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**The “Natural” Interest Rate and Secular Stagnation:
Loanable Funds Macro Models Don’t Fit Today’s Institutions or Data***

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The main point of this paper is that loanable funds macroeconomic models with their “natural” interest rate don’t fit with modern institutions and data. Before getting into the numbers, it makes sense to describe the models and how to think about macroeconomics in the first place.

Today’s “New Keynesian” orthodoxy says that short- to medium-run performance is determined by interest-sensitive “loanable funds.” Unimpeded interest rate adjustment should support robust macroeconomic equilibrium. Examples include the (visibly non-existing) “zero lower bound” on rates that allegedly holds down saving and contributes to secular stagnation, the global “savings glut” keeping market rates near zero, and the “dynamic stochastic general equilibrium” (DSGE) models beloved by freshwater economists and central banks in which investment is determined by saving as a function of financial return.¹

Loanable funds doctrine dates back to the early nineteenth century and was forcefully restated by the Swedish economist Knut Wicksell around the turn of the twentieth (with implications for inflation not pursued here). It was repudiated in 1936 by John Maynard Keynes in his *General Theory*. Before that he was merely a leading post-Wicksellian rather than the greatest economist of his and later times.

Macroeconomic models are built around assumptions about behavior imposed upon accounting relationships such as value of output (or demand) = cost of output (which generates income) and value of assets in a balance sheet = value of liabilities + net worth. Keynes said that changes in income dominate in making sure that the first accounting balance is satisfied. He switched Wicksell’s assumptions about macro causality – or, in the jargon, the “closure” of the model – to fit his understanding of the system. New Keynesian economists reswitch the closure back to Wicksell.

Institutions have evolved since Wicksell and Keynes were writing – the welfare state materialized and international trade expanded. Both thought, correctly for their times, that most

saving comes from households and most investment is done by business. Unlike Keynes, Wicksell argued that “the” interest rate as opposed to the level of output adjusts to assure macro balance. If potential investment falls short of saving, then the rate will, maybe with some help from inflation and the central bank, decrease. Households will save less (and possibly also run up debt to buy into a financial bubble as prior to 2007) and firms seek to invest more. The supply of loanable funds will go down and demand up, until the two flows equalize with the interest rate at its “natural” level.

In New Keynesian thinking, demand for investment can be so weak and the desire to save so strong that the natural rate lies below zero. The “distortion” imposed by the zero lower bound short-circuits the adjustment process, leading to calls for central banks to raise their inflation targets to reduce the “real” interest rate (nominal rate minus inflation). More straightforward interventions such as restoring American labor’s bargaining power so that rising wages can push up prices from the side of costs, expansionary fiscal policy, or redistributing from the top one percent to households in the bottom half of the income size distribution whose saving rates are negative are apparently impossible for “political” reasons.

Numbers for households and business

Because saving is a residual quantity in ways to be discussed, loanable funds theory is not consistent with contemporary data on the composition of gross domestic product (GDP). To begin to see why, we can look at simplified numbers for 2014 from the Bureau of Economic Analysis national accounts for income and outlays of US households and corporate business. The estimates are expressed in trillions of current dollars. They are presented with one digit after the decimal point (one hundred billion dollars) and minor items are left out, so they don’t quite add up.

Household income		Household outlays		Business income		Business outlays	
Production	11.7	11.9	Consumption	Production	4.0	0.6	Taxes
Gov. trans.	2.5	3.0	Taxes	Fin. trans.	2.3	3.5	Fin. trans.
Fin. trans.	2.0	0.3	Fin. trans.	RoW trans.	0.4	0.2	RoW trans.
		0.9	Saving			2.4	Saving
	16.2	16.1			6.7	6.7	

The sectors receive incomes from participation in the process of production (wages, profits, etc.) and transfers (pensions, health insurance, etc.) from government at all levels, and from and to the rest of the world (or RoW). The American economy is heavily financialized, with large flows of interest and dividend payments across all sectors. Details about sector-to-sector payments are not presented. Rather, each sector is treated as making transfers into a fictional accounting sector, which then pays all the money back out. Overall, some sectors gain and others lose but you can't see the counter-parties.

The biggest contributions to household income come from production. Labor compensation of 9.3 includes wages (7.9) and supplements (1.4) such as payments from employers for pensions including social security, medical and other insurance, etc. Wages and supplements account for 80% of the total of 11.7. Other flows tied to production include proprietors' incomes, rents, depreciation, etc. Non-production related transfers make up 28% of the grand total of 16.2. Payments from government are at 16%. Interest and dividends make up 12%.

Households get a net financial transfer of 1.7 ($= 2.0 - 0.3$). The sum of the transfer and business saving of 2.4 is close to profits of 4.0 so essentially all earnings are retained or paid out to (mostly rich) households. Capital gains due to price increases of real estate and corporate equity are *not* included in national income accounts because they do not figure into the cost of production. In a typical year they exceed business saving. Via interest, dividends, and capital gains, profits are more than transferred to households. Around 70% of gains flow to the richest one percent.

On the spending side, household consumption exceeds income from production. Households also spend on income and employment taxes (the latter essentially offset supplements to wages). They make transfers (mostly mortgage interest) to finance. Saving is the difference between incoming and outgoing payments flows 15 times its size. As such, it is bound to be difficult to estimate and to fluctuate over time. Consumption, especially of durable goods, does appear to be somewhat sensitive to interest rates. So saving must respond as well. The problem is that the relationship is bound to be erratic – the saving tail cannot wag the consumption dog.

Business earns 4.0 in profits, and makes large transfers to and from the financial sector and the rest of the world. After the transfers and paying taxes, it saves 2.67 times as much as households. How the interest rate is supposed to affect this saving flow is obscure. Contrary to loanable funds doctrine, a *higher* rate might in fact *reduce* saving by forcing business to increase financial transfers to other sectors.

Government and the rest of the world

The data for government and the rest of the world are also of interest:

Government income		Government outlays		RoW income		RoW outlays	
Indirect tax	1.1	2.6	Consumption	US imports	2.9	2.3	US exports
Household tax	3.0	2.5	H'hold trans.	Bus. trans.	0.2	0.4	Bus. trans.
Business tax	0.6	0.6	Fin. trans.	Fin. trans.	0.5	0.5	Fin. trans.
Depreciation	0.5	-0.3	Saving			0.4	Saving
Fin. trans.	0.1						
	5.3	5.4			3.6	3.6	

A first point is that government and RoW are quantitatively as important as business in the macro scheme of things.

Second, as with business, a higher interest rate could reduce government saving by pushing up outgoing financial transfers.

Finally, because Keynes argued that prices and rates of return to assets are *not* determined by *flows* of loanable funds he had to come up with another closure for financial

markets. He insisted that holdings of assets and liabilities must come into balance via changes in prices and returns in markets for their *stocks*.

Foreign exchange is an important example, with demands for domestic and foreign obligations largely determined by interest and exchange rates. An increase in demand by the rest of the world for liabilities issued by the home country should lead to increases in their prices. A floating exchange rate would tend to appreciate and/or interest rates (inverse to asset prices) would fall. Over time, the stronger currency would hold down home exports and boost imports – an adverse shock to aggregate demand.

These linkages are complicated and easily disturbed. They operate over different time frames. Stocks of financial claims held by home and RoW can cross borders in microseconds; international trade flows take weeks or months to adjust. This system does not provide a reliable foundation for a natural interest rate. As discussed below, international portfolio shifts *may* affect the interest and exchange rates, with unpredictable implications.

Initial quantification

An illustration of irrelevance of the natural rate is provided by the simplest Keynesian model of output determination. It states that output (say real GDP) is the ratio between total demand “injections” (household and business investment, government spending on goods and services, and exports) and the sum of demand-reducing “leakage rates” from private sector saving, taxes, and imports. The familiar multiplier is the inverse of this sum.

For 2014, sectoral average leakage rates (or ratios to GDP) were household saving, 0.05; business saving, 0.14; taxes, 0.28; and imports, 0.17. The total is 0.64, implying a multiplier of 1.56. This number is in the ballpark with the currently popular value of 1.5. It is mostly determined by leakages for taxes and imports – both are unlikely to be sensitive to the interest rate.

Figure 1 shows that both saving and investment shares of households are fairly stable. Saving did not soar in the 1980s when interest rates were high nor plummet with low rates in recent years. The flows for business fluctuate across the cycle, with relatively small differences between investment and saving.

Figure 1

More complicated output determination

Using a modicum of algebra, a slightly fancier approach is to ask how sectors would contribute to demand as output hypothetically varies. Define leakage rates as λ_h for households, λ_b for business, λ_g for government, and λ_r for RoW

Corresponding injections are expenditures on goods and services including investment levels I_h and I_b for households and business respectively; the sum G of government's current and capital spending (but not transfers); and E for exports. In the first formula just below,

$$(I_h - \lambda_h X) + (I_b - \lambda_b X) + (G - \lambda_g X) + (E - \lambda_r X) = Total(X) = 0 \quad (1)$$

each term in parentheses represents *net borrowing* by the corresponding sector (with X as total output or GDP). Interpreting the flows is straightforward. The only tricky part is that if the home country has a balance of payments surplus, $E - \lambda_r X > 0$, then the rest of the world must be borrowing from it. Since around 1990, $(E - \lambda_r X) < 0$ for the USA.

Setting the sum of the flows, or $Total(X)$, to zero determines the level of output. A positive net borrowing flow means that the corresponding sector is stimulating effective demand; a negative flow signals retardation. As output rises, net borrowing flows go down from levels set by injections until stimulus and retardation balance.²

Referring just to investment and saving, Keynes (1939) wrote that “Increased investment will always be accompanied by increased saving, but it never can be preceded by it.... [C]redit expansion provides not an alternative to increased saving, but a necessary preparation for it. It is the parent, not the twin, of increased saving.” If “investment” is replaced by “injections” and “saving” by “leakages,” the quotation is a succinct description of the formula above.

Figure 2 for “Counter-cyclical net borrowing” shows the situation for the USA in 2014. At the observed GDP level of 17.35 (where the “Total” line crosses the horizontal axis at point A) the government contributes positively to effective demand. Because the other sectors have negative net borrowing (positive net lending), government demand floats the GDP boat. As functions of X , all borrowing flows go down as the economy expands so in this model they are counter-cyclical. A shift upward of any schedule will raise total net borrowing and increase output.³

Figure 2

So what do loanable funds and the natural rate have to do with this diagram? Not very much. As discussed above, a fall in the interest rate might hold down saving by households and stimulate their residential investment. But the level and shallow slope of the household net borrowing schedule suggest that the impact on output would be modest. An upward shift of business net borrowing caused by higher investment would add stimulus. But there is little evidence that business capital formation responds strongly to the interest rate.

Figure 2 depicts a thought experiment in which potential shifts in output away from point A set off responses that drive it back. If total net borrowing exceeds zero at a level of X below (to the left of) A, then along Keynes's lines output will rise back up. The national accounts are constructed on the assumption that injections equal leakages – the numbers say that the economy is always at a position such as A.

Observed net borrowing trends

Figure 3 illustrates an accounts-based way of looking at the system. The four sectoral curves show levels of net borrowing added to current real output. The output curve itself threads the needle among the net borrowings, increasing at an approximate rate of 2.3% per year over the period in the chart. If one of those schedules were to shift, then output would adjust – again as suggested by Keynes. Changes in the interest rate might move one or another borrowing curve, but are not central to the story.

Figure 3

Borrowing flows during the Great Recession provide a useful illustration. The output curve bent downward in 2007. At the same time, government borrowing rose as tax receipts dropped off and the Obama stimulus kicked in. Household and (especially) business borrowing dropped as saving rates went up in the face of a plummeting interest rate. (The Fed funds rate was slashed by around five percentage points between 2007 and 2009.) Later, they recovered. Borrowing by RoW roughly tracked GDP. Business investment and household saving stabilized as the recession ended (see Figure 1), but the overall impact on the aggregate demand remained small. Applying Occam's Razor suggests that automatic stabilizers and the stimulus package were the key factors in limiting the loss of GDP to a few hundred billion dollars per year and pushing output back toward long-term growth.

International Complications

Macroeconomics describing how two or more countries interact isn't rocket science, but is a lot messier than the single country version. To cope with the details, more abstract discussion than heretofore is required – complicated but not profound. As with rockets, misunderstanding complications at times lead to disaster.

Macro balances in two countries – home (or the “USA”) and RoW (say “China” or “Germany”) – have to satisfy the accounting relationships underlying Figure 2. Double entry bookkeeping between the countries assures that the trade deficit of one will equal the surplus of the other. The “balance of payments” per se is not a binding restriction on either economy.⁴

Postponing loanable funds for the moment, let's stick with Keynes. The natural assumption is that flow output levels in both economies will be determined by effective demand. Presumably, a savings glut would emerge if the RoW saving rate increased. Typical responses would include output reductions in both countries and offsetting increases in the RoW trade surplus and the home deficit. Worldwide output would be held down by Keynes's paradox of thrift. No effect on interest rates so far.

The second component of Keynes's macroeconomics says that interest and exchange rates between the economies are *not* set by loanable funds but rather in markets for stocks of financial claims. At any time, levels of stocks are fixed but their prices and rates of return (which vary inversely) can adjust. Home's net foreign assets (NFA) comprise its holdings of RoW liabilities such as equity and debt minus the value of its own paper held abroad. Home NFA equals RoW net foreign liabilities. Apart from capital gains and losses, home NFA is fixed but decreases over time if there is an external deficit that must be financed by new net sales of home liabilities to RoW.

Valuations are ruled by wealth owners' portfolio preferences. Suppose that “buy side” preferences shift toward home's liabilities and away from RoW's. Claims against the rest of the world will be sold in exchange for home's liabilities. Financial stocks cannot change so that to clear markets, prices for home's paper must rise and returns (including interest rates) to decline. There will be opposite movements in RoW. Home's exchange rate is a crucial asset price. It will tend to strengthen or appreciate.

These responses are straightforward, but can have huge repercussions over time, especially in small vulnerable economies. Cheaper credit may spur output expansion and

accelerate run-ups of prices for real estate and shares, matched by new borrowing to finance the capital gains. Higher GDP along with appreciation can widen the external deficit, to be covered by capital inflows (more purchases of home's liabilities) and falling NFA. Eventually, growing fears of crisis on the part of creditors may lead them to transform home's capital inflows into flight. A reverse switch in portfolio preferences can force home's interest rate to skyrocket. Output levels can crash. Eventually, currency devaluation and rising net exports may help turn the economy around.

Such scenarios played out in the emerging market debt crises between 1970 and 2000, and more recently (but without recovery) in the South of the Eurozone. The USA followed a somewhat similar pattern prior to the 2007 crisis, but added clever innovations. The government and "agencies" such as Fannie Mae instead of the private sector ran up foreign debt. The financial sector created destabilizing derivatives based on rising real estate prices and invented the shadow banking system. After the turn of the century, capital inflows and expansionary monetary policy kept interest rates down and asset prices up. Plummeting housing prices set off the crash of '07, as highly leveraged balance sheets imploded. Eventually, as shown in Figure 3, government net borrowing supported GDP recovery while the private sector saved to restore balance sheets.

Recovery, however, may not have resolved all problems. Post-2007, as shown in Figure 4, foreign claims against the USA have mounted, accompanied by low interest rates and appreciation. Whether this debt bulge will set off adverse reactions remains to be seen.

Figure 4

What pushes what?

The most popular alternative to Keynesian open economy analysis is the savings glut theory of interest rates. When it was proposed in 2005, Bernanke's model reflected American paranoia about the Chinese trade surplus at the time, said to be supported by cheap labor, weakened exchange rates, export subsidies, and financial interventions aimed at channeling domestic saving toward acquisition of US liabilities. More recent versions attribute the foreign surplus to Germany – directly to its own trade performance and indirectly through its political role in pushing austerity with falling outputs and deficits in Southern Europe.⁵

Then as now, the story goes that a higher American deficit had to be ratified by low interest rates that were “needed” to keep savings low enough and investment high enough to support macro balance as in Figure 2. That is, the RoW net borrowing (NB) schedule shifted downward. Cheaper credit induced the other NB curves to slide upward to maintain macro balance.

For the period prior to 2007, this theory looks superficially correct. After all, foreign NB did fall from around zero in 1990 to minus five percent of GDP just prior to the crisis. After the late 1990s the real five-year T-bond interest rate fell from around five percent to close to zero.⁶ Figure 1 here shows that prior to the crisis there were increases in business and household (residential) investment and a drop in household saving. Bernanke’s correlations were observed. The problem is that the correlations are spurious; the observations are better explained on Keynesian grounds. There are at least three reasons why.

First, the interest rate fell because markets for stocks of bonds and shares transformed. There was slow inflation, bidding down the rate. Financial commentators point to a bond bull market (rising bond prices, falling rates) that began with stabilization in the 1980s. It was aided by the “Greenspan-Bernanke put,” whereby the Fed funds rate was cut whenever the stock market dropped by 20% or so. As pointed out above, such “fast” movements in financial markets do not readily relate to “slow” movements in trade.

Second, household saving rates went down as the bubble in real estate prices was expanding. Rising prices collateralized loans used to buy into the bubble, while Wall Street invented destabilizing derivatives and banks aggressively pushed lending. In that financial environment, increases in households’ debt naturally supplanted saving as their principal source of investable funds.

Finally, the main offsetting shift to the five percentage point fall in foreign NB came from the government. After 2000, it’s borrowing, varying counter-cyclically, rose by roughly the same amount and then dropped off a couple of percentage points. Household NB played a less important role, rising by around three points. Business NB, as usual, fluctuated around zero.

Observed movements in NB flows (especially for government) do not strongly support the assertion that the trade deficit was the key force driving US macroeconomics via interest rate reductions. Spurious correlations notwithstanding, attributing the bubble and subsequent crisis principally to movements in the US foreign trade account is peculiar at best.

Similar observations apply to more recent developments. For example, China's trade surplus persists but asset preferences, in part stoked by local capital flight, have shifted strongly against the renminbi. Attempted sales of renminbi liabilities have provoked pressures for devaluation with associated inflation and real wage cuts. To counter market forces, the People's Bank of China injected around a trillion dollars of reserves (that is, its holdings of the rest of the world's liabilities) into the market during 2016. Loanable funds were almost irrelevant to these events. China's 2016 external net lending of around \$300 billion via the current account was a minor flow in comparison to the central bank's financial interventions.

Conclusion

Wicksell and Keynes unwittingly planted red herrings for future economists by concentrating on household saving and business investment. They did not foresee that trade and government injections and leakages would come to play major roles in determining effective demand. Keynes's signal contribution was to switch the emphasis from interest rate adjustments to changes in income as the key macroeconomic adjustment mechanism. In so doing, he argued that the interest rate and asset prices adjust to clear balance sheets incorporating stocks, *not* flows, of financial claims. He pioneered national income accounting which now reveals the importance of leakages due to business saving, taxes, and imports.

He also invented a macroeconomic sociology of stagnation in which bear speculators forced interest rates to be high in the bond market and high saving "rentiers" held down demand. Today, the wealthy benefit from a big share of profits in GDP based on political wage repression. These profits are more than transferred to households by interest, dividends, and capital gains (with the latter mostly flowing to the rich). Bond price bulls replaced bears. They are supported by low interest rates from the Fed and arguably the RoW savings glut. There has been a realignment of the classes since Keynes's day, but his insight that capitalism favors the rich and tends toward stagnation remains valid.

Writing in the *General Theory* after leaving his Wicksellian phase, Keynes said that "... I had not then understood that, in certain conditions, the system could be in equilibrium with less than full employment....I am now no longer of the opinion that the concept of a 'natural' rate of interest, which previously seemed to me a most promising idea, has anything very useful or significant to contribute to our analysis (pp. 242-43)."

Today's New "Keynesians" have tremendous intellectual firepower. The puzzle is why they revert to Wicksell on loanable funds and the natural rate while ignoring Keynes's innovations. Maybe, as he said in the preface to the *General Theory*, "The difficulty lies, not in the new ideas, but in escaping from the old ones... (p. viii)."

Notes

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1. Lawrence Summers (2014) highlights secular stagnation, acknowledging the idea's Keynesian inspiration in the 1930s. The global savings glut was popularized by Ben Bernanke (2005). Paul Krugman's (2009) blog post on the zero lower bound is one of many based on misrepresentation of the standard IS/LM macro model. For a critique, see Taylor (2014). For authentic Keynesians, DSGE models are beyond the pale.

2. The formula in the text is based on ideas by the late Wynne Godley, although he may not have used its exact formulation. See Wynne Godley and Marc Lavoie (2012).

3. The configuration of the chart is not inevitable. Germany looks like the US with fiscal and foreign roles reversed. A huge demand injection generated by the trade surplus is offset by low borrowing and/or net lending of the other sectors.

4. The accounting and reasoning underlying the discussion here draw on Godley and Lavoie (2012) and Taylor (2008).

5. See Bernanke (2015) for a recent restatement.

6. See Taylor (2010), Figures 5.8, 5.9, and 1.4 for the numbers.

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Figure 1: US private sector investment and saving as shares of current GDP

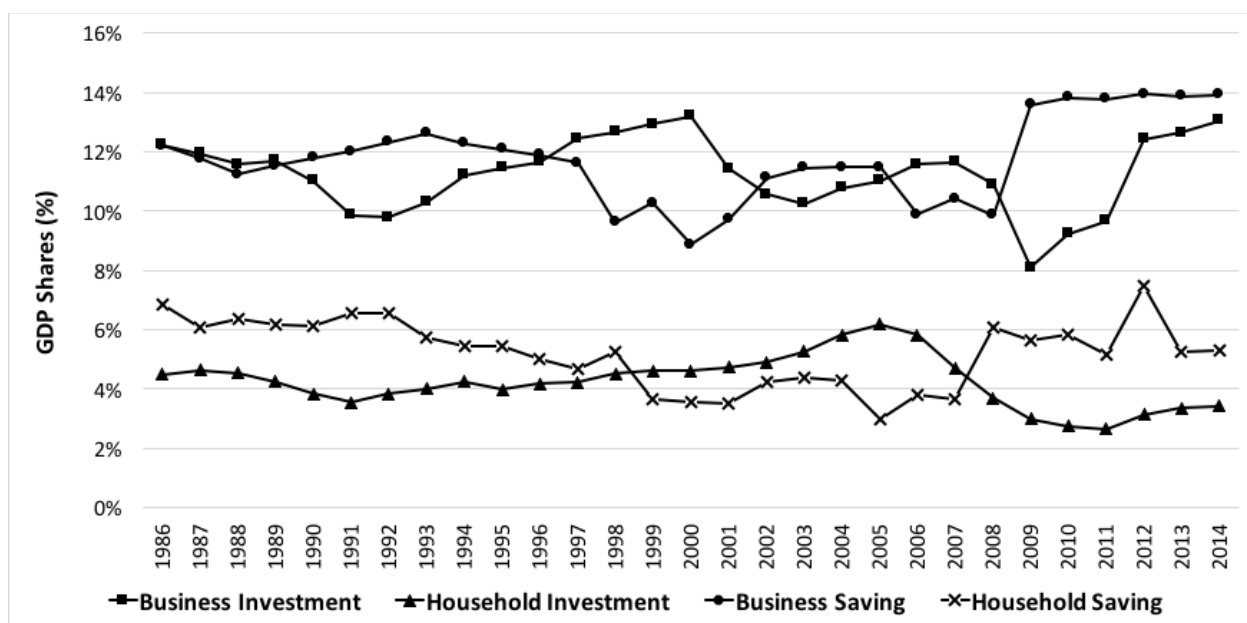


Figure 2: US counter-cyclical net borrowing

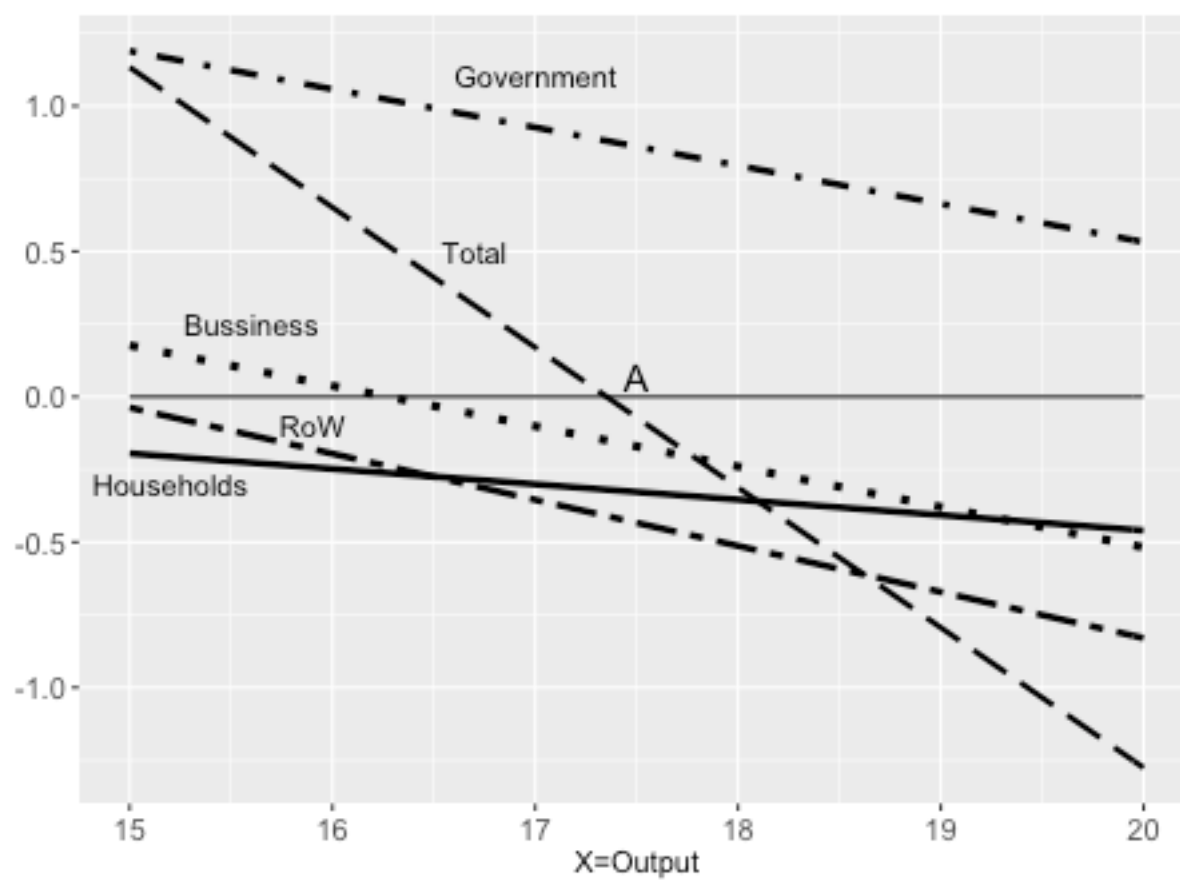


Figure 3: US net borrowing and GDP over time

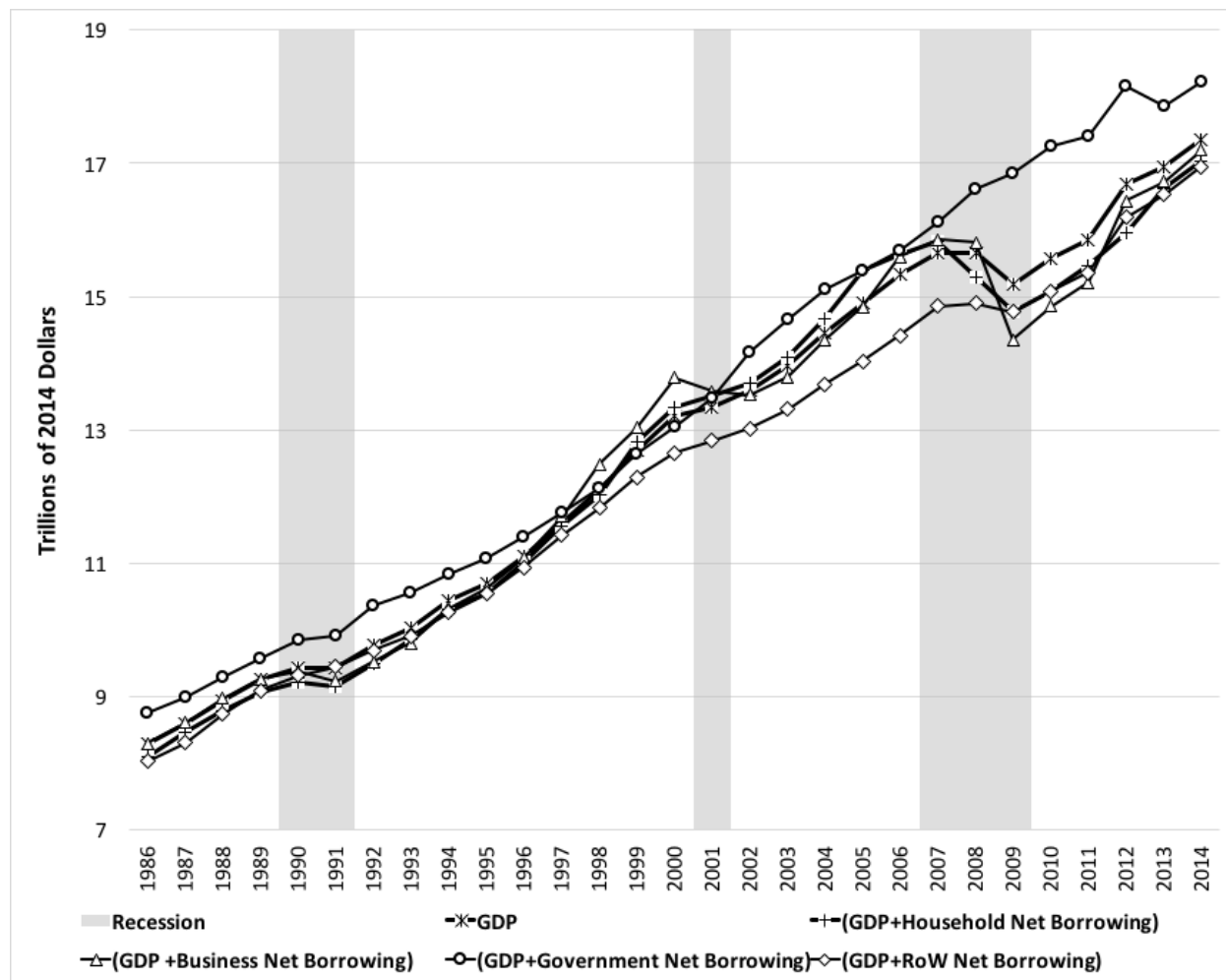


Figure 4: RoW net financial claims on the USA