Working Paper No. 569

Fiscal Policy and the Economics of Financial Balances

by

Gennaro Zezza*
University of Cassino
The Levy Economics Institute of Bard College

June 2009

* The author gratefully acknowledges comments from Claudio H. Dos Santos, Wynne Godley, Dimitri B. Papadimitriou, Anwar M. Shaikh, and the participants in a seminar held at the Université de Paris XIII, Villetaneuse, France, on February 13, 2009. Any remaining errors are my sole responsibility. Comments to: Dipartimento di Scienze Economiche, Università degli Studi di Cassino, Cassino (FR) 03043 Italiy. E-mail: zezza@unicas.it

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

ISSN 1547-366X

ABSTRACT

This paper presents the main features of the macroeconomic model being used at The Levy Economics Institute of Bard College, which has proven to be a useful tool in tracking the current financial and economic crisis. We investigate the connections of the model to the "New Cambridge" approach, and discuss other recent approaches to the evolution of financial balances for all sectors of the economy. We will finally show the effects of fiscal policy in the model, and its implications for the proposed fiscal stimulus on the U.S. economy. We show that the New Cambridge hypothesis, which claimed that the private sector financial balance would be stable relative to income in the short run, does not hold for the short term in our model, but it does hold for the medium/long term. This implies that the major impact of the fiscal stimulus in the long run will be on the external imbalance, unless other measures are taken.

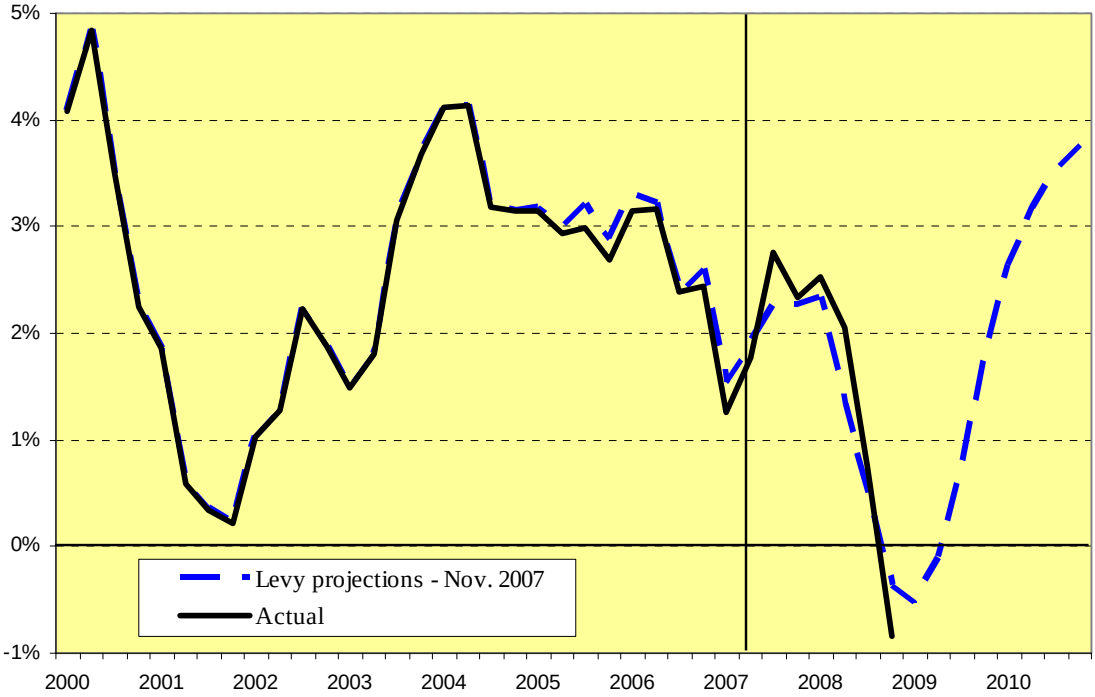
Keywords: Fiscal Policy; Financial Balances; New Cambridge

JEL Classifications: E12, E17, E21

I. INTRODUCTION

In the last ten years,[1] the macroeconomic team at the Levy Economics Institute of Bard College—led by Wynne Godley—has been warning about the unsustainability of the growth path in the U.S. economy, characterized by the accumulation of large and growing debts. The recession in 2001 was, in our view, a first sign of trouble in this unbalanced growth pattern, but a serious recession was avoided at the time by fiscal and monetary intervention, only to postpone the problem and make it more serious. We have again been warning about the possibility of a recession,[2] which eventually materialized along the lines we projected in Godley et al. (2007).

Figure 1. U.S. Real GDP (Annual Growth Rate)



Sources: B.E.A. and author's calculations

[1] The first analysis is in Godley (1999).
[2] See Papadimitriou, Zezza, and Hannsgen (2006) and Godley et al. (2007), among others.

In figure 1, we compare our projection for real GDP growth, published in Godley et al. (2007) with the actual evolution in GDP, where the vertical line corresponds to the information available at the time of the projection.[3] The chart shows that our model has a good tracking record. At the time we were expecting a moderate recession, although we have become much more pessimistic as new data on financial markets has later become available.[4]

Our work is centered around a macroeconometric model that has thus proven to be quite reliable in tracking the U.S. economy over the medium term. Moreover, the approach we adopt for summarizing our results is based on the projection of the financial balances of the private, public, and foreign sectors. Although our approach was quite unconventional, especially since most models discuss households and business separately, it has attracted some attention and has been increasingly adopted or imitated.[5] However, we believe that the use of financial imbalances is sometimes framed in a misleading way, or is grounded in a completely different theoretical approach, so we believe it may be useful to shed some light on our own view on how the dynamics of financial balances can be of guidance to the medium-term prospects of an economy and what is the relation of fiscal policy to such imbalances—and to economic growth—in our framework.

In the next section we will briefly summarize our interpretation of U.S. growth in the last fifteen years and the origins of the current crisis. We will then present in section 3 the main features of the Levy macroeconometric model and then discuss alternative approaches to financial balances in section 4. A discussion of the impact of fiscal policy in section 5 will conclude.

2. OUR VIEW OF THE FINANCIAL AND ECONOMIC CRISIS

In our view, the current financial and economic crisis is not the consequence of malpractices in some sectors of the financial industry or a result of policy failure—although both certainly played a role—but rather the inevitable consequence of an unbalanced growth process that

[3] Discrepancies between our projection and history *before* 2007 are due to revisions to U.S. national accounts.
[4] Our latest report is Godley, Papadimitriou, and Zezza (2008). See also Papadimitriou (2009).
[5] See Wolf (2008a and 2008b). The financial balances approach has been adopted by Goldman Sachs for short-term projection; see Hatzius (2003 and 2006), among others. Other approaches to financial balances will be discussed in section 4.

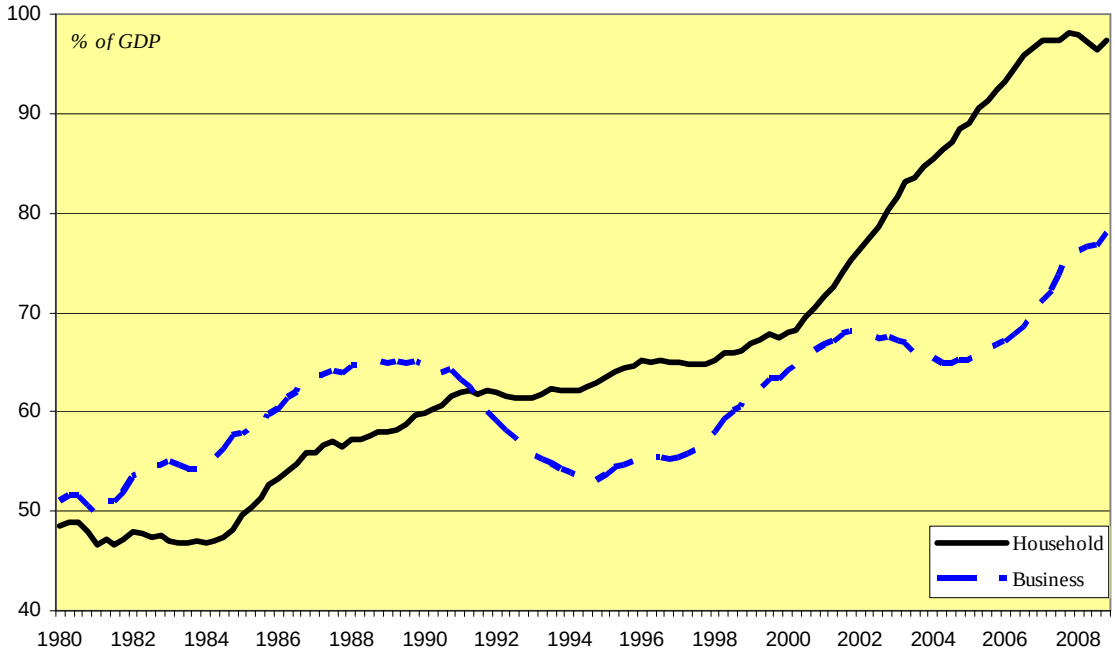
started at the end of the 1980s.[6] Godley's first *Strategic Analysis* report pointed to seven unsustainable processes:

> "(1) the fall in private saving into ever deeper negative territory, (2) the rise in the flow of net lending to the private sector, (3) the rise in the growth rate of the real money stock, (4) the rise in asset prices at a rate that far exceeds the growth of profits (or of GDP), (5) the rise in the budget surplus, (6) the rise in the current account deficit, (7) the increase in the United States' net foreign indebtedness relative to GDP." (Godley 1999: 2)

Some of these processes—excluding monetary policy (3) and budget policy (5)—characterized both the so-called "New Economy" growth period, which ended with the 2001 recession (Godley and Izurieta 2002), and the next growth period characterized by a housing bubble, which ended in 2007. Private sector debt has been rising steadily as a share of GDP (figure 2), with household debt accelerating in the 2000s, reversing its course only in the first quarter of 2008 with the start of the current financial crisis.

[6] The saving rate of the personal sector started to decline around 1985. In the same period the distribution of income started to shift systematically in favor of the richest quintile of the population. For a theoretical model of the relation among the saving rate, borrowing, and the distribution of income, see Zezza (2008).

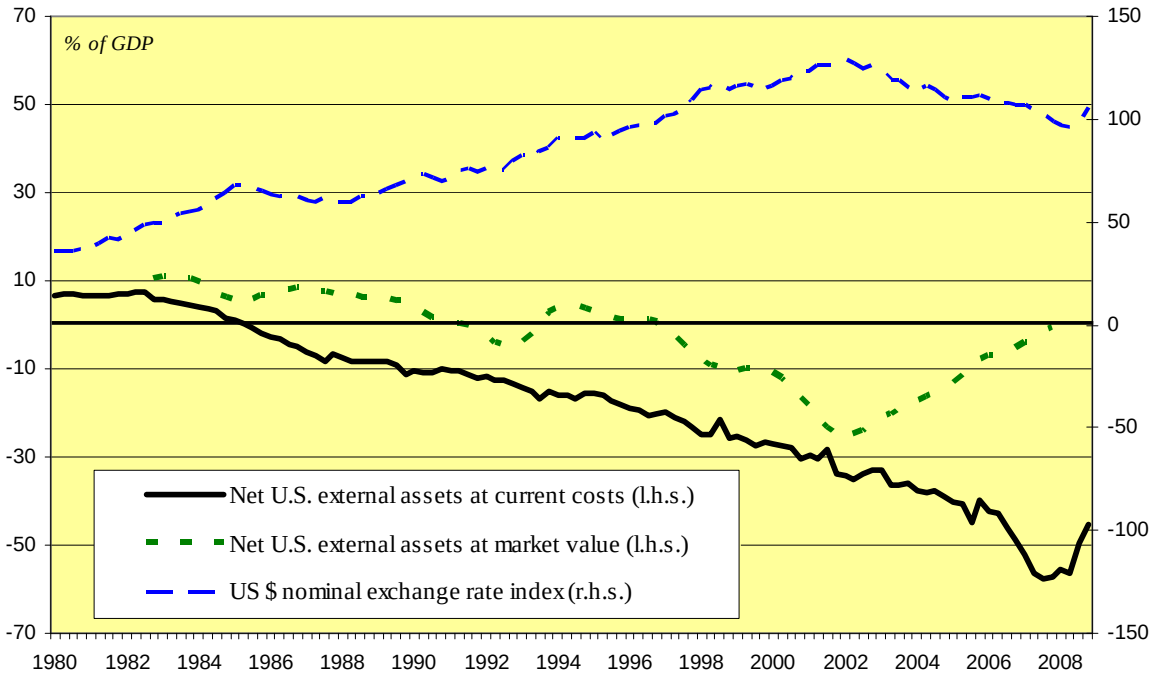
Figure 2. Household and Business Debt



Sources: B.E.A. and the Federal Reserve

The strong increase in domestic demand (financed by credit) was the main source of U.S. growth in the 2000s, resulting in a widening deficit in the current account balance, which, in turn, cumulated into a growing external debt. In figure 3 we report the net asset position of the United States, relative to GDP, along with an implicit measure of U.S. debt obtained by cumulating the current account balance through time, starting from a benchmark value. This latter figure will not depend on fluctuations of either assets market values or the exchange rate, and the figure clearly shows the very specific feature of the U.S. economy: a depreciation of the exchange rate—similar to the one that began in 2002—has little effect on U.S. liabilities, which are mainly in U.S. dollars, but increases the market value of U.S. assets abroad (which are mainly in euro, yen, and other strong currencies), resulting in an improvement in the net asset position, even against a large and growing current account deficit.

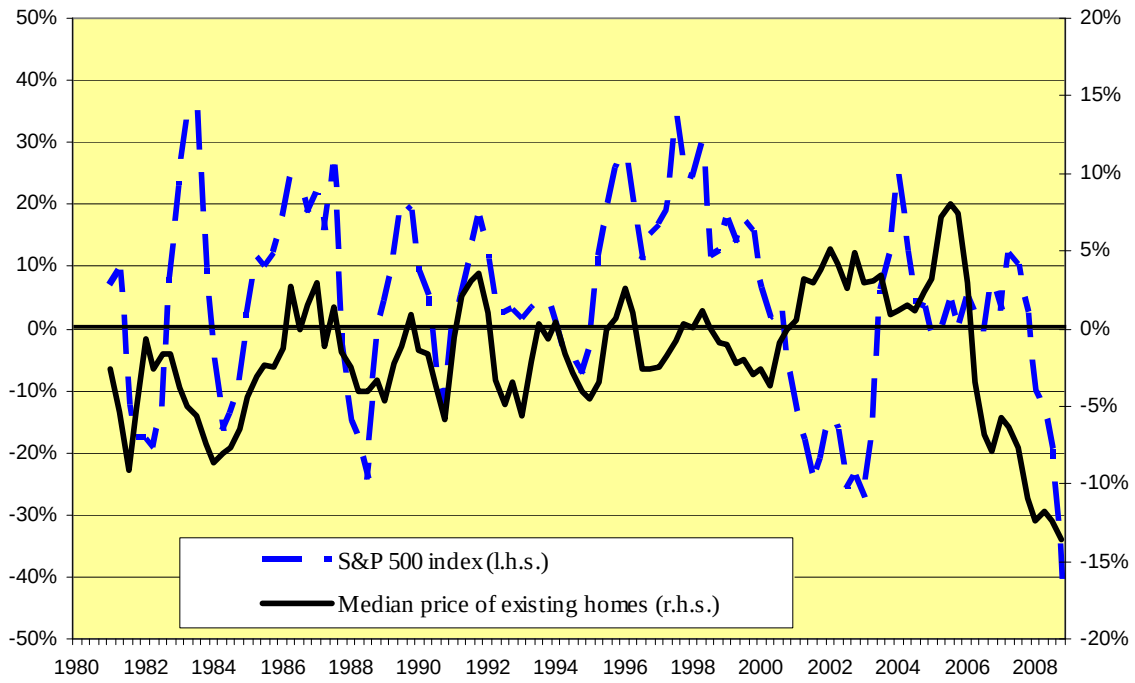
Figure 3. U.S. External Debt and U.S.$ Exchange Rate



Sources: B.E.A. and the Federal Reserve

In figure 4 we report two simple measures of relative growth in asset prices, obtained by subtracting the annual growth rate in nominal GDP from the growth rate in a stock market index and in a price index for the housing market. The picture in figure 4 shows clearly how the stock market bubble played a major role in the "New Economy" period between 1995 and 2000, and how the housing market bubble started immediately after, with both price indexes now decreasing.

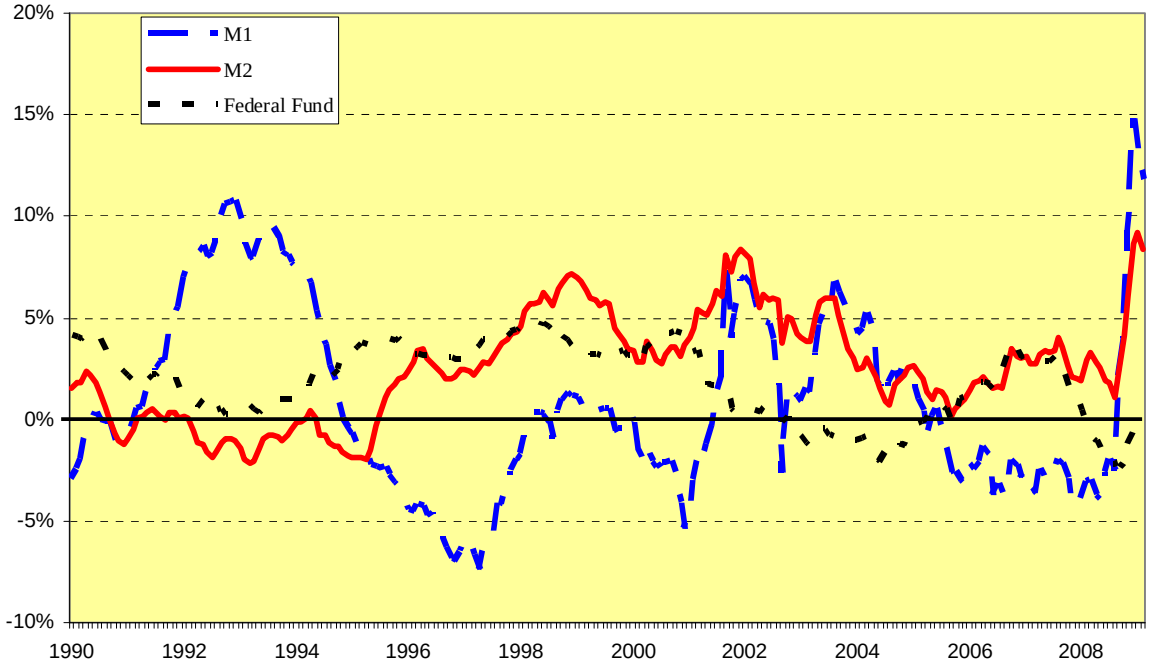
Figure 4. Difference between Growth in Asset Prices and Growth in GDP



Sources: S&P, Association of Realtors, and B.E.A.

The charts in fivgures 2–4 show that five of the unsustainable processes outlined in Godley (1999) were still at work in the 2000s, after the 2001 recession and the end of the "New Economy." On the other hand, budget and monetary policy changed their course. In figure 5 we report three measures of the monetary policy stance, namely the federal fund rate and the growth rate in M1 and M2. We subtract the inflation rate to obtain a measure of the ex post interest rate and measures of the growth in the money stock net of inflation. The chart in figure 5 confirms that the stock of M2 was growing rapidly in the second half of the 1990s, although the real interest rate was not low. With the 2001 recession, interest rates were reduced in real terms and they were gradually raised again in 2004, when the price of oil increased and inflation seemed to become a threat again.

Figure 5. Monetary Policy
Growth Rate in M1, M2, and the Federal Fund Rate, All Net of Inflation



Sources: B.E.A and the Federal Reserve

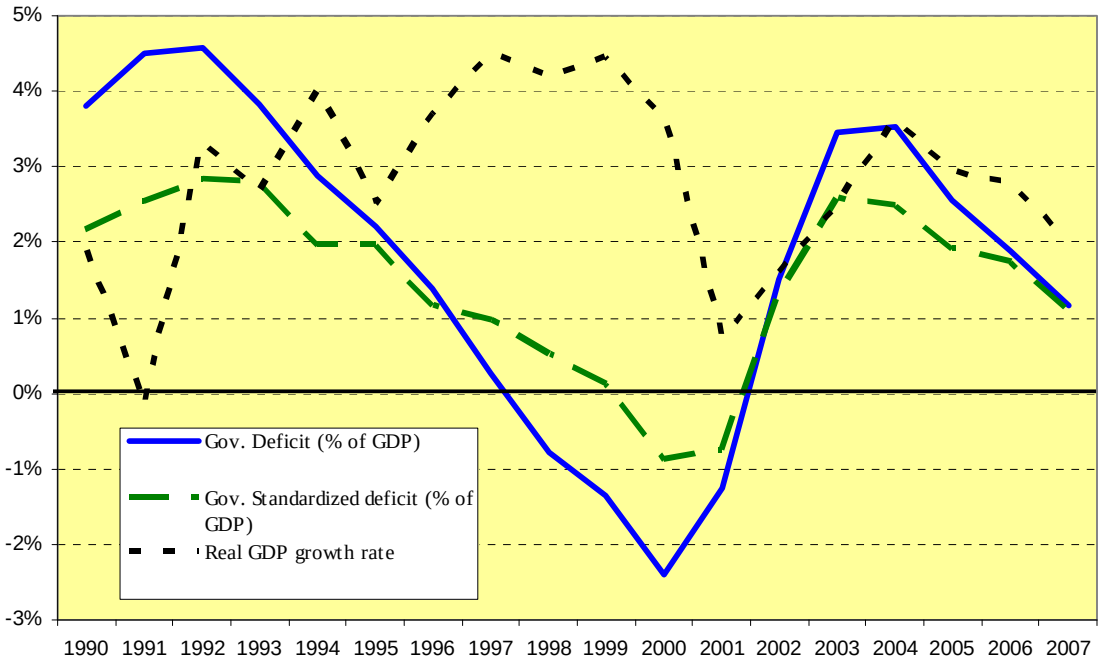
Some commentators argue that the reason for the current crisis is based on the easing of monetary policy:

> "The classic explanation of financial crises is that they are caused by excesses—frequently monetary excesses—which lead to a boom and an inevitable bust. This crisis was no different: A housing boom followed by a bust led to defaults, the implosion of mortgages and mortgage-related securities at financial institutions, and resulting financial turmoil. Monetary excesses were the main cause of the boom. The Fed held its target interest rate, especially in 2003–2005, well below known monetary guidelines that say what good policy should be based on historical experience. Keeping interest rates on the track that worked well in the past two decades, rather than keeping rates so low, would have prevented the boom and the bust." (J.B. Taylor 2009)

This explanation, however, does not take into account that household (and foreign) debt had started to rise well before the monetary easing. The decline in mortgage rates allowed the private sector to increase their debt while keeping interest payments constant as

a share of income,[7] and therefore postponed a more severe recession and fueled a boom. If interest rates had been kept at higher levels, the short growth recession of 2001 would have lasted longer and would have had more serious consequences on unemployment and output.

Figure 6. U.S. Federal Budget and Real GDP Growth



Sources: C.B.O. and B.E.A.

Fiscal policy was also used to contrast the drop in domestic demand in the 2001 recession. As figure 6 shows, the federal budget turned from a surplus into a deficit and helped the economy recover. One of the problems with the current recession is thus that fiscal policy is required at a time when the government is already running a deficit. We will come back to fiscal policy in the first section of the paper.

Summing up, the long period of sustained growth in the United States was fueled, in our view, by "excessive" private domestic expenditure, with a major role played by households expenditure in the 2000s, financed by increasing injections of credit. The mainstream view—before the crisis burst—was that growth in domestic expenditure was not

[7] See Shaikh et al. (2003) for our early analysis of household debt and the interest payments burden.

excessive, but rather due to rational expectations on future income growth. Our view[8] is that excessive consumption was—at least in part—determined by two joint factors: a shift in the distribution of income towards the richest quintile and the struggle of the median household to keep its relative standard of living against the richest quintile.

In the following we will not explore this issue further, but we will investigate the mechanics linking borrowing and expenditure to growth and financial balances in our model.

3. THE LEVY MODEL

The Levy macroeconometric model was originally built in the 1990s with annual data and developed over the years, adopting quarterly data and with substantial revisions in the econometric methodology, although we may say that the key properties of the model have been preserved in all subsequent releases. The private sector is modeled as a whole, with no distinction between household and business.[9] The model accounting structure can thus be laid down—at the current stage—with no explicit representation of the financial sector or, better, assuming that the financial sector accommodates any demand for credit, accepts any supply of deposits, and transfers all of its profits to the nonfinancial sector.

Adopting the Social Accounting Matrix (SAM) approach pioneered by Richard Stone, model accounting can be represented as in table 1, where monetary payments are recorded in the columns and receipts in the rows. There is no explicit treatment of physical assets and gross investment is included in domestic private expenditure.

[8] See Zezza (2007 and 2008). The relevance of relative consumption, or the "keep up with the Joneses" effect, seems to be gaining ground. See Cynamon and Fazzari (2008), Stiglitz (2008), and Akerlof (2007) for a somewhat different perspective.

[9] This is consistent with the "New Cambridge" approach we will discuss later.

Table 1. Social Accounting Matrix for the Levy Model

	Production	Private Sector	Government	Rest of the World	Capital Account	Total
1. Production		Private expenditure	Government expenditure	Exports		Aggregate demand
2. Private Sector	Wages & profits		Gov't. transfers to private s.	Net income payments		Private s. Income
3. Government	Net indirect taxes and s.c.	Direct taxes and s.c.				Gov't. receipts
4. Rest of the World	Imports	Private s. net transfers to RoW	Gov't. net transfers to RoW			Payments to RoW
5. Capital Account		Net acq. of fin. assets	Gov't. surplus	-BoP		0
TOTAL	Value of output	Private s. income	Gov't. outlays	Receipts from RoW	0	

The SAM has the property that the value of each row is equal to the value of the corresponding column. For the first row and column, the identity is between the value of aggregate demand (including the ex post change in inventories) and the value of production. For the other rows and columns, the identity is defining saving (in the "Capital Account" row) as the difference between income (the row total) less expenditure (including capital expenditure) and transfers. Accounting consistency requires that, when demand equals supply, the sum of saving for all sectors (i.e., our financial balances) be zero, i.e.,

$$NAFA - GD - BP = 0 \qquad (1)$$

where NAFA is the net acquisition of financial assets by the private sector, GD is government deficit, and BP the current account in the balance of payments.

The model is developed along the lines of stock-flow consistent models.[10] The stock of net financial assets of each sector increases with net saving,[11] and stocks feed back into flows through interest payments or whenever flows adjust towards a stock-flow norm.

The crucial equation in the model relates private expenditure to disposable income and net financial assets of the private sector, all measured in real terms, that is,

[10] See Godley and Lavoie (2006) for an extensive treatment.
[11] In its current stage the model does not detail the accounting of capital gains on domestic assets, while the accounting for capital gains on U.S. assets abroad is well developed. Capital gains effects on expenditure are captured through price variables.

$$DE = f(YD, FA, Z) \tag{2}$$

where DE is private expenditure, FA the opening stock of net financial assets, and Z a vector of other variables. Assuming a linear relationship, and abstracting from Z and capital gains, since net assets accumulation is given by:

$$FA = FA(-1) + YD - DE \tag{3}$$

in steady state, when FA = FA(-1) and therefore DE = YD, equation (2) can be solved to yield a stable ratio between income (YD) and net financial assets (FA). This was one of the ideas underlying the "New Cambridge Hypothesis," which assumed in addition that the private sector would adjust rather quickly to a shock to restore its desired income/assets ratio.

Although Godley usually derived his results from a steady-state assumption, assuming steady growth—which is more reasonable—would not change our results. In steady growth,

$$FA = (1+g)\cdot FA(-1) \tag{4}$$

where g is the (steady) growth rate in assets. Using (4) in (3) and assuming a linear relation among DE, YD, and FA, that is,

$$DE_t = \beta \cdot YD_t + \gamma \cdot FA_{t-1} \tag{5}$$

gives:

$$\frac{YD}{FA_{t-1}} = \frac{g + \gamma}{1 - \beta} \tag{6}$$

and disposable income is stable with respect to the opening stock of financial assets, for stable parameter values. Note also that (6) implies that income and assets grow at the same rate.

In the current model,[12] the income/asset ratio of the private sector is affected by capital gains on homes and equities, as well as borrowing. Namely, an increase in either the real price of equities or the real price of homes will increase expenditure over income (and wealth). Again, the ability to borrow for both households and corporations generates an increase in expenditure over income.

We were careful to test for possible misspecifications. In particular, borrowing and income may depend on expenditure, so we tested for weak exogeneity, as well as for structural breaks, and the equation has passed these tests, as well as the standard battery of specification tests.

The rest of the Levy model is more conventional, following the Keynesian and Post Keynesian tradition. Trade depends on income and relative prices, trade prices react to the exchange rate, as well as domestic and foreign prices, etc. Some variables, notably inflation, are not modeled in detail yet.

4. FINANCIAL BALANCES

To properly identify a definition of financial balances that is coherent with national accounting, we may start from the GDP identity:

$$GDP = C + I + G + B \qquad (7)$$

where B is the balance of trade, C is consumption, G is government expenditure, and I is gross investment including the change in inventories. Adding or subtracting net transfers from sector i to sector j, Tij, and considering the household sector H, business sector B, government sector G, and foreign sector W, we get:

$$GDP - Thg - Tbg + Twh + Twb = C + I + (G - Thg - Tbg + Tgw) + (B + Twh + Twb - Tgw) \qquad (8)$$

[12] See the appendix for a technical discussion of our equation.

If transfers from households and business to the government include taxes, we can further split GDP into personal income, Yh, and business gross profits, Yb. With this simplification, the first bracket in our equation is equal to government deficit:

$$GD = G - Thg - Tbg + Tgw \quad (9)$$

and the second bracket is equal to the balance of payments on current account BP:

$$BP = B + Twh + Twb – Tgw \quad (10)$$

we can thus rewrite (5) as:

$$(Yh + Tbh + Twh - Thg) + (Yb - Tbg - Tbh) = C + I + GD + BP \quad (11)$$

where Yb includes any net transfers to business from the rest of the world, and we added and subtracted transfers from business to households, Tbh, which will mainly be dividends.

The first term in brackets defines personal disposable income, YDh:

$$YDh = Yh + Tbh + Twh – Thg \quad (12)$$

while the second term in bracket in equation (8) defines undistributed profits, Π:

$$Π = Yb - Tbg – Tbh \quad (13)$$

We can now split gross investment into residential investment, Ir, nonresidential investment, Ik, and change in inventories, In. Rearranging equation (11) and using (12) and (13) we get:

$$(YDh - C - Ir) + (Π - Ik - In) = GD + BP \quad (14)$$

or, defining personal saving, Sh, as:

$$Sh = YDh - C \tag{15}$$

$$(Sh - Ir) + (\Pi - Ik - In) = GD + BP \tag{16}$$

where the two terms on the left-hand side measure the excess of saving over capital expenditure for the household and business sector, respectively, which are therefore the net acquisition of financial assets (NAFA) by such sectors:

$$NAFAh + NAFAb = GD + BP \tag{17}$$

Another way to look at equation (11) is given by:

$$(Ir - Sh) + (Ik + In - \Pi) + GD + BP = 0 \tag{18}$$

where now each term represents the excess of expenditure over income, with BP being the excess of expenditure in the United States of the foreign sector against income from the United States of the foreign sector.

Financial balances in (18) are derived from income accounting and have a counterpart in the flow of funds. Defining the change in the stock of financial assets as dFA and the change in financial liabilities as dFL for any sector it must be the case that:

$$S - I = dFA - dFL \tag{19}$$

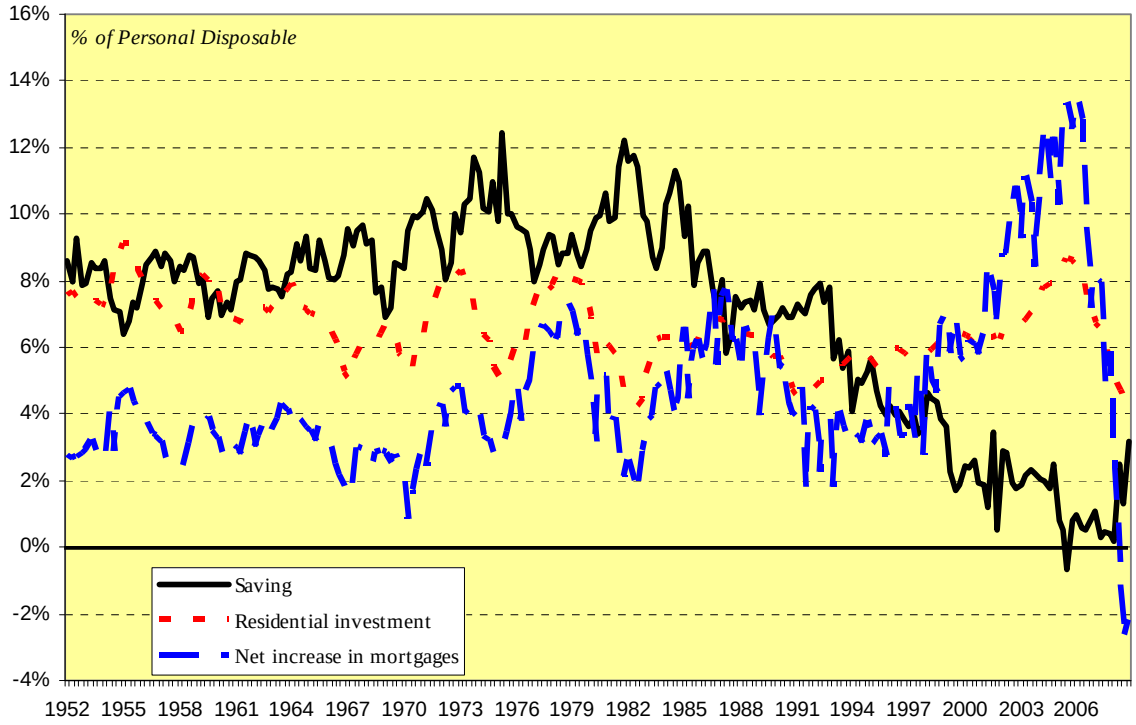
or

$$S + dFL = I + dFA \tag{20}$$

where (20) has the sources of funds on the left-hand side—saving plus borrowing—and the uses of funds on the right-hand side—investment in physical capital plus acquisition of financial assets.

It is interesting to look at the historical performance for the United States of all variables in equation (18). Starting from the personal sector, figure 7 reports saving, residential investment, and the net change in mortgages.

Figure 7. Household Saving, Investment, and Borrowing



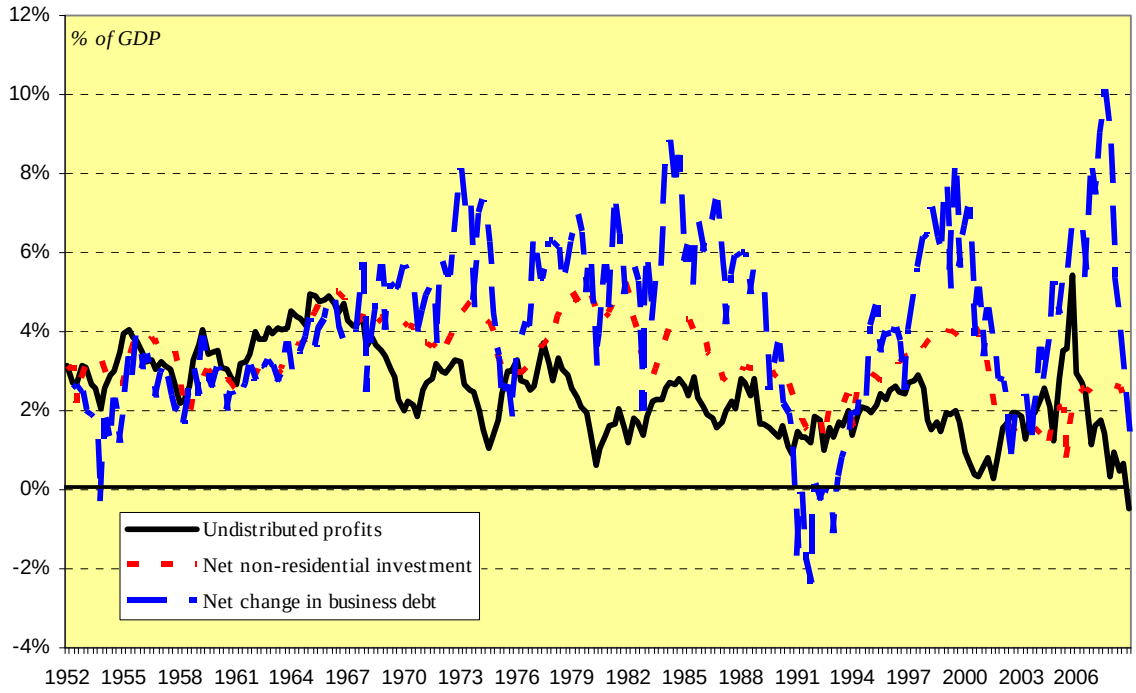
Sources: B.E.A. and the Federal Reserve

Some stylized facts emerge from figure 7: 1) the saving rate for the personal sector has declined steadily from 1985; 2) as saving declines, the share of residential investment financed by borrowing has increased; 3) in 2000s, the value of new mortgages had exceeded the value of residential investment; 4) the magnitude of the drop in borrowing in the current crisis is unprecedented.

Before the housing bubble burst, several commentators argued that the increase in home prices was not a "bubble," but rather the consequence of market mechanisms that were reducing credit rationing, allowing more households to allocate their expenditure optimally,

and the rise in the relative price of homes was thus the consequence of a process of efficient allocation of resources. The fact that the change in mortgages exceeded residential investment shows instead the characteristic features of a speculative bubble, where speculators borrow to buy assets against self-fulfilling expectations of increases in asset prices—that is, until expectations are reversed.[13]

Figure 8. Business Profits, Investment, and Borrowing

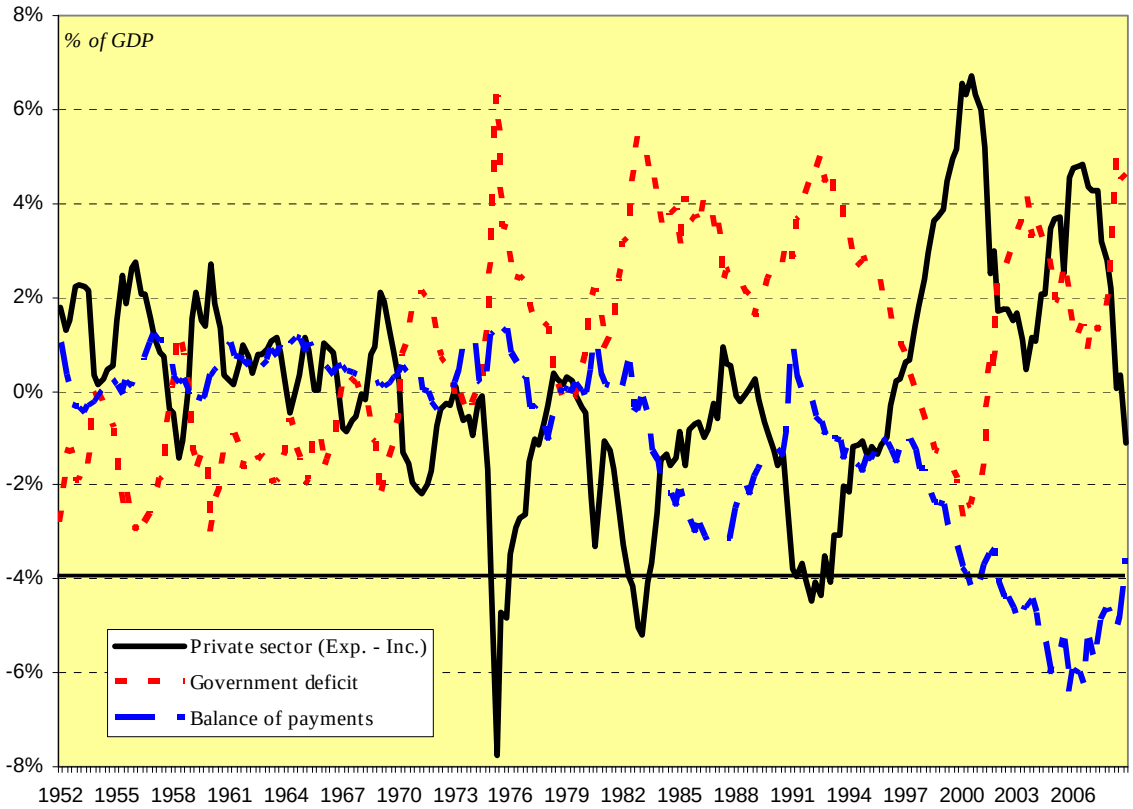


Sources: B.E.A. and the Federal Reserve

In figure 8 we report a comparable picture for the nonfinancial corporate sector. Profits cover a substantial portion of investment,[14] with the remaining funds acquired through borrowing. It is interesting to note that in the last five years or so the increase in business borrowing was not matched by an increase in investment: this is one part of the "financialization" process, where firms borrowed to invest in financial assets—to buy back their own equities or get equity shares in other businesses.

[13] See Shaikh et al. (2003: 6) for our early warnings about problems in the housing market.
[14] In our recent econometric estimates for model development, undistributed profits are a key determinant of business investment.

Figure 9. U.S. Main Financial Balances



Source: B.E.A.

The graph in figure 9 reports the financial balance for the private sector as a whole, together with the financial balances of the other two sectors of the economy. Balances behavior seems to differ from an initial period, characterized by a moderate, stable surplus in the current account balance and a surplus in government budget. We can read the balances as net contributions to aggregate demand, implying that in the 1950s and 1960s, demand was mainly driven by net exports and investment. In the next period, the government budget turned into a deficit, the private sector went into surplus, and the current account balance started to deteriorate: fiscal policy was a net contributor to aggregate demand. In the 1990s, the private expenditure increased again relative to income and the current account balance worsened. As we have seen, fiscal policy partly offset the rise in domestic demand up to the 2001 recession and then turned expansionary to counter the drop in domestic demand.

The analysis of financial balances in figure 9 can be developed along three different lines.

1. First of all, as we have discussed, a positive balance implies that, for that sector, injections exceed leakages, so that that sector is a net contributor to aggregate demand. Since the sum of all balances is always zero, GDP growth can be compatible with *any* combination of financial balances.

2. Movements in the balances signal an increase (decrease) of injections against leakages. If any of the sectors changes its balance, this will have consequences on the growth rate, as well as being reflected on other balances. For instance, an improvement in the foreign balance—generated, say, by a devaluation—will increase GDP, reduce government deficit, and increase saving against investment. An increase in private expenditure over income will also increase GDP and reduce government deficit, but will make the current account balance worse. Analysis of movements in the balances can thus help understanding the trajectory of the economy.

3. Financial balances imply an accumulation of net financial assets. Whenever a balance is in negative territory, it can thus be interpreted as the net increase in debt, which may be unsustainable above a given threshold.

A first approach to the levels and the dynamics of balances is linked with "New Cambridge." In the 1970s, Godley and associates[15] adopted the balances approach as the basis for a model of the UK economy. As we noted, the approach was unconventional, since it merged households and business, analyzing the private sector as a whole.

The "New Cambridge Hypothesis" was that NAFA—the net acquisition of financial balances for the private sector as whole—was stable, relative to GDP, and any shock to this stable assets/income ratio would be corrected rather quickly.

The implication of this hypothesis was a "twin deficits" result, i.e., any imbalance in the foreign account was matched by an imbalance in the government account. In the face of a crisis that called for expansionary fiscal policy on Keynesian lines, it was thus necessary to adopt measures to counter the implied widening of the current account imbalance. Such measures could be exchange rate devaluation or protectionism.

[15] See Cripps and Godley (1976). See Mata (2006) for a nice reconstruction of the debate on the "New Cambridge Hypothesis" at the time.

The "New Cambridge Hypothesis" was grounded in empirical results, which did not hold in the following years, so that the approach was progressively abandoned and basically neglected until Godley's work at The Levy Economics Institute of Bard College started to gain ground for its merits in providing a consistent explanation of the evolution of the U.S. economy.

At least two research groups have been investigating the economics of financial balances, grounding their work on Godley's approach.

Hatzius, at Goldman Sachs, has modeled financial balances through an error correction approach towards a long-run equilibrium, which is determined by financial variables. In his approach, the private sector balance depends on an indicator for the equity market, an indicator for the housing market, and an indicator for the corporate credit spread (Hatzius 2005: 12).[16] He claims that his model has good short-run forecasting properties, as movements of balances away from equilibrium seem to be leading indicators for the business cycle.

Taylor and associates[17] have also been investigating financial balances, without developing a full model, but analyzing the relation of each balance to the business cycle and against each other. Their results are quite relevant to the current debate, which sometimes uses financial balances to address the effects of fiscal policy. For instance, Fama uses the identity connecting financial balances to claim that "[t]he added (government) debt absorbs savings that would otherwise go to private investment" (Fama 2009). The idea that any increase in government deficit implies a change in the opposite direction for the private sector balance is identified in DeLong (2009) with the "Treasury view" that Keynes opposed. This idea has been proposed again in a more sophisticated form through the Ricardian equivalence, which claims that any increase in government deficit will be discounted by the private sector, generating complete crowding out.

Barbosa-Filho et al. (2006)—among others—show that the Ricardian equivalence approach has no empirical ground, although its proponents still use it[18] to claim that fiscal policy will not be effective for boosting aggregate demand, even in periods of rising unemployment.

[16] Hatzius (2003) has a model where the household and corporate financial balances are treated separately, with the same methodology.
[17] See Barbosa-Filho et al. (2006 and 2007). See also Taylor (2004).
[18] See Barro (2009) and J.B. Taylor (2009).

We finally want to discuss the relation of financial deficits to the corresponding stock of net liabilities. Abstracting from capital gains, the dynamics of debt, D, is increased by a deficit, DEF, according to:

$$D_t = D_{t-1} + DEF_t \tag{21}$$

Dividing through by GDP, and using lower-case letters to denote variables as a share of GDP, we get:

$$d_t - d_{t-1} = def_t - \frac{g}{1+g} \cdot d_{t-1} \tag{22}$$

where g is the growth rate in nominal GDP. The stock of debt is increasing, as a share of GDP, whenever:

$$def_t > \frac{g}{1+g} \cdot d_{t-1} \tag{23}$$

which gives a useful expression to evaluate the sustainability of financial balances and, therefore, of growth trajectories. For instance, if the stock of debt is 100 percent of GDP, any deficit above the GDP growth rate will result in ever-increasing debt/GDP, which will eventually trigger a crisis.

Inspection of financial balances is therefore useful to quickly evaluate whether a deficit is getting to "excessive" levels and the underlying stock of debt may become unsustainable.

But when is debt unsustainable?[19] A rise in debt implies an increase in the risk of default and larger interest payments as a share of income. The public sector should be better equipped to cope with this, especially when the central bank is willing to finance any new debt that is not absorbed in the market.

[19] A more sophisticated analysis of debt sustainability can be developed taking interest rates into account, and standard specifications usually show that debt will rise as a share of output whenever the interest rate is larger than the growth rate, with a primary deficit equal to zero. We do not follow these lines since we are interested here in directly comparing financial balances to debt accumulation.

For similar reasons, the United States is able to finance a growing external debt, as long as the world is willing to accept U.S. dollars as a reserve currency. Private sector debt is more prone to trigger a crisis and we therefore believe it is better—in the current crisis—to substitute private debt with public debt through fiscal expansion.

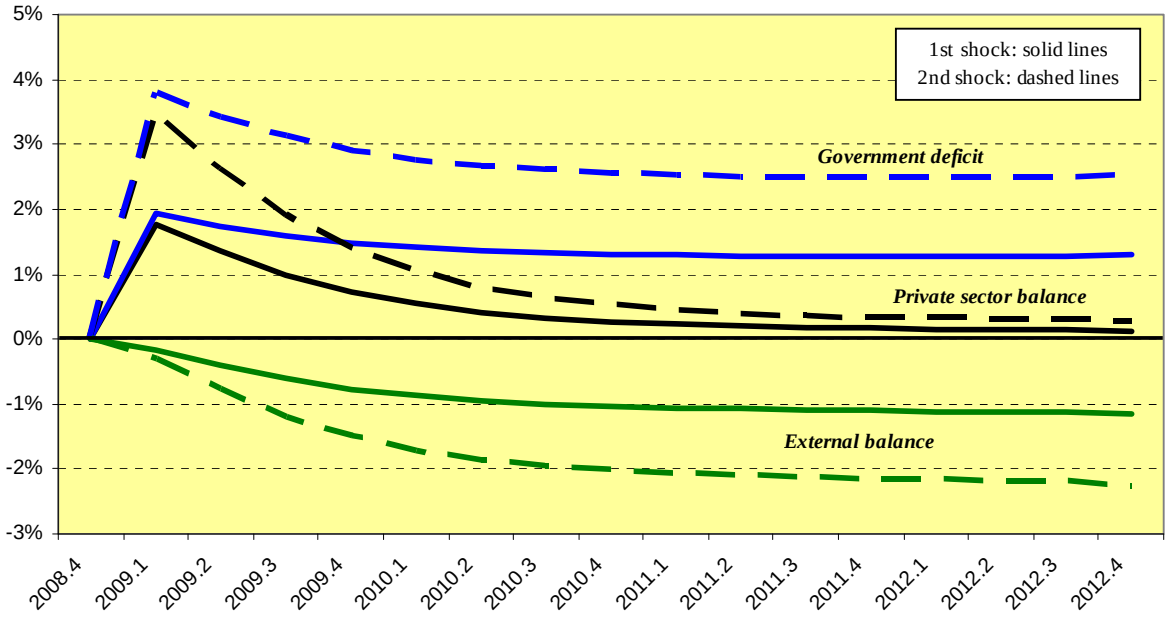
5. FISCAL POLICY IN THE LEVY MODEL

Our latest exercise in estimating the effects of fiscal policy with the Levy model has been recently presented in Godley, Papadimitriou, and Zezza (2008) and Papadimitriou (2009). We are interested here in the effects of an increase in fiscal deficit over the other financial balances. In our exercise, we explore the effects of two shocks to government outlays—both expenditure and transfers—where the second shock is twice the first, and compare our results with a baseline projection.[20]

Results for the impact on balances—compared to the baseline—are reported in figure 10. We note that in the long run the private sector balance tends to revert to its baseline value, so that a shock to government deficit has an impact on foreign deficit of almost equal proportions.

[20] The magnitude of the smaller shock, and its composition, are loosely based on the Obama plan circulating in January 2009, see Romer and Bernstein (2009).

Figure 10. Effects of a Fiscal Stimulus on Financial Balances



Source: Author's calculations

Our model therefore respects the "New Cambridge Hypothesis," but only in the medium term. Any fiscal expansion will result in a wider external deficit, therefore fiscal policy in the United States alone will not solve, but may worsen, the problem of global financial imbalances. Coordinated international efforts are required for fiscal expansion in surplus countries and/or a realignment of exchange rates.

6. CONCLUSIONS

This paper has explored the main properties of the Levy macroeconomic model for the United States, which has proven to be a useful tool to track the evolution of the U.S. economy in the medium term.

We have shown the relation of the model to the "New Cambridge" school and discussed the implications for the analysis of the financial balances of the private, government, and foreign sectors. We have briefly presented our interpretation of the evolution of the U.S. economy in the last 15 years, claiming that it has been driven by domestic demand financed by borrowing, thus generating a rising debt-to-income ratio for the private sector, which would sooner or later trigger a crisis.

Finally, we have discussed how financial balances can be used to assess the role of fiscal policy. Our empirical results show that government expenditure can and should play a role in sustaining aggregate demand when either the private or the foreign sectors are shrinking. In our approach, however, fiscal policy will generate larger external deficits in the medium term, which should be countered through additional policy intervention.

Our current line of research aims at developing a more disaggregated model, where households and nonfinancial businesses are tackled separately to verify if results obtained modeling the private sector as a whole still hold.

REFERENCES

Akerlof, G.A. 2007. "The Missing Motivation in Macroeconomics." *American Economic Review* 97(1): 5–36.

Barbosa-Filho, N., C. Rada, L. Taylor, and L. Zamparelli. 2006. "Fiscal, Foreign, and Private Net Borrowing: Widely Accepted Theories Don't Closely Fit the Facts." Anais do XXXIV Encontro Nacional de Economia, 177, ANPEC—Associação Nacional dos Centros de Pósgraduação em Economia.

————. 2007. "Cycles and Trends in U.S. Net Borrowing Flows: Pro-Cyclical Household Net Borrowing, Counter-Cyclical Government, Consumption and the Current Account, and Elusive Twin Deficits." Working Paper 2007-5. New York: The New School for Social Research, Schwartz Center for Economic Policy Analysis (SCEPA).

Barro, R.J. 2009. "Government Spending Is No Free Lunch." *Wall Street Journal*, January 22, available at: http://www.economics.harvard.edu/faculty/barro/files/WSJ_09_0122_GovSpendingNoFreeLunch.pdf

Cripps, F., and W. Godley. 1976. "A Formal Analysis of the Cambridge Economic Policy Group Model." *Economica* 43(172): 335–348.

Cynamon, B.Z., and S.M. Fazzari. 2008. "Household Debt in the Consumer Age: Source of Growth—Risk of Collapse." *Capitalism and Society* 3(2).

DeLong, J.B. 2009. "The Modern Revival of the 'Treasury View'." January 18, available at: http://braddelong.posterous.com/delong-the-modern-revival-of-t

Fama, E. 2009. "Bailouts and Stimulus Plans." January 13, available at: http://www.dimensional.com/famafrench/2009/01/bailouts-and-stimulus-plans.html

Godley, W. 1999. "Seven Unsustainable Processes." Strategic Analysis, January. Annandale-on-Hudson, NY: The Levy Economics Institute of Bard College.

Godley, W., and A. Izurieta. 2002. "Strategic Prospects and Policies for the U.S. Economy." Strategic Analysis, January. Annandale-on-Hudson, NY: The Levy Economics Institute of Bard College.

Godley, W., and M. Lavoie. 2006. *Monetary Economics: An Integrated Approach to Credit, Money, Income, Production, and Wealth.* Houndsmills, Baskingstoke, UK: Palgrave Macmillan.

Godley, W., D.B. Papadimitriou, G. Hannsgen, and G. Zezza. 2007. "The U.S. Economy: Is There a Way Out of the Woods?" Strategic Analysis, November. Annandale-on-Hudson, NY: The Levy Economics Institute of Bard College.

Godley, W., D.B. Papadimitriou, and G. Zezza. 2008. "Prospects for the United States and the World: A Crisis That Conventional Remedies Cannot Resolve." Strategic Analysis, December. Annandale-on-Hudson, NY: The Levy Economics Institute of Bard College.

Hatzius, J. 2003. "The Private Sector Deficit Meets the GSFCI: A Financial Balances Model of the U.S. Economy." Global Economics Paper No. 98, September 18. London: Goldman Sachs.

————. 2005. "The Private Sector Deficit: Déjà Vu All Over Again." U.S. Economic Analyst No. 05/32, August 12. London: Goldman Sachs.

————. 2006. "Private Sector Deficit Starts to Weigh on Growth." U.S. Economic Analyst No. 06/39, September 29. London: Goldman Sachs.

————. 2008. "Macro Policy in a Liquidity Trap." U.S. Economic Analyst No. 08/46, November 14. London: Goldman Sachs.

Mata, T. 2006. "The importance of being Cambridge: Old school, new school and Cambridge journal in the 1970s." Delivered at the 11th Annual European Conference on the History of Economics, October 19–21, available at: http://economix.u-paris10.fr/pdf/colloques/2006_ECHE/Mata.pdf

Papadimitriou, D.B. 2009. "Global Imbalances: Strategic Prospects for the U.S. and the World." *Intervention* 6(1): 55–62.

Papadimitriou, D.B., G. Zezza, and G. Hannsgen. 2006. "Can Global Imbalances Continue? Policies for the U.S. Economy." Strategic Analysis, November. Annandale-on-Hudson, NY: The Levy Economics Institute of Bard College.

Pesaran, M.H., Y. Shin, and R.J. Smith. 2001. "Bounds testing approaches to the analysis of level relationships." *Journal of Applied Econometrics* XVI(3): 289–326.

Romer, C. and J. Bernstein. 2009. "The Job Impact of the American Recovery and Reinvestment Plan." Available at: http://otrans.3cdn.net/45593e8ecbd339d074_l3m6bt1te.pdf (accessed 6/21/2009).

Shaikh A.M., D.B. Papadimitriou, C.H. Dos Santos, and G. Zezza. 2003. "Deficits, Debts, and Growth: A Reprieve but Not a Pardon." Strategic Analysis, October. Annandale-on-Hudson, NY: The Levy Economics Institute of Bard College.

Stiglitiz, J.E. 2008. "Towards a General Theory of Consumerism: Reflections on Keynes' *Economic Possibilities for Our Grandchildren*." in G.S. Becker, L. Becchetti, and W.J. Baumol (eds.), *Revisiting Keynes: Economic Possibilities for Our Grandchildren.* Cambridge, MA: MIT Press.

Taylor, L. 2004. *Reconstructing Macroeconomics: Structuralist Proposals and Critiques of the Mainstream.* Cambridge, MA: Harvard University Press.

Taylor, J.B. 2009. "How Government Created the Financial Crisis." *Wall Street Journal,* February 9.

Wolf, M. 2008a. “Obama’s economic challenges.” *Financial Times*, November 11.

————. 2008b. “Global imbalances threaten the survival of liberal trade.” *Financial Times*, December 2.

Zezza, G. 2007. “The U.S. Housing Market: A Stock-Flow Consistent Approach.” *Ekonomia* X(2), forthcoming.

————. 2008. “U.S. Growth, the Housing Market, and the Distribution of Income.” *Journal of Post Keynesian Economics* 30(3): 379–405.

APPENDIX. The Econometrics of Private Expenditure

One among the possible linearizations of our private expenditure equation is the following, estimated with Eviews vers.6:

Dependent Variable: D(PE)
Method: Least Squares
Date: 22/02/09 Time: 19:58
Sample (adjusted): 1970:3 2007:4
Included observations: 150 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PE(-1)	-0.342899	0.037269	-9.200641	0.0000
YD(-1)	0.273551	0.033706	8.115865	0.0000
FA(-1)	0.042468	0.007146	5.942782	0.0000
PFA(-1)	3.076543	0.386320	7.963711	0.0000
PH (-1)	3.082319	0.879336	3.505282	0.0006
DBH(-1)	0.197673	0.028628	6.904996	0.0000
DBB(-1)	0.111728	0.020148	5.545388	0.0000
D(PE(-1))	0.202948	0.058231	3.485207	0.0007
D(YD)	0.421597	0.043817	9.621739	0.0000
D(DBH)	0.165243	0.027161	6.083927	0.0000
D(DBB)	0.081859	0.024156	3.388801	0.0009
C	-186.2441	37.48880	-4.967993	0.0000

R-squared	0.725933	Mean dependent var	48.02400
Adjusted R-squared	0.704087	S.D. dependent var	49.80985
S.E. of regression	27.09549	Akaike info criterion	9.513230
Sum squared resid	101314.8	Schwarz criterion	9.754081
Log likelihood	-701.4922	Hannan-Quinn criter.	9.611080
F-statistic	33.22974	Durbin-Watson stat	1.974629
Prob(F-statistic)	0.000000		

Where:

- PE = private expenditure at chained 2000 prices;
- YD = private disposable income at chained 2000 prices;
- FA = the opening stock of financial assets, deflated by the PE deflator. The stock of financial assets is the sum of government debt (obtained cumulating government deficits from a benchmark value) and foreign net assets (obtained cumulating the current account balance from a benchmark value);
- PFA = S&P 500 index, deflated by the PE deflator;
- PH = the Realtor.org index for the median price of existing single-family homes, deflated by the PE deflator;
- DBH = the change in household debt outstanding, deflated by the PE deflator;
- DBB = the change in business debt outstanding, deflated by the PE deflator.

The equation implies the following long-rung relation:

```
PE = 0.798·YD + 0.124·FA + 8.972·PFA + 8.989·PH + 0.576·DBH + 0.326·DBB
    (0.027)    (0.023)    (0.585)     (2.638)    (0.070)     (0.045)
```

where numbers in parenthesis are standard errors.

Although our long-run relation cannot be identified as a cointegrating vector with the Johansen approach, it passes the cointegrating test in the ARDL approach (Pesaran, Shin, and Smith 2001).

We checked the equation for weak exogeneity of income and borrowing, using as instruments for income: the lagged value of income; the lagged value of GDP growth in U.S. trading partners; the lagged value of the federal fund rate; the lagged value of the indirect tax rate, government expenditure, and transfers; and the lagged value of foreign inflation. Instruments for both borrowing variables were their lagged values. Our equations pass the test for weak regressors and the Wu-Hausman test for exogeneity confirms that all variables can be treated as weakly exogenous.