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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

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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

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Abstract Trend and cyclical patterns of household, business, government, and foreign net borrowing shares of GDP are reviewed using diagrams and covariance decompositions of the identity stating that the sum of the shares equals zero. Household and business net borrowing shares and thereby those sectors' contributions to effective demand are pro-cyclical. Household borrowing is led by residential investment. Household consumption varies counter-cyclically but it is offset by rising taxes as opposed to saving, suggesting that the "consumption-smoothing" featured in much macro theory is not empirically important. Pro-cyclicality of private net borrowing is countered by a counter-cyclical government deficit along traditional lines. In terms of trends, "twin" fiscal and foreign deficits appear infrequently, with the household and external deficits much more closely related. The former is linked to a strong upward trend in health care spending as a share of disposable income.

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This paper is about patterns of net borrowing by major "institutional sectors" in the U.S. economy – households, the rest of the private sector or "business," government, and the rest of world – and their relationships with post-WWII business cycles and salient trends. Godley and Cripps (1983) were among the first contemporary macroeconomists to emphasize the significance of net borrowing flows. But the crucial "adding-up" restriction (2) below follows directly from Keynes's (1936) identification of national income with national output (or saving with investment after all other income and outlay flows are netted out) which he may have borrowed in part from institutionalist national accountants such as Wesley Clair Mitchell and Colin Clark (Mirowski, 1989). Adding-up ultimately dates to the invention in 12th century Venice of double-entry bookkeeping, codified by the mathematician Luca Pacioli late in the 15th century.

In the discussion to follow, we begin with net borrowing algebra and statistics, and then go on to a graphical analysis of the history since the 1950s. "Headlines" about the main results are presented, with statistical analysis of trends and cycles in subsequent sections.

1. Net Borrowing Algebra and Statistics

For any group i of economic actors, an excess of their current expenditures (E_i) for consumption, investment, and other uses over their income (Y_i) must be "financed" by higher net liabilities (increases in total liabilities minus total assets). Equivalently, they have to borrow to pay for their investment (I_i) less saving (S_i). So their net borrowing (NB_i) can be estimated by using either expenditure and income (or investment and saving) flows appearing in the national income and product accounts (NIPA) or changes in financial positions from the flows of funds (FOF). In

this paper we concentrate on numbers emerging from the NIPA.[1] A sector makes a positive contribution to effective demand if its net borrowing exceeds zero.

In algebra, the value of net borrowing by sector i is

$$NB_i = E_i - Y_i = I_i - S_i = -NL_i \qquad (1)$$

where NL_i is the sector's net lending. The adding-up restriction mentioned above is

$$\sum_i NB_i = 0 \qquad (2)$$

where we measure all flows in current prices.

For the U.S. it makes sense to separate business from household borrowing flows because their trend and cyclical patterns differ. Unfortunately the published accounts do not provide an explicit breakdown of investment expenditures on the part of the two components of the private sector.[2] One way to get around this problem is to assume that all residential investment is done by households and non-residential investment by business. This assumption does not depart too far from the truth and allows analysis to proceed.[3]

Restriction (2) permits useful elementary statistical analysis. To illustrate, suppose that two or more variables x_i sum to zero,

$$\sum_i x_i = 0 \qquad . \qquad (3)$$

[1] FOF and NIPA estimates of net borrowing differ from one another for technical reasons as well as unavoidable errors and omissions. The biggest discrepancy is for non-financial business and may amount to 10% of that sector's gross saving (Taylor 2004).

[2] All saving and investment numbers examined in this paper are "gross" in the sense that a more or less arbitrary estimate of capital stock depreciation is not subtracted from them. After such a subtraction, U.S. "net" personal saving is often negative, a statistical artifact widely publicized in the media.

[3] Residential investment by business is well less than a hundred billion dollars per year or one percent of GDP. Magnitudes of net borrowing flows by sectors are on the order of hundreds of billions of dollars per year, or a few percent of GDP.

Let the covariance of any two of the variables be given by γ_{ij}, so the variance of x_i is γ_{ii}. If $\sigma_i = \sqrt{\gamma_{ii}}$ the correlation coefficient of variables i and j is $\rho_{ij} = \gamma_{ij} / \sigma_i \sigma_j$.

With restriction (3) in effect, we have

$$Var(\sum_i x_i) = 0 = \sum_i \gamma_{ii} + 2\sum_{i<j} \gamma_{ij} \quad . \tag{4}$$

It will also be true that

$$\sum_i \gamma_{iz} = 0 \tag{5}$$

for any variable z (one of the x_i or an indicator of the business cycle, for example). Restated in terms of correlation coefficients (5) becomes

$$\sum_i \rho_{iz} \sigma_i = 0 \quad . \tag{6}$$

As will be seen, (5) or (6) provides a convenient decomposition of the effects of changes in net borrowing flows on one another. Positive and negative covariances must be mutually offsetting.

In one specific example, if $z = x_i$ then (5) can be restated as

$$\gamma_{ii} = -\sum_{j \neq i} \gamma_{ji} \quad . \tag{7}$$

The right-hand side shows the contributions (with a minus sign) of the covariances of x_i with the other x_j toward "explaining" its own variance. This equation is useful in assessing the twin deficit hypothesis regarding foreign net borrowing, and similar causal assertions. Additional decompositions can be derived by substituting (5) into (4) and rearranging terms.

2. Patterns in the Data

In this section we briefly review the general patterns of U.S. net borrowing following WWII and summarize our observations in headline form. The stories (including statistical analyses) attached to the headlines are set out in the following sections.

Figure 1 is complicated but summarizes a lot of information. It shows how quarterly net borrowing flows relate to one another and to the overall business cycle. Borrowing levels are shown as ratios to GDP[4] and oscillate roughly in a range from -7% to +7%. The shaded areas cover the time periods between real output peaks and troughs of NBER reference business cycles. Evidently, trough-to-peak cyclical expansions identified by the NBER methodology last longer than recessions.

Figure 1 here.

Looking first at broad trends, a few patterns (or lack of same) stand out:

The U.S. usually ran a current account surplus (positive foreign net borrowing with the U.S. lending to the rest of the world) until around 1980 when the economy embarked upon an external deficit with a strongly increasing trend after 1991. The transient external recovery beginning in the mid-1980s was due to dollar devaluation (the Plaza accords), a recession, and American export of military services during the Gulf War. It did not persist.

Before 1980, increasing household net lending (more negative levels of net borrowing across business cycles) offset the mildly upwardly trended government and business deficits to support the surplus on current account. Thereafter, although the fiscal position certainly mattered, rising

[4] Figure 1 retains the same patterns if the borrowing flows are normalized by trend GDP.

household deficits maintained a steadier relationship with the almost uninterrupted decrease in foreign net borrowing. As discussed in sections 2 and 3, statistical tests indicate that personal net borrowing was the main domestic counterpart to foreign net lending in the latter part of the 20th century. One underlying factor appears to have been substantial increases in household expenditures on services in general, and health care in particular.

Clear visual coincidences of movements in the government and foreign deficits only occurred during the Reagan and (second) Bush presidencies. Despite its endless invocation in policy discussion, the "twin deficits" theory of the balance of payments seems to apply for limited periods at most.

Turning to cycles, it appears that especially prior to 1980 household borrowing *led* the business cycle. Increasingly negative net borrowing (higher net lending) occurred during or just after recessions with borrowing going up (lending dropping off) ahead of the cyclical peak. Relative to GDP, households acquired more net financial assets at the bottom of the output cycle, and less near the top.

The implication is that the covariance of the household net borrowing share and capacity utilization (actual GDP divided by its Hodrick-Prescott trend) is strongly positive, a result that runs distinctly counter to the notion of "consumption-smoothing" built into a big swath of macroeconomic theory.[5] The presence or absence of "expenditure-smoothing" is a more relevant

[5] Consumption-smoothing was not a major theme in the *General Theory,* but Keynes thought it "probably" would happen: "The marginal propensity to consume is not constant for all levels of employment, and it is probable that … when real income increases … the community will wish to consume a gradually diminishing proportion of it" (Keynes, 1936, p. 120). Similar notions carried into post-WWII consumption theories – Duesenberry's (1949) ratchet effects, life cycle models à la Modigliani and Brumberg (1954), and Friedman's (1957) permanent income hypothesis – and on through rational expectations into Ricardian Equivalance and contemporary real business cycle theory.

issue, but it has not been widely discussed because economists have tended to ignore capital formation by households. In fact, residential investment is a key contributor to pro-cyclical household net borrowing.

Like households in the US, business sets its net borrowing levels pro-cyclically. However, non-residential investment and business saving track together much more closely than the corresponding flows for households. Throughout the post-war period, troughs in business net borrowing shares tended to coincide with or lag output troughs, while maximum shares overlapped with or led output peaks. Movements in both investment and saving by business contributed to this rather strong correlation.

Unsurprisingly, U.S. current account surpluses (or at least lower current account deficits in the recent period) appeared to track output troughs and analogously, peaks in foreign net lending shares occurred close to output peaks in the U.S. The lengths of the lags, however, were quite variable across cycles. For that reason, pro-cyclical foreign net borrowing does not show up strongly in the statistical analysis presented below.

So where does all this leave government net borrowing? From equations (1) and (2) it must be equal in magnitude with opposite sign to the sum of household, business, and foreign flows. If all three vary pro-cyclically then as a "theorem of accounting" the fiscal deficit must be counter-cyclical, in line with the government's traditional function of stabilizing output fluctuations by operating on aggregate demand (under Keynesian assumptions, at least!).

Most contemporary macro models consolidate households and business into a portmanteau private sector. Figure 2 shows how private and government net borrowing flows have varied over time. Consistent with the household behavior discussed above, increases in private net borrowing shares lead the cycle. The fiscal deficit share drops off as output rises, with the peak in net borrowing typically occurring at the beginning of cyclical recoveries. Automatic stabilizers (including lower tax revenues and rising transfers to households which partially counter their pro-cyclical behavior) help explain this phenomenon. Lows in government net borrowing shares coincide with or lead the output peak, as the tax take rises.

Figure 2 here

The bottom line is that fluctuations in private and public net borrowing offset one another, but *not* for the reasons emphasized by rational expectations and Ricardian equivalence doctrines. The private sector does not appear to smooth its spending while the fiscal deficit moves counter-cyclically as traditionally it should. The upshot is the pattern shown in Figure 2. Moreover, the two domestic sectors' net borrowing flows do not cancel one another fully. As noted above, lending to the U.S. from abroad appears to be weakly pro-cyclical.

These observations suggest the following headlines:

From the perspective of received macro theory, the biggest story is that household and business net borrowing are *not* counter-cyclical (although household consumption is). After an analysis of trends in the data in sections 3 and 4, covariance analysis of household cycles is presented

in section 5. To flesh out the story, we also look into sources and uses of household disposable income and the relationship of disposable income to GDP.

As discussed in section 6, oscillations of both investment and saving contribute to the pro-cyclicality of business net borrowing. Increases in foreign net borrowing lag the cycle while decreases lead (weakly in both directions).The balancing counter-cyclicality of government net borrowing is the topic of section 7.

In terms of trends, household and foreign net borrowing flows tend to be mutually offsetting, as discussed in section 3.

As a consequence, "twin" foreign and government deficits do not show up prominently in the data. This finding is the major policy headline, and is discussed in section 4.

Finally, recent econometrics (Barbosa and Taylor,2006; Chiarella et. al., 2005) suggests that effective demand in both the U.S. and (Western) "European" economies is "profit-led" How this result may (or may not) square with our observation that demand is "household net borrowing-led" is the topic of section 8.

3. The Household-Foreign Connection

We begin with an analysis of the apparent trends after the early 1980s in household and foreign net borrowing (with positive and negative slopes respectively). They can be investigated statistically in several ways. We discuss whether there were breaks in trend for the two series in the early 1980s, and then take up factors underlying the rise in household net borrowing.

A first question is whether the series of borrowing flows normalized by current GDP are stationary. Over the entire sample period 1947-I to 2004-II an augmented Dickey-Fuller test

suggests that business and government net borrowing are stationary (P-values close to zero) while household and foreign net borrowing are integrated of order one (P-values 0.18 and 0.57 respectively).

Were there statistically significant breaks in the household and foreign series in the early 1980s? Standard methods do not seem very helpful in determining just *when* a break in trend may have occurred, but can be used to investigate the significance of changes at a certain time. For convenience, we selected a possible break point as 1983-I during the period 1954-2004 (to avoid the effects of post-WWII macro instability). We used a dummy variable to allow for changes in the constant and a deterministic trend in a vector error correction model for household and foreign net borrowing. Following standard selection criteria, the model was estimated with four lags.

The Johansen cointegration tests on the trace and maximum eigenvalue were performed. The former indicated that there is one cointegrating equation at the 1% level, and the latter signalled two cointegrating equations at the 5% level.

Finally, Chow tests applied to the two series separately did not reject the hypotheses of breaks at time 1983-I.

The presence of breaks in the two series therefore cannot be rejected – statistically there *was* a change in the patterns of foreign and household net borrowing after the early 1980s. What can we say about causal factors? There has been enormous debate about whether the U.S. current account deficit has been the result of factors internal to the economy or whether it was "imposed" from abroad.

One line of argument for external causality resembles "Dutch disease" analysis of the effects of resource bonanzas. American fiscal and monetary stances are allegedly aimed at keeping the level of economic activity high. A passive exchange rate policy has led to a strong dollar which stimulates imports and holds exports down (Wolf 2005). *Domestic* policy choices supposedly have combined to allow the external deficit to drive the other net borrowing flows. A global "saving glut" has been the external force driving the deficit up (Bernanke, 2005).

But what do the glut (if it exists) and a strong exchange rate have to do with household net borrowing? To the extent that foreign demand for American liabilities stimulated the stock market and housing booms of the recent period by bidding down borrowing costs and boosting asset prices, lower household saving and higher debt could have been a consequence. However, it is hard to understand how the rest of the world was the principal cause of the bubbles. And as we will see in section 4, shifts in household saving have not been major contributors to changes in net borrowing.

On the other hand, other domestic factors have contributed to the trend in household net borrowing. Figure 3 shows, for example, that both disposable personal income and household consumption rose sharply as shares of GDP after the early 1980s.

Figure 3 here

Among categories, decreases in spending shares of durable (slightly) and non-durable consumption have been more than offset by increasing consumption of services. The most important contributor has been consumption of medical services. As shown in Figure 4, it rose from around

8% to 12% of total consumption after 1980. Cost was a major factor in driving up outlays for health. From values of 100 in 1983, price indexes for medical care rose to well over 300 in 2005 while the overall consumer price index only went to about 180.

One cannot argue that cost-driven increases in health spending were the unique driving force behind the worsening trade deficit, but they and other internal factors must have played significant roles.

Figure 4 here

4. Twin Deficits?

Equation (7) provides a direct test of the twin deficit hypothesis that fiscal and foreign net borrowing are closely related (with the former presumably causing the latter, although as we have seen causality is extremely difficult to detect in net borrowing data). For the 1954-2004 sample period, (7) for the variance of foreign net borrowing (X 1000) can be written as

$$0.261 = -(-0.18 - 0.0643 - 0.0167)$$

where the covariances between foreign borrowing and household, government, and business borrowing are displayed from left to right. Household net borrowing is clearly the major contributor to "explaining" the variance of foreign borrowing, with government a distant second and business nearly irrelevant.

One cannot readily test the statistical significance of covariances, but it is easy for correlation coefficients between foreign and other net borrowing flows (always normalized by current GDP).

The numbers are household, -0.584; government, -0.204; business, -0.006. The first two are significantly different from zero, but again government takes the secondary role.

Two further tests can be considered. A "strong" version of the twin deficits hypothesis would be that household and business net borrowing should have zero covariances with past and future values of foreign net borrowing. The contrary appears to be the case:

(i) The covariances between the government and foreign net borrowing are negative for all leads and lags (up to six quarters both ways) *but*

(ii) The covariances between household and foreign net borrowing are negative for all lead-lag definitions. The numbers are higher in absolute value (usually twice the size) than between the government and foreign net borrowing.

As with the contemporaneous relationship, the correlation coefficients are significant, but the ones for government net borrowing are usually smaller.

Secondly, in light of the results from last section, it is interesting to break the sample in the early 1980s. It turns out that in the second period the negative statistical relationship between the fiscal and foreign deficit disappears (despite President Reagan's famous twins!). It is stronger in the first period, especially with the fiscal leading the foreign deficit. Twin deficit theory appears to be a partial explanation of the foreign deficit only until the early 1980s when the household sector dramatically changed its net borrowing behavior.

5. Pro-cyclical Household Net Borrowing

Now we turn to cyclical behavior of the time series, beginning with the household net borrowing share of GDP. The analysis is based on equations (5) and (6). "Capacity utilization," or

real GDP divided by its trend, is the variable *z*. We focus first on correlograms for the various series, and then take up covariances.

The first column in Table 1 corroborates the evidence from Figure 1. The household net borrowing share of GDP leads capacity utilization with statistically significant positive correlation coefficients. It lags with negative coefficients as net borrowing swings downward during the latter phase of a cyclical output expansion.

Table 1 here

From (1), household net borrowing is equal to investment minus saving. The second column of Table 1 presents lead and lag correlations of capacity utilization with residential investment normalized by personal income. Like net borrowing, investment leads the cycle with statistically significant correlations. It drops off with respect to lagged capacity utilization, with significant coefficients as well. The third column of Table 1 shows that the household saving share is not closely correlated with the cycle. The implication is that the cyclical pattern of household net borrowing is largely driven by residential investment.

With *NB* as household net borrowing and *Y* as personal income, it must be true that $NB/GDP = (NB/Y)(Y/GDP)$. The second-to-last column of Table 1 shows correlations of Y/GDP with capacity utilization. The only significant coefficients point to a decline in the ratio in advance of the cycle, explaining why NB/GDP is slightly more closely related to capacity utilization than NB/Y in the last column.

Table 2 summarizes results from a deeper probe into household behavior, presenting correlation coefficients of leads and lags in capacity utilization with shares of different spending flows in personal income. The first column shows that consumption is smoothed over the cycle, having statistically significant negative correlation coefficients with lagged capacity utilization. But as just noted, a lower consumption share is not offset by more saving (third column of Table 1). The share of taxes (second column of Table 2) swings up pro-cyclically instead. The remaining spending flows (interest payments and "other") do not have significant correlations. The link between lower consumption and higher taxes might be construed as consistent with Ricardian equivalence theories but the absence of a saving response belies that interpretation.[6]

Table 2 here

To illustrate a bit more about income generation, Table 3 gives the correlogram for the sources of personal income. With the only significant correlation coefficients, the wage share of income leads the cycle, consistent with the long-standing observation that real labor payments (however defined in terms of specific income flows) are pro- or at least a-cyclical. Transfer payments are negatively correlated with capacity utilization (all leads and most lags) as might be expected. Despite the fact that the correlation coefficients are not significant, the absolute values of the covariances of transfers with the cycle generally exceed those of wages. So in terms of covariances, pro-cyclical wages are more than offset by counter-cyclical transfer payments.

[6] In any case, direct estimation of consumption functions does not provide support for Ricardian equivalence, e.g. Gale and Orszag (2004).

Dividend, interest, and "other" payments have insignificant correlations and generally smaller covariances with capacity utilization than wages and transfers. Increases in dividends lead capacity utilization and decreases lag. The sign pattern for interest payments is the reverse (falling rates presumably lead capacity and rising rates lag), and other payments are generally counter-cyclical.

Table 3 here

If W stands for wage payments, it will be true that $W/GDP = (W/Y)(Y/GDP)$. With W/Y pro-cyclical and Y/GDP counter-cyclical, the cyclicality of W/GDP cannot be inferred directly. However, as discussed immediately below, a rising non-wage (or profit) share tends to lead the cycle. Some thoughts are presented subsequently about possible relationships among pro-cyclical profits and household net borrowing and counter-cyclical interest rates.

6. Business and Foreign Net Borrowing

Figure 5 depicts time series for business (non-residential) investment, saving, and net borrowing, all normalized by trend GDP. The sector's net borrowing has historically fluctuated in the vicinity of zero, and often by not always varies pro-cyclically. The typical pattern is an increase during an upswing and a decrease during and after NBER recessions. Investment follows a broadly similar pattern (its decline in the late 1980s – leading into the boom of the 1990s -- is something of an aberration).

Business saving typically rises as the economy emerges from recession and stabilizes or declines later in the upswing. The profit share of business value-added (or GDP) drives its

movements. There are many economic theories of profits. For present purposes it is useful to look first at cyclical movements of the wage share, which is equal to the real wage divided by labor productivity. A standard stylized fact is that productivity tends to rise as the business sector passes through a trough and goes into an upswing.[7] Real wage increases usually occur later in an expansion, presumably as the labor market tightens. The labor share first falls after a recession and later rises. An increase in the profit share therefore occurs soon after a recession, followed by a decline. Figure 5 suggests that business saving follows this pattern as well.

Figure 5 here

Table 4 summarizes correlations of the components of business net borrowing with capacity utilization. In the first column, borrowing itself is pro-cyclical aside from negative correlations for relatively distant leads and lags. Consistent with accelerator-based investment theories, the share in GDP of non-residential capital formation lags capacity utilization with positive correlation coefficients and is (weakly) inversely associated with its future movements.

The correlation coefficients for business saving suggest that it tends to fall near cyclical peaks and rise near troughs. With longer leads and lags it is positively associated with the cycle. Such results are consistent with the pattern in Figure 5, where savings peaks during upswings and then drops off as the economy goes into recession.

[7] Again there is no dearth of rationalizations. In the general direction of increasing economic orthodoxy they include (i) variable utilization of inputs over the cycle (in particular "labor hoarding" by firms at cyclical troughs), (ii) widespread imperfect competition and increasing returns, (iii) pro-cyclical technology shocks as in real business cycle models, and (iv) efficiency-enhancing resource reallocations during recessions.

Movements in both saving and investment contribute to the cyclicality of net borrowing, as is evident from the large number of statistically significant correlation coefficients in the table.

Table 4 here

Finally, the last column of Table 4 signals that correlations for foreign net borrowing with the output cycle are relatively weak. It is correlated positively but insignificantly with lags in capacity utilization, and negatively with leads. That is, as in Figure 1, the current account deficit tends to rise as the economy emerges from recession and decline during slumps.

7. Counter-Cyclical Government Borrowing

In line with standard discussions it makes sense to examine net borrowing of the government sector as the difference between expenditures (including investment) and receipts. The correlations appear in Table 5. Recall from Figures 1 and 2 that the government deficit share of GDP varies counter-cyclically, rising during and immediately after recessions and then dropping off.

Consistent with the correlations for taxes on households in Table 2, receipts of the government in the second column are positively correlated with current and immediately lagged capacity utilization. The coefficients for all lags and most leads are positive. As with transfers to households in Table 3 (which in fact account for roughly one-third of government spending, along with similar shares for wages and purchases), expenditures are negatively correlated with current capacity utilization and immediate leads and lags. With significant correlation coefficients in the vicinity of current utilization, government net borrowing follows a similar pattern. Evidently, cycles

in both spending and income contribute to this outcome. Absolute values of covariances of receipts with capacity utilization are usually about 50% greater than covariances of spending.

Table 5 here

Table 6, set up explicitly in terms of covariances (multiplied by 1000) of net borrowing shares as opposed to correlation coefficients, provides another perspective on the counter-cyclical role of the government. The bold-faced entries correspond to significant correlation coefficients in the previous tables. From equation (5) sums of covariances along rows of the table must be equal to zero.

Table 6 here

In the row for current utilization, the government's net borrowing covariance of -0.17 basically offsets positive covariances of 0.055 for households and 0.132 for business respectively. For lags in capacity utilization the government's negative covariances mostly offset pro-cyclical business net borrowing; for leads, household net borrowing takes over business's role. In line with the discussion above, absolute values of covariances for foreign net lending are not very large.

8. Distribution and Demand

Recent econometric literature (Chiarella et. al., 2005; Barbosa and Taylor,2006) suggests that the profit share leads the business cycle for two reasons,. The first is that effective demand itself is "profit-led" in the sense that over the medium term it tends to rise when the profit share increases. Secondly, relatively high (low) economic activity is associated with a low (high) profit share emerging from the real wage and productivity dynamics sketched above. The outcome is a counter-

clockwise damped distributive-demand oscillation in the (capacity utilization, wage share) plane, similar to Goodwin's (1967) famous growth cycle.

Figure 6 presents profit share fluctuations together with household net borrowing shares for the U.S. economy. While the two series do not overlap, their general cyclical similarity is visually striking. Moreover, being led by residential investment, household net borrowing is responsive to counter-cyclical fluctuations in the real interest rate. Working out these relationships in detail will be the goal of future research.

Figure 6 here

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Table 1: Correlations between household NB/GDP, I/Y, S/Y, Y/GDP, and NB/Y, and dated levels of capacity utilization

	NB_{HH}/GDP	I_{HH}/Y	S_{HH}/Y	Y/GDP	NB_{HH}/Y
Capacity (-6)	-0.1196	**-0.250***	0.016	0.0905	-0.120
Capacity (-5)	-0.1362	**-0.269***	0.0291	0.0761	-0.140
Capacity (-4)	-0.1176	**-0.250***	0.0216	0.0389	-0.124
Capacity (-3)	-0.0871	**-0.173***	0.0289	-0.0021	-0.098
Capacity (-2)	-0.0177	-0.048	0.0146	-0.0587	-0.033
Capacity (-1)	0.084	0.112	-0.0204	-0.13	0.066
Capacity	**0.1625***	**0.266***	-0.0336	**-0.1823***	0.143
Capacity (1)	**0.214***	**0.363***	-0.0484	**-0.167***	**0.198**
Capacity (2)	**0.2426***	**0.389***	-0.0719	**-0.1501***	**0.230**
Capacity (3)	**0.2339***	**0.361***	-0.0795	-0.1203	**0.225**
Capacity (4)	**0.2145***	**0.306***	-0.0866	-0.0958	**0.208**
Capacity (5)	0.1547	0.225*	-0.0588	-0.0751	0.149
Capacity (6)	0.0831	0.153	-0.0145	-0.0537	0.078

* indicates significance at 10 % level

Table 2: Correlations between shares of personal income uses and dated levels of capacity utilization

	Consumption/Y	*Taxes/Y*	*Interest/Y*	*Other/Y*
Capacity (-6)	-0.0909	0.1191	0.0243	0.0124
Capacity (-5)	-0.1387	0.1803	0.026	0.0002
Capacity (-4)	**-0.1636***	0.2378	0.023	-0.0192
Capacity (-3)	**-0.1914***	**0.2773***	0.0155	-0.0427
Capacity (-2)	**-0.1795***	**0.2823***	0.0068	-0.0465
Capacity (-1)	-0.1352	**0.2648***	-0.0004	-0.0493
Capacity	-0.091	**0.2141***	-0.009	-0.0532
Capacity (1)	-0.0438	0.1541	0.0025	-0.0763
Capacity (2)	0.015	0.089	0.0127	-0.0851
Capacity (3)	0.0656	0.0135	0.0199	-0.0912
Capacity (4)	0.1053	-0.0456	0.0288	-0.0942
Capacity (5)	0.1077	-0.0979	0.0402	-0.0896
Capacity (6)	0.0875	-0.1394	0.0557	-0.0862

* indicates significance at 10 % level

Table 3: Correlations between shares of personal income sources and dated levels of capacity utilization

	Wages / Y	*Dividends / Y*	*Interest / Y*	*Transfer / Y*	*Others / Y*
Capacity (-6)	-0.0391	-0.0364	0.0109	0.0441	-0.0145
Capacity (-5)	-0.0118	-0.0514	0.0112	0.0303	-0.0143
Capacity (-4)	0.0103	-0.0684	0.0102	0.0109	-0.0083
Capacity (-3)	0.0429	-0.0758	0.0092	-0.0119	-0.0048
Capacity (-2)	0.0818	-0.067	0.0063	-0.038	-0.0022
Capacity (-1)	0.1378	-0.0516	0.0005	-0.068	-0.0019
Capacity	**0.1825***	-0.0265	-0.0068	-0.0937	-0.0005
Capacity (1)	**0.2201***	-0.0025	-0.0049	-0.107	-0.0091
Capacity (2)	**0.245***	0.009	-0.0086	-0.1163	-0.0111
Capacity (3)	**0.222***	0.0182	-0.017	-0.1025	-0.0072
Capacity (4)	**0.1733***	0.0216	-0.0201	-0.075	-0.005
Capacity (5)	0.1205	0.0222	-0.0155	-0.043	-0.0084
Capacity (6)	0.0843	0.0272	-0.0029	-0.0148	-0.0205

*indicates significance at 10 % level

Table 4: Correlations between business investment, saving, net borrowing, and foreign net borrowing shares of GDP with dated levels of capacity utilization

	NB_{BUS} / *GDP*	I_{BUS} / *GDP*	S_{HH} / *GDP*	For NB
Capacity(-6)	-0.0547	0.0607	0.1103	0.0763
Capacity(-5)	0.0353	0.1264	0.0675	0.0873
Capacity(-4)	**0.1607**	**0.1936**	-0.0125	0.0824
Capacity(-3)	**0.3213**	**0.2466**	**-0.1426**	0.0631
Capacity(-2)	**0.4437**	**0.2657**	**-0.2597**	0.0217
Capacity(-1)	**0.5047**	**0.254**	**-0.3358**	-0.0281
Capacity	**0.4949**	**0.1935**	**-0.3758**	-0.0649
Capacity(1)	**0.3598**	0.1144	**-0.2952**	-0.1017
Capacity(2)	**0.1844**	0.0339	**-0.1721**	-0.1165
Capacity(3)	0.0183	-0.0322	-0.0469	-0.1188
Capacity(4)	-0.1238	-0.07	0.076	-0.1204
Capacity(5)	**-0.2026**	-0.0867	0.1476	-0.1261
Capacity(6)	**-0.2166**	-0.0878	**0.1618**	-0.1448

Table 5: Correlations between government expenditure, receipts, and net borrowing shares of GDP with dated levels of capacity utilization

	$Expenditure_{GOV}/GDP$	$Receipts_{GOV}/GDP$	NB_{GOV}/GDP
Capacity(-6)	0.0607	0.0315	0.0703
Capacity(-5)	0.054	0.0551	0.032
Capacity(-4)	0.0325	0.0865	-0.041
Capacity(-3)	-0.001	0.1244	-0.1423
Capacity(-2)	-0.0388	0.151	**-0.2384**
Capacity(-1)	-0.0714	**0.163**	**-0.3088**
Capacity	-0.0865	**0.1584**	**-0.3299**
Capacity(1)	-0.0589	0.1388	**-0.2596**
Capacity(2)	-0.0225	0.1036	**-0.1563**
Capacity(3)	0.0115	0.0533	-0.0402
Capacity(4)	0.0494	0.0145	0.0698
Capacity(5)	0.0888	-0.0115	0.168
Capacity(6)	0.1213	-0.0303	0.2461

Table 6: Covariances between net borrowing shares of GDP and dated levels of capacity utilization (X 1000)

	NB_{HH}/GDP	NB_{FOR}/GDP	NB_{GOV}/GDP	NB_{BUS}/GDP
Capacity(-6)	-0.0424	0.022	0.0361	-0.015
Capacity(-5)	-0.0449	0.025	0.0145	0.0097
Capacity(-4)	-0.0364	0.0234	-0.0242	**0.0437**
Capacity(-3)	-0.0264	0.0179	**-0.0727**	**0.087**
Capacity(-2)	-0.0037	0.0061	**-0.12**	**0.12**
Capacity(-1)	0.0296	-0.0079	**-0.15**	**0.136**
Capacity	**0.0548**	-0.0182	**-0.17**	**0.132**
Capacity(1)	**0.0724**	-0.0285	**-0.14**	**0.0966**
Capacity(2)	**0.0824**	-0.0328	**-0.0988**	**0.05**
Capacity(3)	**0.0798**	-0.0336	-0.051	0.005
Capacity(4)	**0.0734**	-0.0342	-0.0059	-0.0336
Capacity(5)	0.0531	-0.0359	0.0378	**-0.0553**
Capacity(6)	0.0285	**-0.0413**	**0.0719**	**-0.0593**

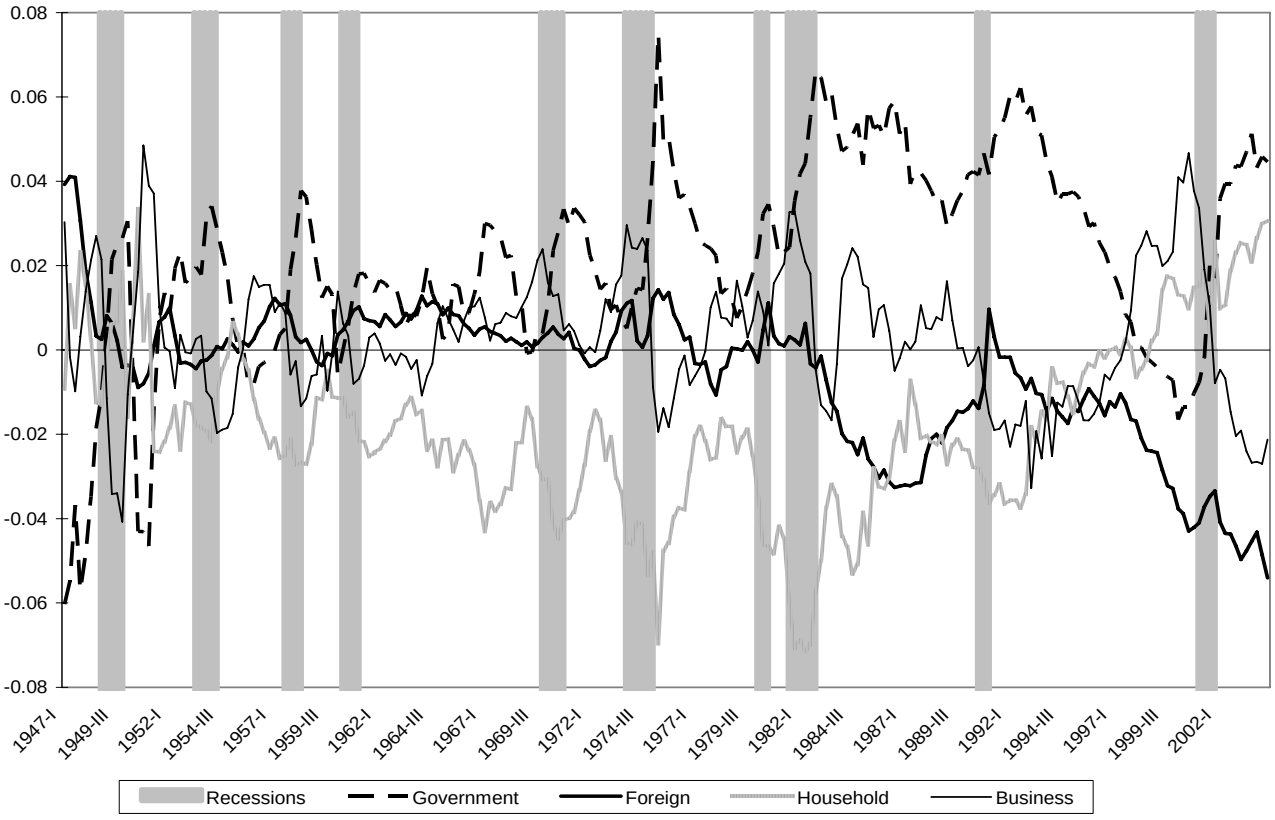

Figure 1: Net borrowing flows normalized by trend GDP and NBER reference cycles

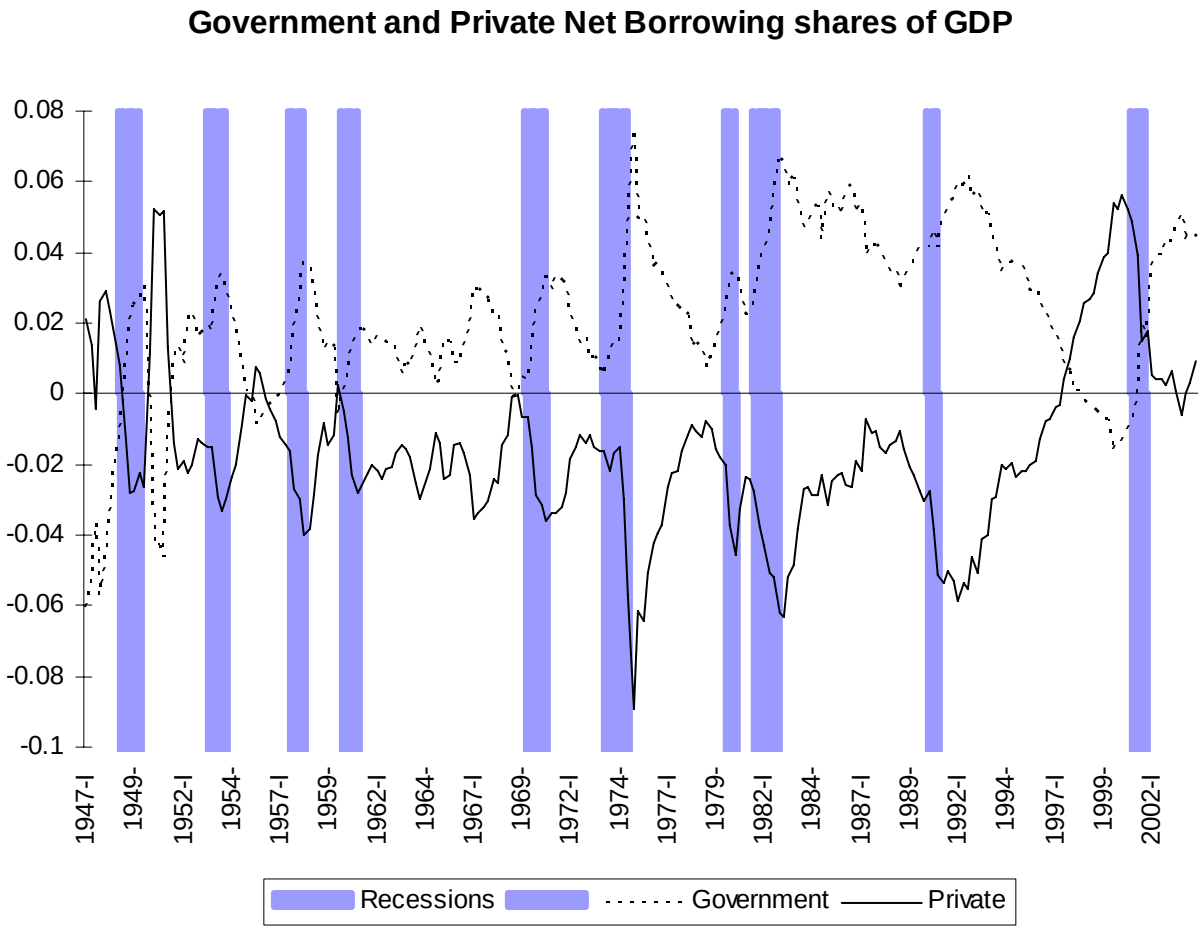

Figure 2: Government and private net borrowing normalized by trend GDP.

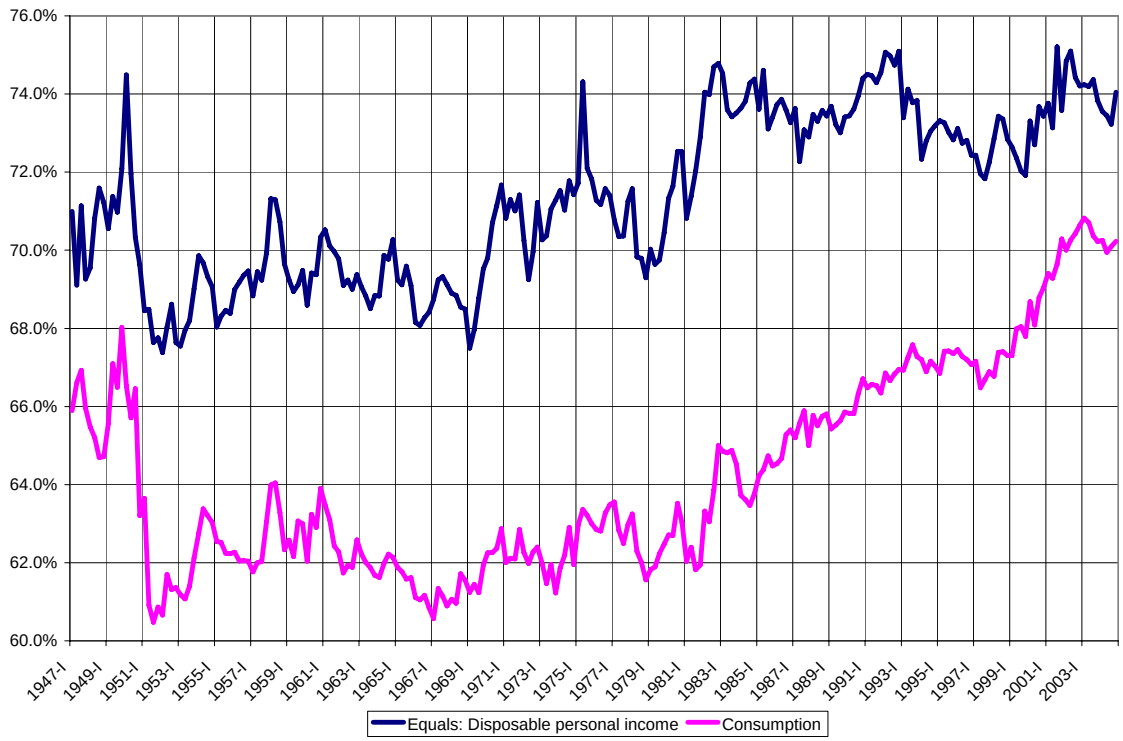

Figure 3: Disposable personal income and household consumption as shares of GDP

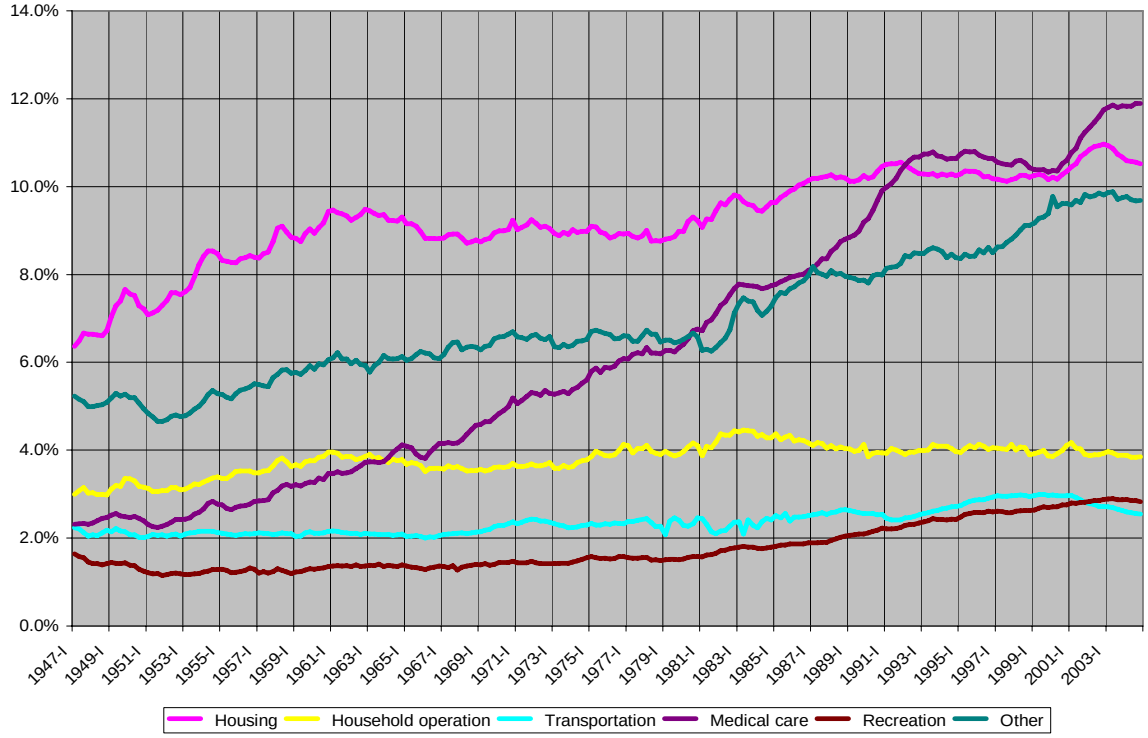

Figure 4: Main components of consumption of services

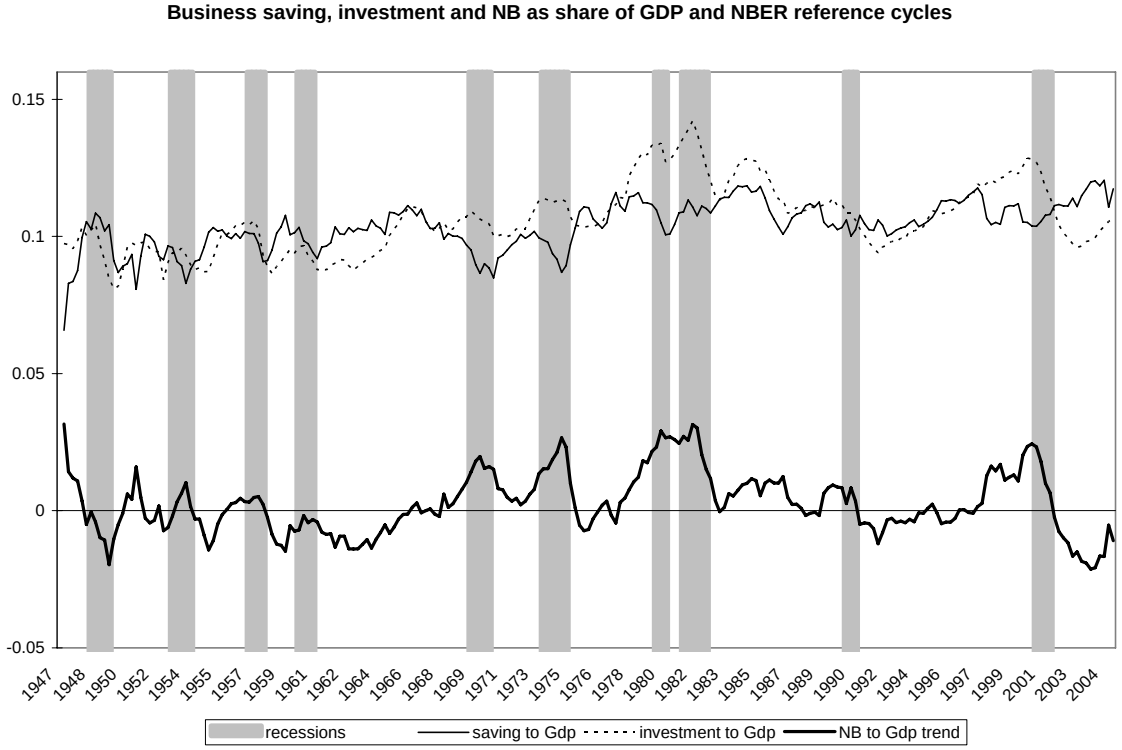

Figure 5: Business saving, investment, and net borrowing normalized by trend GDP

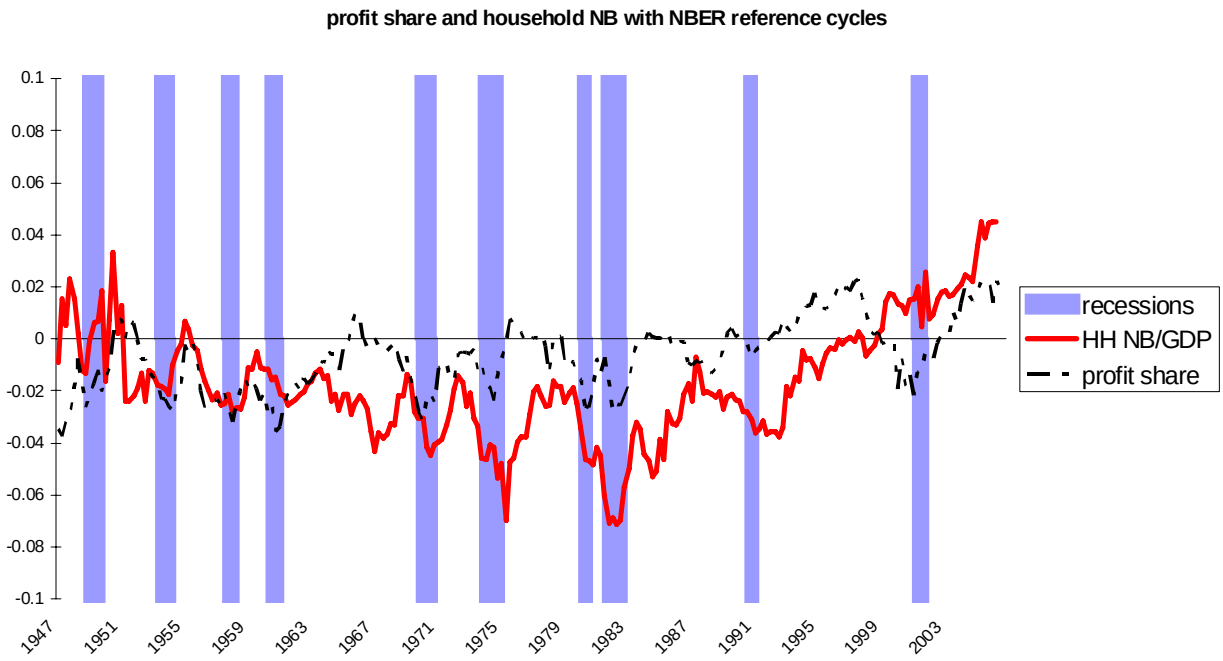

Figure 6: Profit share of business income and household net borrowing share of GDP.