which we can call Q_t, represent a series of cash flows or profits anticipated to arise at future dates, t, from an investment in a representative asset in the capital stock. Given these yields, and given a known supply price for the capital asset, there arises a discount rate that equates the discounted value of the yields to the supply price that Keynes calls the "marginal efficiency of capital." He then asserts that increased levels of investment in a particular type of capital will typically reduce the marginal efficiency, both by making that type more abundant and lowering its yields and by making it more costly to produce, thus raising its supply price. This leads him to believe that by aggregating over all the capital assets, we can obtain a downward sloping schedule of the overall marginal efficiency. It is then a short step to the textbook investment-demand schedule, by which the level of investment spending will be pushed out until "the marginal efficiency of capital in general is equal to the market rate of interest." (Keynes, 1936, p. 137).

Minsky's quibble with this (now standard) treatment is that it conflates the interest rate with the discount rate that entrepreneurs actually apply to prospective yields in order to arrive at an estimation of the economic value of the capital assets. "this choice of construct by Keynes led to an undue emphasis upon the interest rate, which to Keynes was always an attribute of money loans, as the tune caller . . . "(Minsky, 1975, p. 99). It led, Minsky argues, to an underappreciation of the full role of uncertainty in the investment decision itself.

Minsky's alternative exposition starts by recognizing the central role of estimations of the value of the capital asset, as the discounted value of expected yields, using a discount rate that is generally *greater* than the monetary rate of interest because of the sacrifice of liquidity involved in committing to a physical asset having limited marketability (compared to a financial instrument that earns the monetary rate of interest).[10] While Minsky refers to this

[10]Formally, Minsky's entrepreneur calculates the value of the capital asset, which we can write (suppressing time subscripts) as $P_K = \Sigma(\delta Q)$, where δ are the dated capitalization factors, $1/(1+i+\eta)^t$, i is the monetary interest rate, and η is the uncertainty premium. Minsky's exposition focusses on the capitalization factor, and I've taken the liberty of translating that analysis into the corresponding discounting rate, $i+\eta$. Notice also that I'm ignoring the issue of the cost of equity capital, which plays a central role in the

estimated value as the "price" of capital assets, it is not a market price in the ordinary sense of the term but rather a subjective valuation or (to misuse economics jargon) "shadow" price that facilitates the investment decision.

At some risk of oversimplifying, think of the capital asset as a standardized unit of physical capital, say a fully equipped fast food restaurant. The profit revenues from a typical McDonald's are fairly predictable; the shadow price of the restaurant will be the capitalized value of these prospective yields, using for discounting purposes the monetary rate of interest plus a premium that captures the sacrifice of liquidity. The premium over the monetary rate of interest measures the degree of uncertainty perceived by investors/entrepreneurs. (NB: most investment decisions do not generate prospective yields that are nearly as predictable as a franchise restaurant. In Taleb's terminology, they are from Extremistan, not Mediocristan.)

In Minsky's treatment, the level of investment will be regulated by differences between the supply price of capital assets and these estimates of the value of the capital assets. When the supply price (at which the asset can be purchased from another capitalist firm, or the cost of building a franchise restaurant in our example) is less than the estimated value of the asset, it clearly makes good sense for an entrepreneur to purchase the asset, or, in other words, to invest, as long as ready funding from internal profits or external sources is available. He champions this expositional and analytical strategy because, among other things, "the capitalization factor, which can have a varying ratio to the market rate of interest on secure loans because of the different values placed upon liquidity, is explicitly considered" (1975, p. 100).

Under normal circumstances, there is little difference between the two expositions. A stimulative monetary policy will lower the monetary rate of interest. In Keynes's account, this will make it economic to invest in more projects that support a lower marginal efficiency of capital. In Minsky's account, the lower monetary rate will increase the discounted value of future yields and make economic the purchase of more capital assets of given supply-price.

But in a liquidity trap, the estimated value of the capital assets falls *below* the supply-price of new capital goods, making investment in real capital uneconomic. This will be the state of affairs during and immediately after a financial crisis in which the level of uncertainty rises, causing such a rush

neoclassical and q-theories of investment.

to liquidity and rise in the uncertainty premium applied by entrepreneurs to the discounting of future yields (Q's) that, as Minsky observes, "even if the interest rate on financial assets continues to fall as the supply of money is increased, the capitalization rate applied to investment assets may not rise by enough to induce investment" (1975, p. 116). In this, monetary policy will quite possibly be rendered impotent even before it reaches the ZRB, for the inability to affect the interest rate is not the *differentia specifica* of a Minskian liquidity trap.[11]

Of course, to achieve a full degree of monetary policy ineffectiveness, Minsky's analysis does require that there is some boundary condition on the shadow price of capital assets.[12] Without this boundary, at some point, even with a very high uncertainty premium, the monetary authority should be able to reduce the interest rate enough to make the purchase of new capital assets economic once again. In this case, the liquidity trap described above is a local singularity that can be escaped after a large, discrete reduction in the policy rate. Only if there is a lower bound on the interest rate will it be possible for the maximum value of capital assets to fall short of the supply-price of capital assets, insuring a global or true liquidity trap that cannot be escaped by monetary means alone.

Now we can see that the debate over whether the monetary authorities have any powder left once they hit the ZRB misses the point. In the liquidity trap that Minsky describes, non-traditional monetary policies may have little immediate effect on aggregate demand if they are incremental and tentative. In the best-case scenario, this is a local trap that can be escaped, but only if the authorities are willing to take bold actions that induce large and discrete movements in the relevant long-term interest rates. Of course, in practice we will never know what kind of singularity the US and world economy have encountered because (fortunately) the application of healthy doses of fiscal stimulus confounds the controlled experiment that would be required for a fair test.

[11] Another way of putting this is that in a Minskian liquidity trap, the IS curve becomes vertical over a broad range, so that even if the monetary authority can push down the (non-horizontal) LM curve, it does no good. By contrast, the conventional Hicksian treatment defines the liquidity trap by a horizontal LM curve, coupled with a (typically non-vertical) IS curve. Of course, both accounts assume that the IS curve is ill-positioned in the sense that achieving the natural rate of interest is problematic.

[12] See Minsky's (1975, pp. 103-104) derivation of the function describing P_K, where he explicitly assumes that some boundary does exist.

The Minskian approach to investment and accumulation clarifies greatly the relationship between the profitability of capital and the liquidity trap. We can follow Taylor and O'Connell (1985) to see the connection. They observe that in a simplified model, the stream of expected future profits, or prospective yields in Keynes's terminology, can be written as the arithmetic product of the expected profit rate times the average price level. The expected profit rate, in turn, can be conceived as the actual or ex post profit rate plus an expectational "correction" that can either be positive (profits are expected to rise) or negative (fall).[13] Taylor and O'Connell ignore the distinction so beloved by Minsky between the monetary interest rate and the actual discount rate deployed by entrepreneurs (reflective of the uncertainty premium) in order to focus on the role of changes in expectations of future profits, as reflected in the expectational correction factor. But by combining these two expositional approaches, we can readily enumerate the three factors that can spring a liquidity trap by reducing the value of assets in the capital stock below their supply-price:

- An increase in the uncertainty premium in the discount rate used by capitalists, signifying a strengthened desire for liquidity.
- A decline in the expectational correction factor, signifying pessimism about future profitability.
- A decline in the observed rate of profit that forms the basis for projections of future profits.

The first item we have already discussed, and this surely plays the major role at the moment of crisis. The second item can also pull the economy into a liquidity trap, or at least increase its vulnerability to entrapment, if entrepreneurs become discouraged by a conviction that the future will not be as favorable to business profits as the present. These two factors are in

[13]Thus, the prospective yields for an asset in the capital stock are given by $Q = (r+\epsilon)P$, where r represents the net profit rate and ϵ represents the expectational correction factor, and P represents the price of a unit of output. The estimated value of capital assets will be given by $\Sigma(\delta Q)$ as before. The simplifying assumption is that the price of capital goods is no different than the price of other goods, so that one index covers them all. In this case, investment in a new asset makes economic sense whenever $P_K < P$, and the aggregate rate of investment will be regulated by the difference between the expected profit rate and the discount rate, $(i + \eta)$.

principle hard to disentangle, and in Keynes's analysis both are subsumed under the notion of "animal spirits." Lack of faith in future business conditions is likely to accompany a heightened sense of uncertainty and insecurity that can only be pacified by cold, hard cash. The final item represents the factor that Keynes has identified in the epigraph as the source of the "acuteness and the peculiarity of our contemporary problem," for when he makes historical comparisons of the marginal efficiency of capital, as in the famous final chapter of the *General Theory*, it is well known that he refers to the profitability of capital.[14] A low profit rate predisposes a capitalist economy to financial crisis. All three items have arguably contributed to the Great Recession of the Naughties.

3 Profitability

Serious research on the profitability of capital dates back to the 1970s, and since that time, heterodox, chiefly Marxian-influenced economists and historians have continued to track and analyze the movements in various measures of profitability.[15] Two recent treatises on the nature of modern capitalism (Brenner, 2002; Duménil and Lévy, 2004a) make the sharp decline in the rate of profit during the 1970s that is readily observable in the data presented below in Table 1 central to their somewhat divergent analytic narratives. In short, Brenner cleaves to an essentially neo-Smithian theory in which competition from newly industrialized countries puts downward pressure on mark-ups and burdens advanced capitalist economies with excess capital stock and declining profitability. Dumenil and Levy, by contrast, adhere to the traditional Marxian view that the bias of capitalist technology toward ever rising fixed capital requirements per unit of output, which they call technical change *a là Marx*, can (but not must) put downward pressure on profitability for significant periods. Brenner criticizes this viewpoint for its Malthusian flavor: "Were this theory correct, what would logically be entailed is the impeccable Malthusian proposition that the rate of profit can be expected to fall because, as a direct result of capital accumulation,

[14]Keynes subscribed to the marginalist theory that the rate of profit was a measure of the scarcity of capital, subject to the law of diminishing returns. The accumulation of capital, he believed, would depress the rate of profit by making capital more abundant.

[15]For a survey of some of this literature and broader discussion of the continuing importance of profitability as a regulator or capital accumulation, see Glyn (1997).

overall productivity—productivity *taking in to account both labor and capital inputs*—can be expected to decline" (2002, p. 14). Despite these disagreements, both authors proceed from the premise that the 1970s was a crisis of profitability, and that the subsequent period from 1980 or so to the present (which conventional economists now call the Great Moderation) represents a protracted response to this period of turbulence.

A simple but useful historical periodization that will structure this discussion, making very loose estimates of the beginning and ending dates, is the following:

- 1945-1970: Golden Age of Capital Accumulation
- 1970-1982: Profitability Crisis
- 1982-2001: Great Moderation (includes 1990s New Economy)
- 2001-20??: Run-up and Great Recession

At the risk of committing Malthusian errors, I regard the classical-Marxian theory of growth as a reasonably good analytical framework for organizing a narrative around this periodization. The Marxian theory marshals the hypothesis of biased technical change and regards class conflict as central to understanding the distribution of income. Technical change can play a supporting or retarding role in the accumulation process, depending on whether it is capital-saving or capital-using. For example, a labor-saving and capital-using pattern, sometimes called Marx-biased technical change, represents a kind of secular (negative) technology shock that will erode profitability when workers are able to capture, as they almost always are, a sufficient share of the gains in output per worker that result from the technical improvements. Thus, the Marxian theory requires a flexible approach that emphasizes the mutually reinforcing roles of technical change, accumulation, and conflict over the distribution of income mediated by the reserve army of labor and by political, social or institutional forces.

As macroeconomic data sets have improved their coverage across countries and time, evidence of biased technical change has grown. The history of developed capitalist economies like the U.S. supports the view that both unfavorable (capital-using) and favorable (capital-saving) technology shocks have been observed, and that no clear secular trend has emerged over, say,

Table 1: **Nonfinancial and Total Corporate Profit Rates and Factors, Selected Years 1960-2007**

			Broad capital				Narrow capital				
Year	π	$\Delta\pi$	r	Δr	ρ	$\Delta\rho$	r	Δr	ρ	$\Delta\rho$	$r^{\#}$
1951	23.14						15.39		66.51		15.94
1955	22.11	-1.03					14.48	-0.91	66.52	-0.99	15.28
1965	22.43	+0.32	12.58		56.08		16.74	+2.26	74.63	+8.11	17.24
1972	17.22	-5.21	9.04	-3.53	52.54	-3.53	11.66	-5.07	67.74	-6.88	12.38
1977	17.73	+0.51	8.19	-0.85	46.21	-6.33	10.53	-1.13	59.40	-8.34	11.29
1988	17.80	+0.07	8.78	+0.59	49.34	+3.13	11.20	+0.67	62.93	+3.53	11.60
1997	18.71	+0.90	9.72	+0.93	51.96	+2.61	12.21	+1.00	65.28	+2.34	13.06
2006	19.38	+0.67	9.51	-0.20	49.09	-2.86	11.80	-0.41	60.89	-4.38	13.69

Notes: # includes financial corporate. Years chosen are prominent peak years for the profit rate, and Δx represents the change in a variable since the last peak year. π represents the share of net operating surplus in net domestic product originating in the nonfinancial corporate sector. ρ represents the net output-net capital ratio. r is the net profit rate, $= \pi\rho$. Broad capital is reproducible fixed assets plus inventories plus cash. Narrow capital is reproducible fixed assets.

the last century.[16] Indeed, the most prominent technology shock was perhaps the favorable increase in capital productivity (i.e., the output-capital ratio) around WWII that has been called the Great Leap Forward by Duménil et al. (1993). But contrary to Brenner, the Marxian approach does recognize the technologically progressive nature of capitalism (it is not Malthusian or Ricardian). Under biased technical change, the productivity "taking into account both labor and capital inputs" to which Brenner refers simply cannot be defined, and in fact, what he is unwittingly invoking is a neoclassical doctrine — total factor productivity — that is dependent upon the marginal productivity theory of distribution that it was invented to rescue from empirical irrelevance.[17]

The data presented in Table 1 show profit rate peaks, a practical way of handling the procyclical nature of the profit rate. The net profit rate is by definition the product of the profit share in net value added and the ratio of value added to the capital stock employed, which is conveniently called *capital productivity*.[18] The table shows the levels and changes in all three of these variables using both a broad and narrow definition of the capital stock. As is customary, the profit rate is measured before tax, and profit is conceived broadly to include property income, including net interest and rents (though these are small); the national income category is net operating surplus. This profit rate represents a broad measure of the maximum rate of expansion of capital (which occurs with total reinvestment of surplus), abstracting from taxes, corporate financial policy, and other concrete mediating factors. Despite the high level of abstraction, this measure is believed to convey useful information about the constraints and determinants of economic growth.

The data using the broad definition of capital in Table 1 begin with the first available peak in the underlying data set, the SNA-NIPA experimental program of the BEA that effectively updates and systemizes the pathbreaking work of Richard and Nancy Ruggles (1970) on sectoral national income

[16]Developing countries, on the other hand, almost universally exhibit Marx-biased technical change until they reach some threshold level of industrial development.

[17]See Foley and Michl (1999) for a theory of production and distribution in the classical/Marxian tradition under biased technical change that can provide an alternative to the neoclassical marginal productivity approach. We show that total factor productivity is essentially an accounting device that makes the observed marginal product of labor equal to the wage by definition.

[18]In other words, the rate of profit is defined by $r = \pi\rho$ where π and ρ represent the profit share in net value added and the ratio of net value added to capital stock.

accounts with stock-flow consistency and that offers the signal advantage of providing one-stop shopping for all the relevant stock and flow items needed for a serious analysis. The lack of data pre-1960 is a minor drawback. The broad definition of capital comprises fixed reproducible assets (structures and equipment), inventories, and cash holdings at the end of the period. This is probably the closest operational definition to "the" Marxian rate of profit at this level of abstraction. The narrow definition strips out inventories and cash, and this is the most commonly used methodology.[19] Secular changes in inventory management (i.e., just-in-time) and financial innovation make the broad definition worth the extra effort needed, and there are indeed some minor differences visible between the two accounting systems.

The most conceptually clean time series data available cover the non-financial corporate sector but this aggregate suffers from a boundary problem since the non-financial corporations are classified according to their principle activity, which lumps considerable financial activities such as GE Capital and GMAC in with the non-financial sector. Especially in view of the growing "financialization" of the US economy, manifest in the rising share of corporate profits captured by the financial sector, the table includes, as a memo item, the rate of profit calculated on the narrow capital definition for the corporate sector as whole (for which more historical data are available than the broad definition). This measure is not wholly satisfactory because the financial corporations, commercial banks, bank holding companies, institutions (like Prince) formerly know as investment banks, mutual funds, and others do not produce a well-defined commodity product and do not deploy fixed capital assets in the same way as a commodity-producing business enterprise.

Yet another set of problems arises in the definition of profit. Like most researchers, I calculate the net rate of profit using the net operating surplus consisting of profits before tax (with adjustments for the effects of inflation and taxes on inventories and on depreciation allowances) plus net interest originating in the non-financial sector.[20] The BEA follows the convention of

[19]Some writers use financial net worth in the denominator of the rate of profit, a practice that I find unappealing at this level of abstraction because it conflates the underlying profitability of capitalist production with the financing of capitalist business enterprises. But return to stockholder equity does have a place in the analysis of leverage.

[20]Because the before-tax profit rate measures the maximum rate of expansion of capital, it is widely regarded as an appropriate metric at this level of abstraction, but some authors prefer the after-tax rate. One problem that is rarely acknowledged is that deducting only the corporate tax from before-tax profit misses the fact that capitalists also pay substantial

treating all salary-type income, including the compensation of top executives, as labor cost. While this may not have mattered much in the 1960s or 1970s, the explosion in average CEO compensation (it increased by a factor of 200!) since then calls this methodology into question if we adopt the Marxian viewpoint that managers are effectively performing the function of capitalist owners, regardless of their formal-legal status, and that their compensation at least partly represents a distribution of surplus value. The rise in executive pay should reflect itself in a rising share of profits in value added, but data limitations prevent further action.[21] On the other hand, a good argument can and has been made (Duménil and Lévy, 2004b) that the recovery of capitalist income has taken the form of increased salaries for top groups rather than increased property income and that this reflects the distinctive political economy of neoliberalism. At a higher level of abstraction, it would clearly be useful to interrogate the data about the limits on accumulation imposed by an even broader definition of the rate of profit.[22]

The narrative emerging from Table 1 starts from the evident collapse of profitability in the 1970s. It is clear that this decline can be attributed, in a purely accounting sense, to both a declining profit share and declining capital productivity. Most of the literature on this period blames the declining profit share on a combination of rising real wages (equivalently declining mark-ups over unit labor cost) and rising prices for raw materials, particularly petroleum, produced outside the domestic corporate sector. At least some of the decline in capital productivity reflects lower utilization of capital stocks in the 1970s. While different writers may emphasize different aspects, there is broad agreement that the crisis of the 1970s was the result of the *success* of the Golden Age policies and institutions in generating high levels of employment, rising real wages, and aspirations on the part of workers that ultimately could not be satisfied within the limitations imposed by capitalist social relations.

After 1980, the decline in the rate of profit is arrested by two develop-

income tax on their dividends.

[21] See Mohun (2006) for further discussion.

[22] Another potential problem is that net interest includes a very large imputed component, as the BEA, following neoclassical orthodoxy, assumes that corporations must be paying their banks implicitly for the services they receive for having low-interest depository accounts. This issue could potentially affect how we regard the distribution of surplus value between nonfinancial and financial institutions, but I have not found it to affect the calculations of profitability in any substantive way.

ments. First, the profit share stabilizes and even increases over some subperiods, most notably the final period leading up to the Great Recession. Second, the decline in capital productivity continues sporadically until the 1990s when it is reversed decisively during the so-called New Economy. By the broad measure (but not the narrow measure), capital productivity appears to recover its 1972 level, and the profit share is larger than its 1972 level. As a result of these twin developments, the New Economy appears to be charged by a positive technology shock that partially restores profitability to pre-1972 levels. Below we will see clear evidence that this did result in the expected improvement in the rate of investment and accumulation in this period. In the Marxian theory of accumulation, positive technology shocks can do this, just as negative shocks can retard growth.

Significantly, the expansion of the US economy after 2001 did not erase these gains in profitability, but it is perhaps significant that the stability that was achieved atypically combines a *rise* in the profit share with a *decline* in capital productivity. It is also possible that the expansion was cut off before it achieved peak utilization and that this pattern will not survive future data releases. That aside, one can speculate that this combination is less favorable to expectations of future profitability (in the sense elaborated in the previous section) than, say, the positive technology shock that drove the New Economy.

For example, in the Marglin-Bhaduri (1990) theory of investment that is widely used by heterodox economists, capitalists respond to each determinant of the rate of profit separately. Capital productivity represents the maximum limit to the rate of profit, and if it is declining at the margin, that will have a powerful effect on expectations because as a first approximation, capitalists have little or no control over the evolution of technology. On the other hand, a decline in the profit share may not have such a powerful effect on expectations. While the capitalist class does have the ability to influence the distribution of income, for example through its pricing policies, labor policies, and by invoking the coercive powers of the state, an increase in the profit share can certainly be revoked by political and institutional forces. From the vantage point of the corporate executives surveying their options during the last decade, their net revenues may have been perceived to be weaker or more tenuous than they appear in aggregate statistics.

To sum up, the Great Moderation can be understood as the political response by the capitalist class to the underlying decline in profitability evident in these data. Its main features are monetary restraint (see below);

selective deregulation of financial markets (financialization), trade, and international capital flows (globalization); and social policies that reduce what little power working people had achieved through New Deal policies and their own self-organization. These features all share the implicit goal of restoring profitability by redistributing income toward capital, away from the working class and the State. And we can see that to some extent these policies have succeeded. Let us examine the two profitability factors in more detail.

3.1 Capital productivity

As we discuss in detail below, the U.S. current account deficit, driven by massive trade deficits with China, Japan, Germany, the GCC, etc. might be expected to affect the profit rate data because of its devastating effects on the tradeable sector, chiefly manufacturing, during the last decade. Figure 1 breaks nonfinancial capital productivity down into manufacturing and nonmanufacturing, using some short-cuts made necessary by data availability, especially the switch to the NAICS around 1998 in the NIPAs, which require separating the sample after that date. Another important caveat here is that the sectoral data on manufacturing value-added are based on establishment records and thus are not adjusted for capital consumption allowances.

[Figures appear at end of paper.]

It has long been understood that the hypothesis that profitability declines under the secular influence of Marx-biased technical change applies with greatest force to the manufacturing industries which rely very heavily on innovations that substitute mechanical for manual and routine mental labor (Michl, 1991). In general, capital productivity has declined steadily in the manufacturing sector, which means that the stability in overall nonfinancial corporate capital productivity visible during many periods in Table 1 results from the counterweight provided by nonmanufacturing sectors that do not display this bias. Interestingly, the rate of decline in manufacturing capital productivity attenuates visibly over the Great Moderation, perhaps as the consequence of the slower accumulation that has characterized this period.[23]

[23]Glyn (1997) finds this attenuation in the decline in manufacturing capital productivity to be true for a broad range of advanced capitalist countries. I should add that the Federal Reserve Board's index of utilization in manufacturing deteriorates secularly, and using it to adjust the capital productivity data would reveal periods of increasing productivity after

Table 2: **The Distribution of Net Domestic Business Sector Income, 1980-2007**

Year	1980-84	1985-89	1990-94	1995-1999	2000-04	2005-07
Labor compensation	70.61	68.73	69.55	68.11	69.34	66.21
Total profit	29.39	31.27	30.45	31.89	30.66	33.79
Nonfinancial profit	26.55	28.36	27.37	27.76	25.74	28.71
Financial profit	2.84	2.91	3.08	4.13	4.91	5.09

And, of course, the manufacturing sector (which remains around 97 per cent incorporated throughout the period) has shrunk from roughly one half to less than one quarter of nonfinancial corporate value added since 1960 so its influence over the aggregate has diminished with time.

What makes the pattern evident in Figure 1 remarkable is that the decline in capital productivity during the last decade has been driven by activities outside the manufacturing sector (e.g., retail/wholesale trade). The manufacturing sector, despite experiencing stagnant or declining output and accumulation, (which might be expected to lower the measured output-capital ratio in the short run), has shown stable or improving capital productivity.[24] Since much of the dynamism of the New Economy was concentrated in retail/wholesale trade (e.g., the rise of big box stores and Wal-Mart style distribution systems), this decline could play a significant role in shaping the contours of accumulation in this critical period, as we discuss below.

3.2 Distribution

In order to provide more insight into the distributional shifts over the Great Moderation, Table 2 breaks down net domestic business sector income into wages and profits, and further decomposes profit-type income (net operating surplus) into nonfinancial and financial sector profit. This broader aggregate

1980. It would not, however, wipe out the evident secular decline before then. I have not adjusted the data in the figure since no utilization indices exist outside of manufacturing.

[24]I also calculated capital productivity using gross value added originating by industry divided by the net capital stock. The major substantive difference is that manufacturing capital productivity does not increase by this measure over 2000-2007, as it does using the national income data. In principle, gross value added divided by the capital stock measures the sum of net capital productivity and the depreciation rate, which has been increasing along with the rising share of equipment in capital stocks.

makes it clear that the corporate sector (where more than two-thirds of private sector GDP originates) has certainly not been unrepresentative. There is an unmistakable decline in the share of wages, but as in the corporate sector, this decline accelerates during the post 2001 cycle. It is also clear that the financial sectors have been disproportionately represented in the general shift toward profit-type income. And again, this pattern accelerates in the post-2001 cycle. Whatever is driving "financialization," as this shift is sometimes described, it is clear that high interest rates are neither necessary nor sufficient.

Nonetheless, it is abundantly clear that the Great Recession of the Naughties does not represent a repeat of the profitability crisis of the 1970s. As the memo item in Table 1 shows, the overall corporate profit rate (which includes financial corporations as discussed above) actually *increases* over its previous peak in the 1990s. The profit rate by any measure appears to be strong, raising the question why the underlying rate of accumulation has not been equally robust.

4 Accumulation and internal balance

In a basic classical growth model (Michl, 2009), accumulation reflects the behavior of the capitalist agents who save and invest a constant proportion of their wealth. In one of the most important advances in macroeconomics in the twentieth century, Luigi Pasinetti discovered that even if workers and the government are significant sources of saving (or dissaving) used to finance accumulation, the saving and investment propensity of the capitalist agents governs the long run relationship between the rate of profit and the rate of accumulation. Pasinetti calls this the Cambridge Theorem. The classical growth model describes the long run at a high level of abstraction where saving and investment become indistinct. The relationship between the classical long run and the Keynesian short run (where coordination between saving and investment is the central issue) remains theoretically unresolved.[25]

[25]There are three basic resolutions of this problem. First, some models essentially take capitalist saving to be the "primitive" and make investment adjust according to some financial or monetary principle so that the system achieves long run growth at full or normal capacity utilization; Duménil and Lévy (1999) or my own work (Michl, 2008) are examples. Second some models take investment (determined by profitability) to be primitive, and make the saving rate adjust, again achieving full capacity utilization; Rowthorn (1999) and Shaikh (2009) are examples. Third, some models regard the saving/investment

4.1 Declining investment

It follows from the Cambridge Theorem that we can gain insight into the effects of movements in profitability by studying their effects on the investment rate, i.e., the share of investment spending in total spending on final goods and services. This ratio of net investment to net value added will be positively related to the capitalists' propensity to save and invest, as well as to the two factors that govern profitability, the profit share and capital productivity.[26] Figure 2 shows this ratio for the net investment attributed to the aggregated business sector (nonfinancial corporate, nonfinancial noncorporate business, and financial business). The investment rate does reflect the broad pattern of profitability we saw in Table 1. The profitability crisis of the 1970s shows up in the sharp declines in investment during the recessions of 1973-75 and 1981-82, although there is a brief seemingly anomalous peak in 1979 that probably reflects the easy credit immediately before Volker's *volte face* in Fed policy (see below). The Great Moderation begins life with investment at historically low levels relative to the Golden Age, consistent with the low profitability discussed above. Finally, during the New Economy of the 1990s investment responds visibly to the improvements in capital productivity and profitability. But it is clear that this vitality could not be sustained in the post 2001 recovery, and in fact, the peak in 2006 is the lowest investment share among all peak years in the figure. We will return to this important issue below.

There is a distinct visual impression of secular decline in the investment share in Figure 2, interrupted by the New Economy. From the vantage point of the classical growth model, this could in principle reflect a decline in the propensity to save and invest, or it could reflect a decline in the components of profitability. Thus, if we are willing to believe that the underlying propensity to save and invest is structurally invariant over time, the down-

distinction itself as primitive, and allow utilization to adjust through changing norms of desired utilization; Lavoie (1995) and Dutt (1997) are examples. The working assumption in this paper is that one or both of the first two types are closer to the truth.

[26]To formalize these points, consider the Cambridge equation representing capitalist saving out of end-of-period wealth, $(1+g) = \beta(1+r)$, where g and β represent the rate of accumulation and the propensity to save and invest out of wealth. The ratio of net investment to value added (I/Y) is equal to g/ρ, so that by dividing both sides by net capital productivity, ρ, we can see that $I/Y = \beta\pi - (1-\beta)/\rho$. A decline in capital productivity thus depresses the investment share, as does a decline in the profit share or (obviously) a decline in the propensity to save/invest out of wealth.

ward shift evident in Figure 2 would represent independent corroboration of the hypothesis that declining profitability has persistently conditioned capital accumulation over the Great Moderation. But it could also represent a structural shift in the propensity to save and invest, perhaps the result of specific features of neoliberalism and financialization.

There has been some discussion in the literature on financialization about a close cousin of the investment rate, namely the ratio of investment to profits. Stockhammer (2004) views the evident decline in this ratio as a puzzle. If capitalists save and invest a constant fraction of their profit income (a flow) rather than their end-of-period wealth (a stock), the share of investment in value added will depend only on the saving rate and the profit share, and it will be invariant to changes in capital productivity. In this case, Stockhammer's puzzle implies that there must have been a structural shift in the capitalist investment propensity during the Great Moderation (since we can be fairly confident that the profit share has not declined in this period).[27]

Yet from the classical growth perspective, the investment-profit ratio can merely reflect the underlying profitability of investment if capitalist agents save and invest a constant fraction of their wealth.[28] If capitalist agents maintain a stable relationship between their consumption and their wealth stocks, in other words, the financialization of corporate behavior, expressed in growing tendencies of business enterprises to pay-out dividends, buy back stock, and devote a smaller fraction of cash flow to investment spending, all reflect the natural response of corporate managers to the demands of their owners. Despite the high level of abstraction required by the classical growth model, it provides a parsimonious explanation of these phenomena. However, it cannot in itself resolve the question of whether this decline in investment spending, normalized by income or capital, represents a structural shift or a response to declining profitability.

This is easy to check by implementing the Cambridge equation linking the rate of accumulation, g, to the rate of profit, r, through the propensity to save and invest out of end-of-period wealth, β. To get maximum coverage and consistency, we use the narrow definition of capital to define both rates, concentrating on the nonfinancial corporate sector. Since annual data don't

[27] In other words, using the traditional version of the Cambridge equation, $g = sr$, with a propensity to save and invest out of profit income, s, the investment share will satisfy $I/Y = s\pi$, and the ratio of investment to profits will satisfy $I/\pi Y = s$.

[28] Formally, the ratio of investment to profit satisfies $I/\pi Y = \beta - (1 - \beta)/r$.

convey much information about long-term structural relationships, we work at a low frequency of 15 years (a short generational period), measuring rates of profit and growth at that frequency and then annualizing the data.[29]

For convenience, the table below shows growth factors, e.g., $(1+g)$, where g is in decimal form. I have also included the most recent (incomplete) generational period, and broken out the Run-Up period as a memo item. Here are the numbers:

	1950-65	1965-80	1980-95	1995-2007	2000-07
1+g	1.031	1.040	1.022	1.025	1.019
1+r	1.132	1.119	1.097	1.105	1.098
β	0.911	0.930	0.932	0.930	0.928

The implicit saving/investment propensity out of capitalist wealth turns out to be remarkably stable.[30] There has been some deterioration from the early to the later parts of the Great Moderation, and that may turn out to be significant despite the modest numbers involved. But the Great Moderation period as a whole does not suggest a dramatic change from the 1950-1980 period taken as a whole. The real puzzle, it seems to me, is the high frequency behavior of investment (which period averages suppress) during the last cycle leading up to the Great Recession.

4.2 Disproportionality and residential investment

The share of household net investment in value added has also been included in Figure 2. Household net investment comprises residential housing, home improvements, and some construction by nonprofit institutions serving households (such as colleges and universities). As a share of net product,

[29]The Cambridge equation is described in a previous footnote. Growth rates are calculated using a discrete growth equation, and the annualized growth factor, $(1+g)$ over T periods is just the geometric mean of the annual growth factors, K_{+1}/K, or alternatively $\sqrt[T]{K_T/K_0}$.

[30]But notice that this whole discussion has assumed a one-commodity world in which the relative price of capital goods is unity. The secularly declining price of capital goods, particularly information technology, has played a mediating role in the real multicommodity world. With declining relative prices, a given nominal flow of investment translates into a larger volume of capital goods as measured by the chain-type indexes used in the NIPA for real capital stocks.

Table 3: **Real Interest Rates and Rates of Accumulation, 1960-2007**

	Real interest rates (% per year)				
	1960-69	1970-79	1980-89	1990-99	2000-07
3-month Treasury	2.12	-0.18	2.65	1.61	0.50
10-year Treasury	2.79	1.00	4.39	3.40	2.01
Aaa Corporate	3.13	1.73	5.14	4.45	3.41
30-Year Mortgage	4.23	2.30	5.58	4.71	3.74
	Rates of accumulation (% per year)				
Nonfinancial corporate	4.06	3.65	2.49	3.10	1.87
Manufacturing	4.67	3.77	1.63	2.35	-0.35
Nonmanufacturing[#]	3.83	3.61	2.80	3.35	2.50
Housing	3.39	3.26	2.63	2.69	3.03

Notes: [#]Calculated using a Tornquist index. Let x, y, and z represent the real capital stocks for corporate, manufacturing corporate, and nonmanufacturing. The index obeys $g_x = \theta g_y + (1-\theta) g_z$ where the nominal shares are additive, $p_x x = p_y y + p_z z$, and $\theta = p_y / p_x x$ is the nominal share of manufacturing capital in corporate capital.
Growth rates of capital stocks are calculated annually using $g_x = x_{t+1}/x_t - 1$, and then averaged over the time intervals shown using a geometric average.

it behaves differently from business investment in important ways. In particular, it is clear that in the post-2001 recovery period, it was residential investment that did the heavy lifting. In the run-up to the Great Recession, residential construction visibly drove aggregate demand.

That is why it makes some sense to view the Great Recession as a crisis of disproportionality. Moreover, the homebuilding industry has evolved from one organized around private contractors into one based on fully capitalist production. As Mark Zandi observes, "From a fragmented collection of small, privately held and essentially local builders, each putting up a few dozen homes a year, the industry had transformed itself, becoming dominated by a dozen publicly traded national firms that built thousands of homes annually. In 1990, fewer than one in ten U.S. homes was build by a publicly held firm; by 2005, the proportion was nearly one in three"(Zandi, 2009, p. 131).

To get some additional insight into the policy environment behind the

emergence of this disproportionality, Table 3 presents data on selected inflation-adjusted interest rates, rates of capital accumulation, and rates of growth of the housing stock. The striking fact about the short-term interest rate that most closely corresponds to the Fed policy rate (the fed funds rate) is that after the 1970s, interest rates have been kept consistently high throughout the Great Moderation period. Even during the New Economy period when policy turned heavily toward fiscal surpluses (see below), rates are higher than Golden Age levels by and large. The one exception, the short-term rate closest to the OPR, is probably misleading because averaged over the decade, it appears low owing to the exceptional efforts required by the Fed to overcome the first jobless recovery after the 1991 recession (post-2001 was the second jobless recovery). If we look at peak levels at the end of the business cycle, inflation-adjusted short rates were higher in 2000 than at any point during the Golden Age (1953-69).

If the 1970s profitability crisis was triggered by the overaccumulation of capital in relation to available supplies of labor and raw materials, then this policy stance makes sense as a way of managing the accumulation process in the interests of capital. Of course, the official ideology[31] provided in part by the economics profession itself through its doctrine of the natural rate of unemployment has been that the Fed learned to follow a Taylor Rule that respects the inflation barrier. In practice this has meant a policy of restrained accumulation that prevented the unemployment rate from falling to levels that once again threatened profit margins and mark-ups.[32] Despite some signs of life in the New Economy, accumulation rates for the nonfinancial and manufacturing sectors remain lower than even the 1970s, and certainly have not recovered the levels of the Golden Age of Accumulation before then.

The Naughties, however, represent an exception. Interest rates were kept unusually low during the recovery after 2001. The eponymous John Taylor (2009) argues that this was the policy error that led directly to the Great Recession via its effects on housing, oil prices, and financial markets. But he does not ask what motivated the Fed's abrupt departure from the Taylor Rule, after allegedly achieving two decades of stable growth during the Great Moderation. Part of the answer lies in the remainder of Table 3 where we

[31]Romer and Romer (2002) present the conventional view of the evolution of monetary policy.

[32]This policy stance is even more pronounced in Europe, where following the Bundesbank, high interest rates arguably drove the "natural" rates of unemployment up through hysteresis-type effects. See Ball (1999).

can see that despite historically strong profitability, nonfinancial corporate accumulation barely responded to the stimulus of low interest rates. Particularly striking is the manufacturing sub-sector (which is almost totally incorporated), where capital *decumulation* and absolute *deindustrialization* prevail.[33] In retrospect, it seems clear that the Fed was desperately trying to generate enough growth so that employment would escape the jobless recovery that followed the 2001 recession. Indeed, with the scent of Japan's Lost Decade hanging freshly in the air, the FOMC in this period explicitly sought to avoid an impending deflation trap. But the usual response from business investment was not going to work in the expected way, and the stimulus gained traction only, as we see in the final row of Table 3, in the residential housing industry, which has always been an interest-sensitive sector in the U.S.

In sum, the decade preceding the Great Recession of the Naughties presents us with the puzzle that despite the dual stimulus of relatively strong ex post profitability and low real interest rates, the investment response from the business sector has been historically weak, even anemic.[34]There is some suggestion from capital productivity, particularly outside of the manufacturing sector, that prospective yields on new capital projects might not be encouraging to capital formation, but as with all recent data, this needs to be handled with care. Without sustained high capital productivity, the profitability of existing projects has been elevated entirely by the redistribution of income from labor toward capital, in particular toward finance capital, distinctive features of the Great Moderation that accelerated fiercely during the last decade.

[33]In fact, manufacturing output growth is also negative or historically low in this period, mirroring the collapse of investment. This represents a structural break from the historical pattern of relative deindustrialization driven by the relatively high rates of technical change in manufacturing. See Congressional Budget Office (1998).

[34]Some may argue that interest rates have little effect on investment even under ordinary circumstances based on the much-discussed insensitivity that a large empirical literature has established, so that we should not expect low rates to stimulate much investment spending. But the interest sensitivity of business investment is rarely found to be zero. It is important to realize that "insensitivity" is often defined in terms of the expectations of neoclassical theory under near-Cobb-Douglas technology, which, as Chirinko et al. (2004) explain, predicts a fairly large elasticity.

5 Accumulation and external imbalance

The previous section speculates that one potential source of investment insensitivity to interest rates could have been the negative technology shock from declining capital productivity in the non-financial corporate sector, but this hardly seems adequate to explain the misshapen contour of accumulation in this critical pre-crisis period.

To get closer to the action, consider Figure 3, a canonical Godley chart that shows the sectoral financial balances (saving minus investment) expressed as a percent of GDP for scaling purposes.[35] Since we are considering all domestic sectors (households, government, business) and the rest of the world, the national accounting identity between saving and investment requires that these series should sum to zero in each year (ignoring the small statistical discrepancies). The Godley chart elegantly displays the structure of lending and borrowing, broadly conceived, since a sector in surplus must be acquiring the liabilities of the sectors in deficit.

The patterns could not be more clear. First, households, which traditionally have been a source of funding for corporations and government, have slipped into the deficit region. This is the financial counterpart to the housing boom visible in the accumulation rates in Table 3 or Figure 2. Second, the current account has fallen into a progressively deeper deficit, represented here by the countervailing inflow of capital from the rest of the world. Third, the government sector's surplus position under Clinton has also flipped, due to Bush II's enthusiasm for fiscal deficits.[36]

Finally, the business sector, traditionally a net borrower to finance accumulation, has flipped over to join the rest of the world in lending to the household and government sectors during the run-up to the Great Recession. The net saving of this sector is mainly the difference between the retained earnings (operating surplus minus net interest, dividends, and business taxes) of corporations or quasi-corporations and their net fixed investment.[37] Thus

[35] Wynne Godley generally adopts a sign convention that makes upward movements in a variable indicate a demand stimulus, which I find confusing, and I stick to the true signs in the national accounting identity.

[36] Godley's (1999) prediction that this fiscal stance was virtually inescapable was, of course, one of the most spectacular I-told-you-so stories in recent memory.

[37] A quasi-corporation is a business enterprise that covers operating costs through sales and keep complete financial records. In the integrated SNA-NIPA national accounts, net fixed investment includes adjusted changes in inventories (which must be financed) and purchases of nonproduced assets like drilling rights, land, or electromagnetic spectrum.

the high levels of net business saving could in principle reflect, for example, an increase in the rate of retention of corporate profits. Yet, as noted above, corporations have been distributing a progressively higher share of their profits (after payment of taxes and net interest) to stockholders. Here are the figures on the percentage share of nonfinancial corporate profits after tax that are distributed as dividends:

1960-69	1970-79	1980-89	1990-99	2000-07
39.36	45.37	49.57	61.67	77.25

Thus this remarkable structural break in business saving reflects the joint effect of the very high share of profits and the very low level of investment spending that we have already discussed. Evidently, despite unprecedented dividend payout rates in the last decade, corporations are still left with surplus funds to place on financial markets where they can work their way back to the household sector either indirectly via intermediaries or directly through the loans, credits and stock buybacks that have become increasingly prevalent over the Great Moderation.

If Figure 3 referred to a developing country, an open economy macroeconomist would see clear signs of impending disaster caused by an excessive and destabilizing capital inflow and corresponding trade and current account deficit. In the 1990s, such episodes inflated domestic asset markets, drove real estate and office construction booms, and ended in the Asian currency crises of 1997. But the figure refers to the global hegemon that issues the dollar liabilities used for reserves that fund international trade and finance. The U.S. enjoys an "exorbitant privilege": it stands at the apex of the Bretton Woods II system, borrowing from official sources in the Pacific Rim who have been eager to accumulate reserves for precautionary motives, and, in the case of China, to sustain a spectacular example of export- and investment-led growth.[38] Not only that, the financial sector has grown much faster than the underlying domestic base of real productive activity and the inflow of capital that is evident in Figure 3 represents a very profitable business opportunity for Wall Street finance companies. From Robert Rubin forward, U.S. Treasury Secretaries of both parties have consistently favored the strong dollar policies that sustain these flows and direct business toward their clients and

[38] According the *IMF World Economic Outlook* (September 2005) China saves and invests an estimated 45-50 per cent of its national income, which as far as I know is without precedent.

employers, particularly the big investment houses. Some economists, such as Cooper (2008), making a virtue of necessity, even argue (at least they did before September 2008!) that this inflow of capital is a Good Thing for the U.S. since it harnesses our comparative advantage in producing and marketing sophisticated financial products. But the key point is that in a world economy structured by the imperatives of globalization, such potentially destabilizing capital flows are integrally related to the policies of neoliberalism.

Is it any wonder that this configuration has had such a punishing effect on the propensity of U.S. corporations to invest real resources in nonfinancial sectors? The sharp collapse of manufacturing investment in particular signals a reluctance of capitalists to take a chance that some Chinese upstart (or perhaps a whole Chinese upstart city specializing in their product line) will eat their lunch when any newly installed capacity comes on stream. In terms of the Minskian liquidity trap, the China price could well be expected to raise the level of uncertainty and increase the discount rate for any given level of monetary interest rates.[39]

The "global savings glut" hypothesis advanced by Ben Bernanke and others is true up to a point, in other words, but it is incomplete. For it is not immediately obvious why an inflow of capital on such cheap terms would not have stimulated a *general* increase in investment, instead of generating a lopsided housing-led recovery after 2001.[40] This point receives some support from IMF staff economists (International Monetary Fund, 2005, Ch. 2) who find that the dearth of investment spending, despite favorable monetary conditions in the last decade, appears to be widespread among both advanced and developing nations. We don't have a savings glut so much as an investment shortage. Perhaps a big part of the answer is that the invasion of cheap imports from China made investment in manufacturing unthinkable, and the rest of the economy presents only so much capacity for capital growth in such a short period.[41]

[39]I am indebted to Duncan Foley for this point.

[40]Bernanke (2005) was aware of the weakness of U.S. investment when he advanced this thesis, but attributed it to "cyclical and other" factors. His point that a surfeit of global savings favored non-tradable sectors does not explain why among these, only the residential housing sector seems to have flourished.

[41]Note that if there had been an investment response to the inflow of foreign capital, it too could have been accommodated by an increase in securitizations (which are used to finance a wide range of business activities outside of real estate, including inventories, receivables, leasing, and auto loans). If the underlying investments were profitable, however, this would not have triggered the financial debacle caused by a securitized real estate

There is another important connection between the external imbalance and performance during the post-2001 recovery. We have already seen evidence that the distribution of income shifted strongly toward profits during this period. This shift may have in part been driven by the effect of trade, particularly on workers in the traded goods sectors, who experienced sharp declines in their bargaining power. And while a low real wage increases the potential rate of growth in the long run in the classical theory, it may have significant short-run effects on aggregate demand under the "wage-led" regimes described by Blecker (2002). Both of these conjectures help make sense of the weak employment and output growth, as well as the disappointing investment performance, during this critical period.

In short, the external disproportionality plagueing the U.S. economy, its current account deficit driven by trade with the Pacific Rim countries and capital inflows from the BRICs, China, and Southeastern Asia, has a complex organic relationship to the internal disproportionality represented in the unsustainable reliance on residential construction during the run-up to the Great Recession. But these two imbalances are in themselves incomplete, for the rise of finance capital has transformed the intermediation process over the Great Moderation. Without the financial innovations that permit the securitization of debt and other sources of cash flow, it is hard to see how the particular form the crisis assumed in its initial phases could have arisen, and that story lies outside the self-imposed limits of this paper. Yet having an understanding of the underlying real contradictions that have developed during the Great Moderation makes these financial developments less mysterious.

The policy implications of this analysis place substantial weight for recovery on correcting the external imbalances, chiefly through a real depreciation of the dollar, and restoring the manufacturing and other tradeable sectors. This is likely to be a focal point of policy debate, especially because it conflicts with the "strong dollar" policy associated with Robert Rubin and now accepted by the Treasury and the Fed.[42] It seems very unlikely that on its own domestic investment will provide the demand growth needed for a sustained recovery toward anything like full employment. The neoliberal policy regime that brought us the Great Moderation has exhausted itself.

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bubble.

[42]At least by its Chairman, Ben Bernanke, based on public statements he made in his appearance on the July 2009 PBS *News Hour*.

6 Conclusion

We have seen that from a Minskian perspective, the best way to think about a liquidity trap is to focus on the investment decision, rather than on the zero interest bound. A Minskian liquidity trap is a pathology of accumulation in which new capital assets are judged less valuable than their market price owing to one (or more) of three factors. First, as Keynes was already aware, when the underlying rate of profit that capitalists experience falls below some critical threshold, the conditions for a liquidity trap ripen. Both direct and indirect signs point to declining profitability as central to the collapse of the Golden Age of Accumulation, and to some features of the Great Moderation, but the rate of profit has been partially restored over the last decades through neoliberal policies. Second, it is not only the ex post profit rate but expectations of future profitability that regulate the investment decision. Here we can only speculate that despite the surface appearance of health in the profit data over the last two cycles, the underlying reality perceived by corporate managers and owners has grown less favorable owing to the inherently tenuous nature of the distributional shift from labor income toward profits and interest upon which the appearance is based. And third, the uncertainty about the future can ratchet up the discounting of any given stream of prospective yields, and the U.S. economy's growing addiction to imported capital and goods cannot have improved the sense of security capitalist decision makers hold about the likelihood that their business ventures will pan out in the face of newly rising centers of production, particularly in China. These three factors were already at work, creating multiple disproportionalities and a heightened vulnerability to financial shocks within the U.S. economy well before visible signs of the Great Recession began to appear in the summer and fall of 2007.

Data sources

Table 1. The main source is the integrated SNA-NIPA national account available at www.bea.gov. Table S.5 covers the nonfinancial corporate sector. For the overall corporate sector, data from the traditional BEA NIPAs, Table 1.14, and the Fixed Capital Stock data, Table 6.1, were used.

Table 3. Interest rates and inflation rates (measured by the CPI-U) were taken from the Economic Report of the President, Tables B-73 and B-64. Rates of accumulation are from the BEA Fixed Capital Stocks data, Table 6.2, and, for housing, Table 5.2.

Table 2. Data are from the integrated SNA-NIPA accounts (see above), Table S.2. The business sector combines nonfinancial noncorporate, nonfinancial corporate, and financial sectors.

Figure 1. Data for national income (without capital consumption adjustment) for manufacturing come from NIPA Table 6.1B (SIC basis) and 6.1D (NAICS basis). For the nonfinancial corporate sector, data come from NIPA Table 1.14. For comparability, the capital consumption adjustment is removed from nonfinancial corporate national income.

Figure 2. Data for business net investment, household net investment and net domestic product are from the integrated SNA-NIPA accounts, Table S.2.

Figure 3. Data for sectoral financial balances are all from the integrated SNA-NIPA accounts, Table S.2. The business sector is defined as above.

In-text tables. Data on the balance sheets of the Federal Reserve Banks comes from the Fed's H.1. press release, which can be found, along with the data used in the text on the assets of large bank holding companies, at www.federalreserve.gov. Data for the profit rate are from the same source as Table 1. Data for accumulation are from the same source as Table 3. Data for the retention ratio are from the same source as Figure 2.

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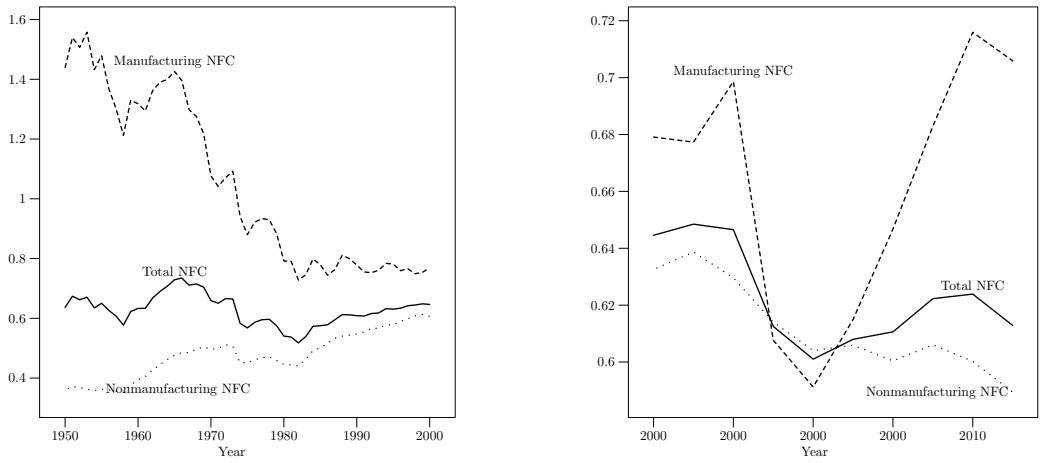

Figure 1: Capital productivity in the nonfinancial corporate sector, using national income without capital consumption adjustments. Left panel: 1950-2000, SIC basis. Right panel: 1998-2007, NAICS basis. Note change of scale.

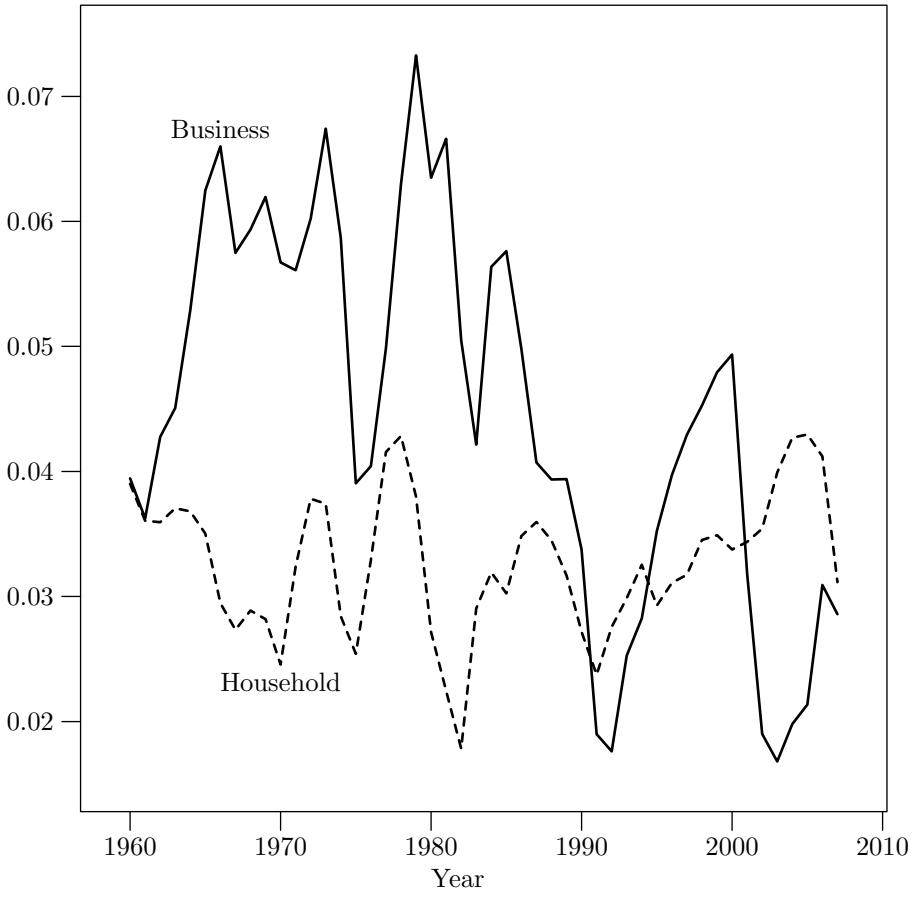

Figure 2: Business sector net investment and household sector net investment (mostly residential) as a percent of aggregate net domestic product.

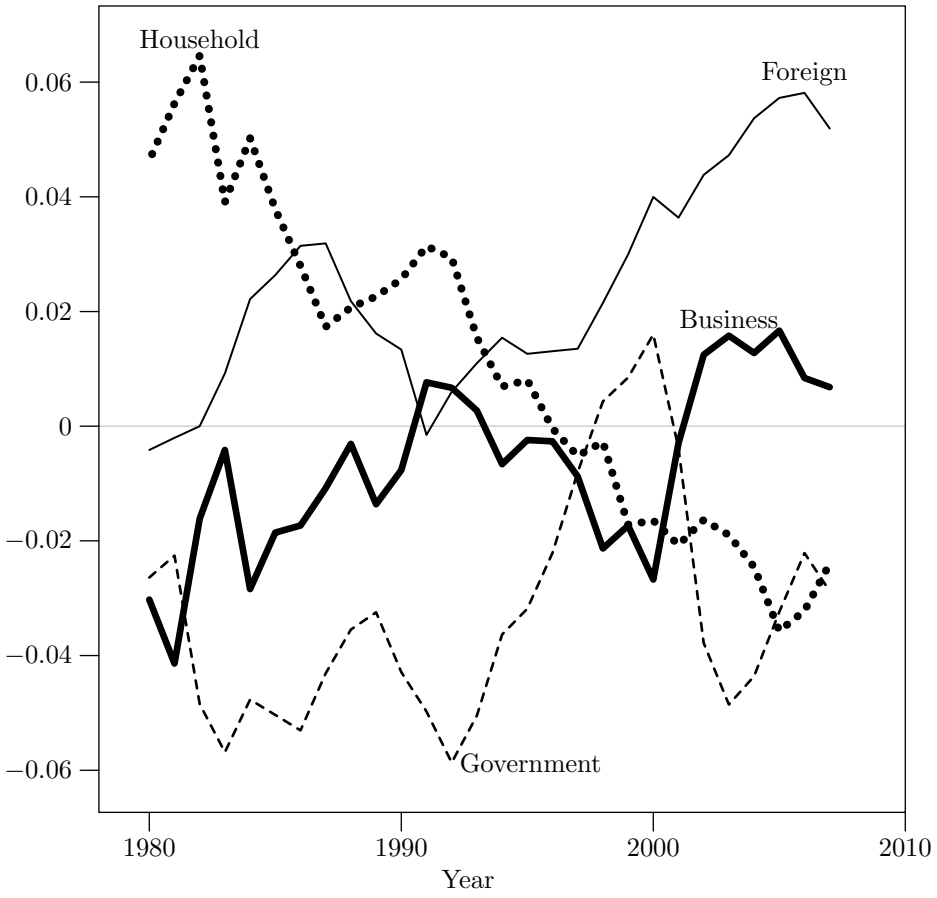

Figure 3: Net financial balances (saving minus investment) for the major sectors, expressed as percent of gross domestic product.