

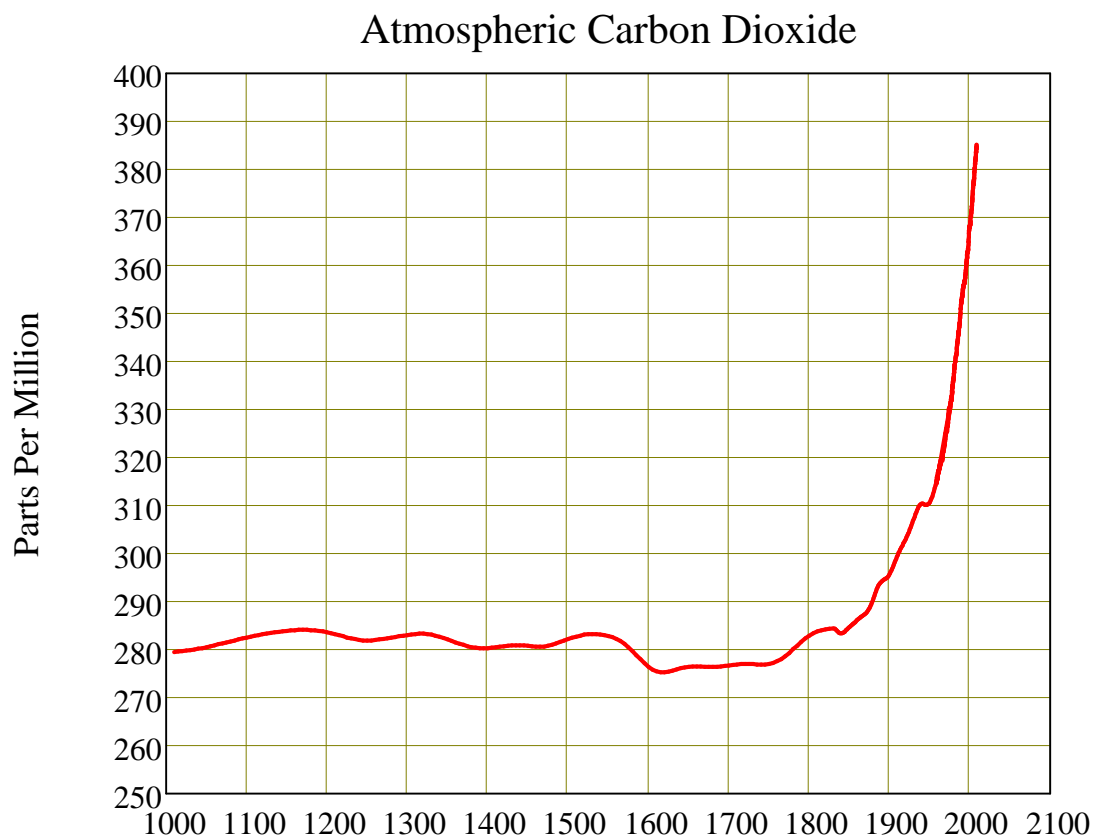
Steve Keen's DebtWatch No 23 June 2008

Debt is the Financial system's Carbon Dioxide

RBA Assistant Governor Guy Debelle and I spoke at a conference on Subprimes in Adelaide last month. One aspect of my analysis that Guy queried was my emphasis upon the Debt to GDP ratio. He noted that this appeared suspect, because it was comparing a stock (the outstanding level of debt) to a flow (annual GDP).

It's a valid point to make. The engineer-turned-economist Mickal Kalecki once caustically observed that "economics is the science of confusing stocks with flows", and I'm a stickler myself for not making that mistake. So making a song and dance about a stock to flow comparison like debt to GDP has to be justified by a sound argument.

The most accessible argument is an analogy to global warming. Just as the growing level of CO₂ in the atmosphere is evidence that the ecosystem is not coping with the (relatively tiny) additional volume of carbon dioxide human activity is adding to the biosphere, the accumulation of debt **relative to income** is evidence that the economy is not coping with the (relatively large) volume of debt being generated by the financial system to finance speculative purchases of assets.



There are at least five strong similarities between this ecological issue and the economic one of accumulating debt:

1. The environment has an established "carbon cycle", by which the emission of carbon dioxide into the atmosphere by animals, etc., is balanced by its re-absorption by plants, etc. This process is augmented by many other factors--such as the expulsion of CO₂ by volcanoes--and, on a geological time frame, far from stable; but over the period of human existence, the atmospheric concentration was below 300 parts per million (ppm) until industrialisation began.
2. The fact that the concentration has risen from under 300 ppm to over 380 ppm in the past century

shows that the planet's natural carbon-processing cycle is not coping with the extra CO₂ added by human industrial and agricultural activity. Global Warming is the most apparent manifestation of this increased stock of CO₂.

3. Even if all human industrial and agricultural activity stopped today, it would take decades for the additional CO₂ we have added to the atmosphere to decline to pre-industrial levels. At present, the existing natural carbon cycle is only means to reduce that accumulation, and it could take longer to reduce the build up than it took to accumulate it, since we have damaged many of the natural "carbon sinks" in the ecosystem.
4. Persisting with present or higher levels of CO₂ will cause the ecosystem to undergo both profound and uncertain change, some aspects of which can be inferred from past geological data.
5. There are feedback effects that mean any climate-altering effects of raised CO₂ levels may be further amplified. For instance, the rise in temperature has reduced the area of ice in the North Pole, leading to reduced reflection of sunlight (since ice reflects most light while water mostly absorbs it), and further increasing global temperatures.

Similar propositions can be put with respect to debt:

1. The economy has a natural capacity to process debt. Borrowing by businesses to finance investment can lead to new products whose sale enables the businesses to make a profit and repay debt over time (Schumpeter's *Theory of Economic Development* gives perhaps the best explanation of this "natural debt cycle");
2. The fact that debt levels are rising with respect to income is a sign that the economic system is not coping with the level of debt being generated today;
3. Even if all borrowing stopped today, it would take decades for the additional debt we have accumulated to be reduced to pre-debt bubble levels. ***The only way that debt levels can be reduced is if income is redirected from either consumption or investment into debt reduction.*** This is the key reason that the debt to GDP ratio is important: it tells us how much of income would be needed to reduce debt, and how long such a reduction would take. However the process of reducing debt will itself reduce income to some degree, since money that would otherwise have gone into investment will now simply be used to pay down debt levels--and incomes and employment will fall as a result;
4. Persisting with the level of debt we have now will mean a profoundly different and uncertain economic environment. The proportion of income needed to service debt will remain at levels that have only ever been experienced in the past during Depressions.
5. Finally, there are feedback effects in the economy that can mean debt to GDP ratios fall even when, ultimately, borrowers try to reduce their exposure to debt. The worst such effects are: direct reductions in investment as retained earnings are used to pay down debt rather than invest; indirect falls in investment as falls in consumption reduce cash flow and depress both earnings and expectations; and falling prices if deflation sets in, as it did during the Great Depression when prices fell as much as 10% per year.

The Debt Bubble



There is also an academic economic argument that can be made about the importance of the debt to GDP ratio, deriving from Minsky's "Financial Instability Hypothesis". In this theory, a rising ratio is both a prediction of the model, and a force leading to greater financial instability and possible economic breakdown in a Depression. But I'll leave a full discussion of this for a future Debtwatch.

Observations on the Data

The most recent data imply that the turnaround in debt to GDP may finally be starting. The debt to GDP ratio fell last month, from 165.25% of GDP to 165.2%. It's not a lot, and it may still return to its 44-year long upward trend; but it is the first time in fifteen years that the ratio has fallen.

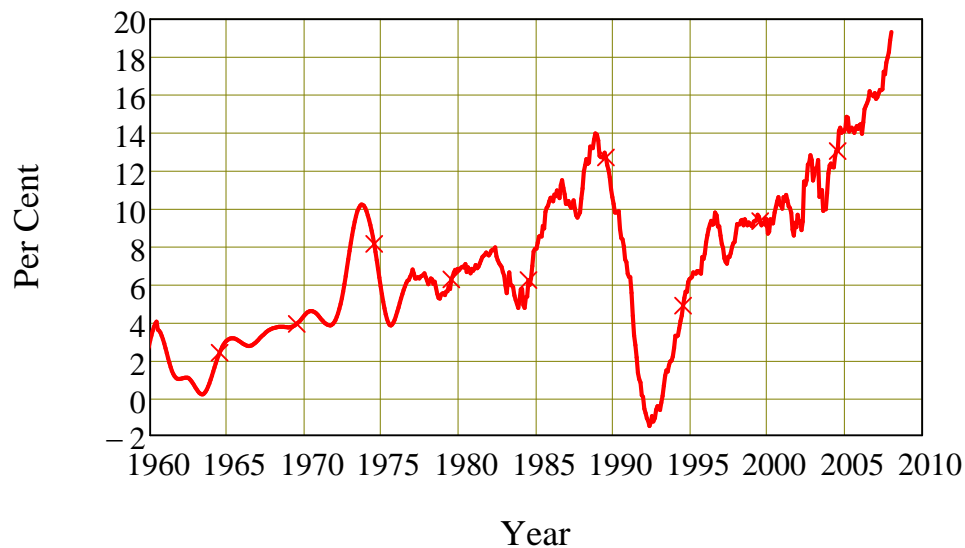
The contributor was an "unexpected" fall in the rate of growth of business borrowing (these things always seem to be "unexpected"). Though it still increased, it grew at a slower pace than GDP--as did personal borrowing. The growth in mortgage debt, on the other hand, continued to outstrip GDP (see Tables 1 and 2 below for details).

While in one sense this slowing down in debt growth is a good thing--in that an unsustainable trend may finally be coming to an end--it also may presage very tough economic times ahead. One aspect of my focus on the debt to GDP ratio is the contribution that **change** in debt then makes to aggregate spending. Aggregate demand in the economy, for everything from commodities to net asset transfers, is the sum of both income (GDP) plus the **change** in debt.

In a well functioning economy, that shouldn't be much relative to GDP itself--and it wasn't in the 1950s and 1960s. Then, the annual change in debt contributed no more than 4% of total demand.



Contribution of Change in Debt to Demand



But as the debt level rises, the change in debt can become an extremely large and volatile component of aggregate spending. That clearly is what happened from 1970 onwards: the annual change in debt began to contribute substantially more than 4% of total demand.

And it was highly volatile: notice the slump in its contribution from over 10% to just 4% in 1973-75 that coincided with the collapse of the Whitlam Government, and the fall from a peak of almost 14% of aggregate demand to minus 1.5% during "the recession we had to have".

Today, the annual change in debt is the source of over 19% of aggregate demand. Should that turn around--as it must even to stabilise the debt to ratio at its current historically unprecedented level--then demand in the economy could "unexpectedly" evaporate.

Chart One

The Debt Bubble

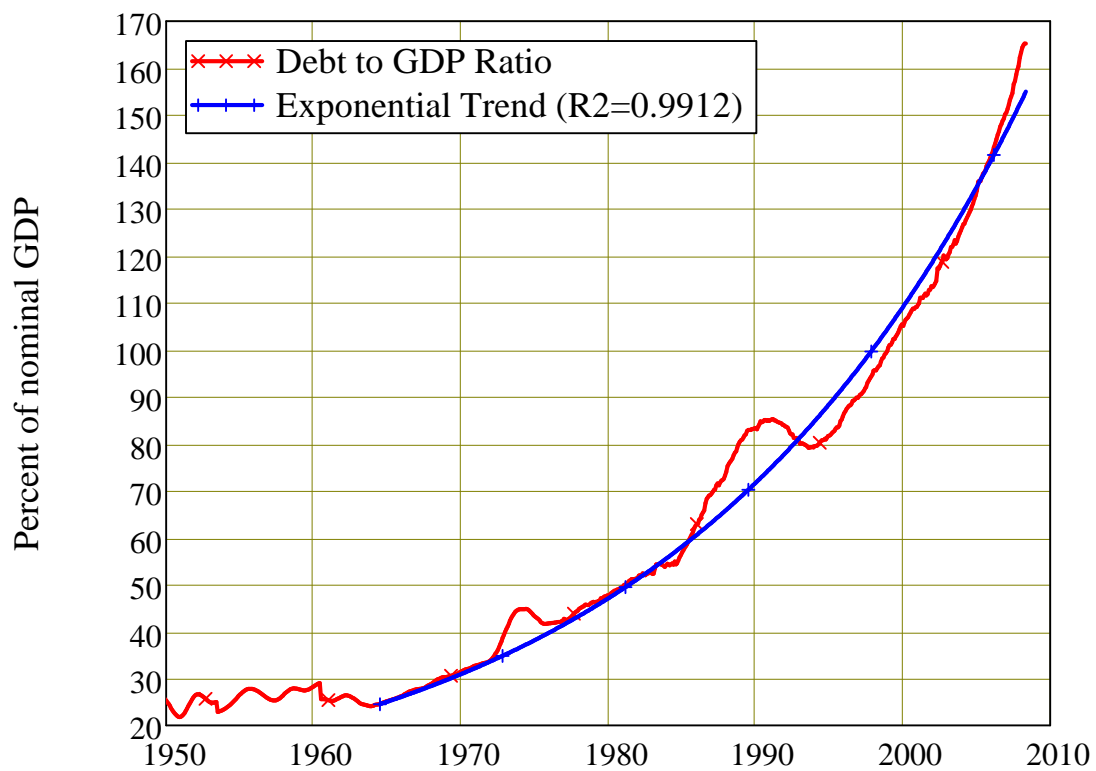


Chart Two

Long Term

Debt to GDP: The Long Term View

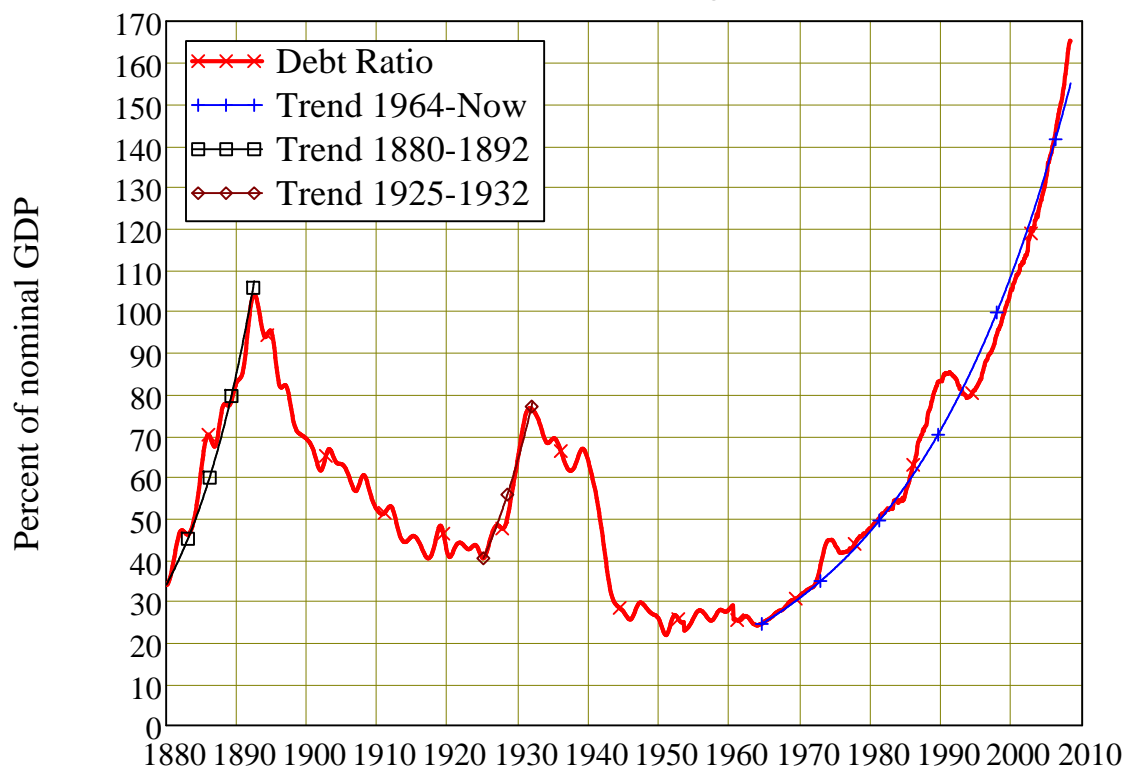


Table One: Aggregated Debt Summary

Table One

	0	1	2
0	"Summary"	"Total Private Debt"	"Nominal GDP"
1	"Date (levels)"	2008.33	2008
2	"Levels (\$m)"	1831139	1083793
3	"Change Month \$m"	9475	6341.42
4	"Change Month %"	0.52	0.59
5	"Change Year \$m"	244522	80347
6	"Change Year %"	15.41	8.01
7	"Since 1990"	8.78	5.45
8	"Since 1980"	12	7.91
9	"Since 1964"	13.47	9.38
10	"Date (% GDP)"	2008.33	"N/A"
11	"As % of GDP"	165.2	100
12	"Change Month"	-0.03	"N/A"
13	"Change Year"	7.36	"N/A"
14	"Since 1990"	3.03	"N/A"
15	"Since 1980"	4.13	"N/A"
16	"Since 1964"	4.19	"N/A"

Table Two: Disaggregated Debt Summary

Table Two

	0	1	2	3
0	"Detail"	"Business"	"Mortgage"	"Personal"
1	"Levels (\$m)"	729564	947318	154255
2	"Change Mth \$m"	1552	7133	790
3	"Change Mth %"	0.21	0.76	0.51
4	"Change Yr \$m"	133447	95603	15471
5	"Change Yr %"	22.39	11.22	11.15
6	"Since 1990"	5.28	13.36	5.66
7	"Since 1980"	10.67	13.08	10.46
8	"Since 1976"	11.17	13.45	11.21
9	"As % of GDP"	65.82	85.46	13.92
10	"Change month"	-0.34	0.21	-0.04
11	"Change year"	13.84	3.46	3.39
12	"Since 1990"	-0.58	9.39	-0.26
13	"Since 1980"	3.03	6.05	2.64
14	"Since 1976"	3.09	5.82	3

 $D_2 =$ **Debt to Income Ratios**

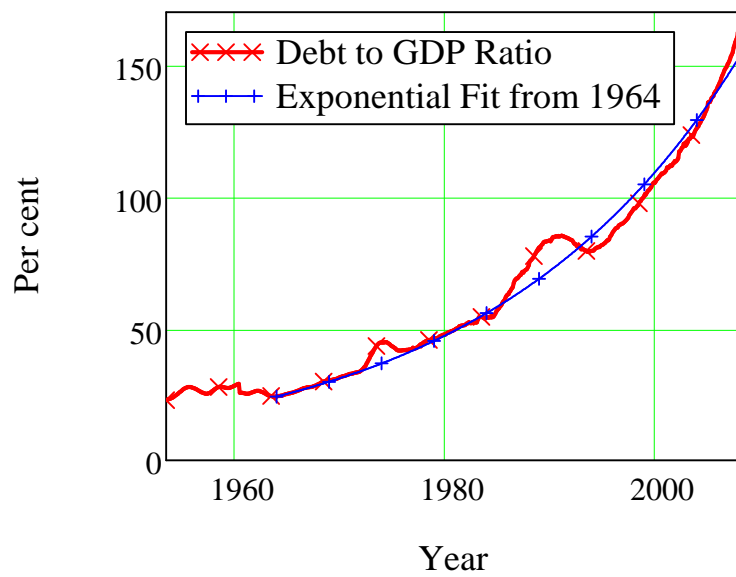
▣ Debt to GDP (D02 & G12)

Figure 1

▣ Debt to GDP Regression

Figure 2

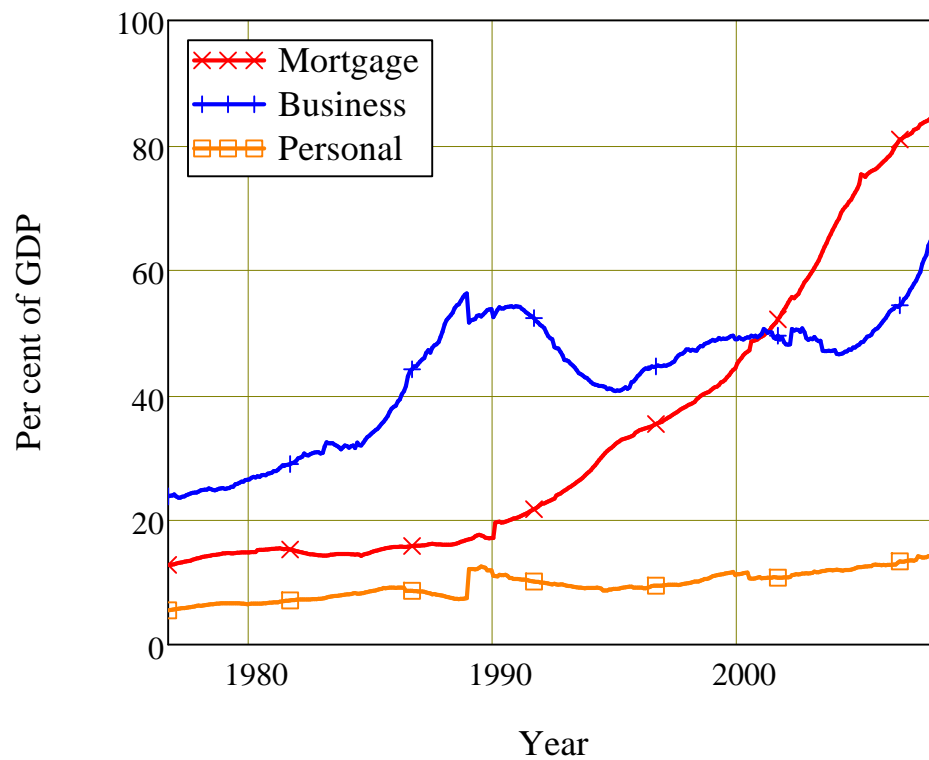
Australian Private Debt to GDP



▢ Debt Components to GDP

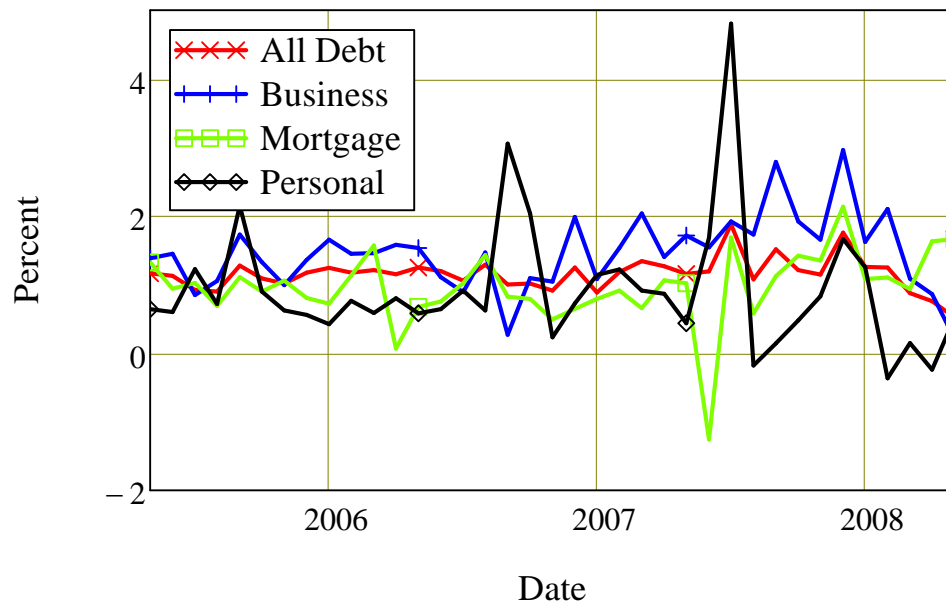
Figure 3

Components of Australian Debt



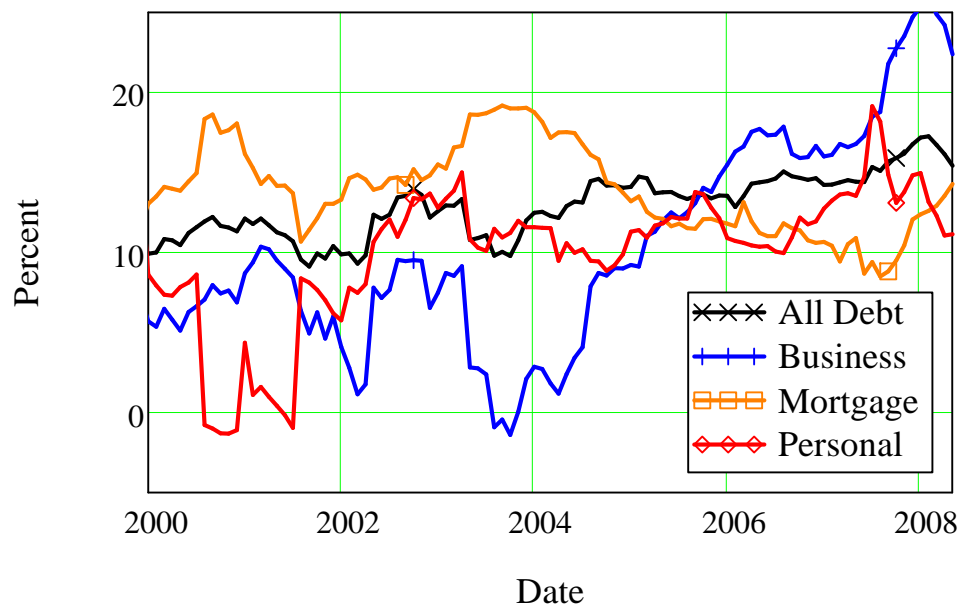
▢ Monthly Growth Rates

Debt Monthly Growth Rates



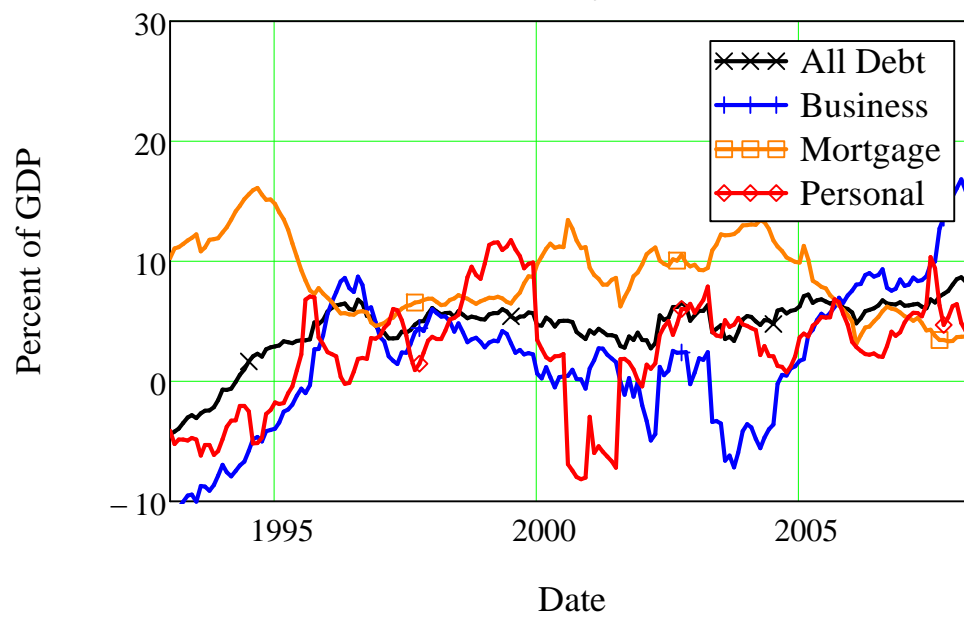
► Yearly Growth Rates

Debt Yearly Growth Rates



► Ratios Yearly Growth Rates

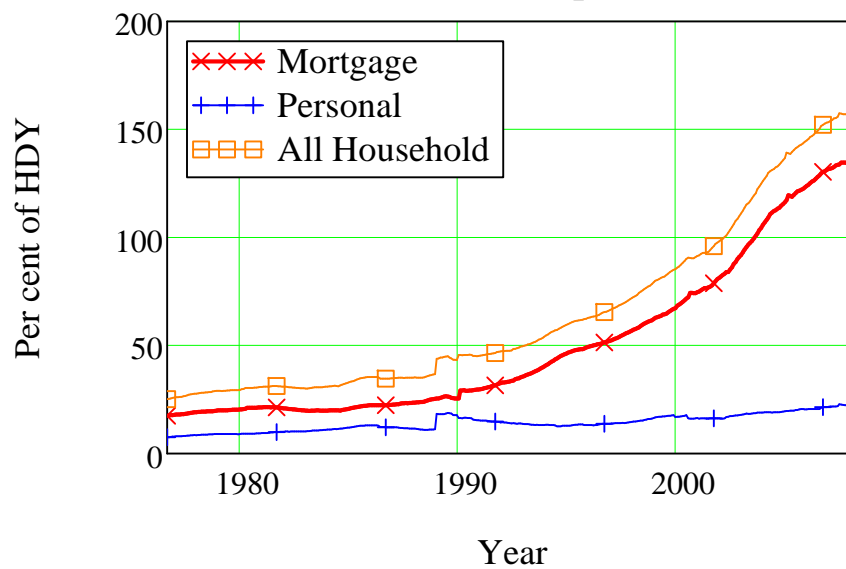
Debt Ratios Yearly Growth Rates



▢ Debt to Household Disposable Income

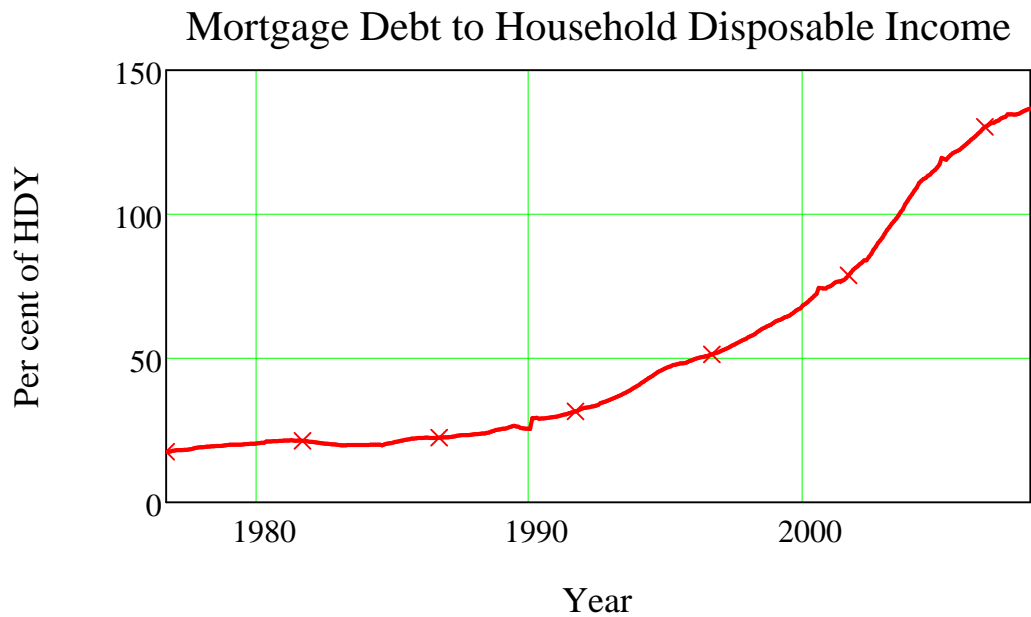
Figure 4

Household Debt to Disposable Income



▢ Mortgage Debt to Household Disposable Income

Figure 5



▢ Debt to Household Disposable Income

(the big jump in personal and fall in business debt in 1989 was due to a change in bank classifications of debt types that caused a proportion of business debt to be reclassified as personal).

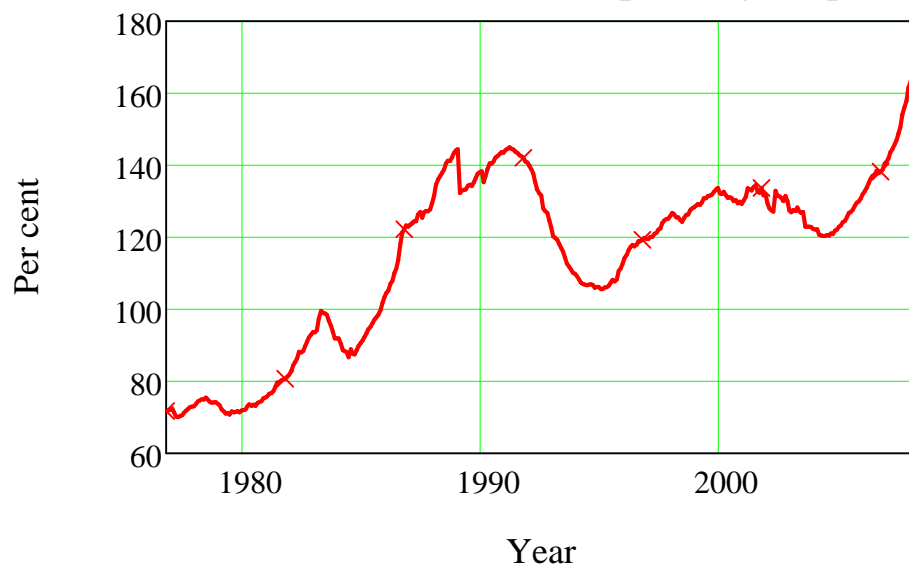
Figure 6



▢ Business Debt to GOS

Figure 7

Business Debt to Gross Operating Surplus

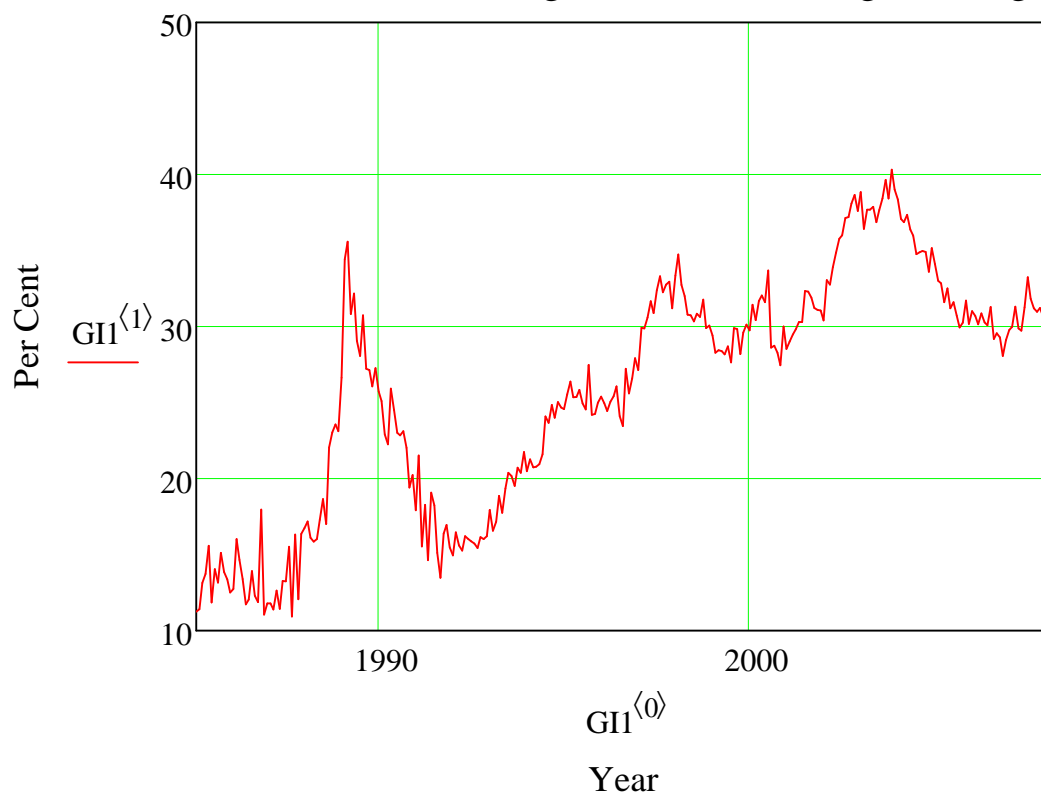


Housing Finance Analysis

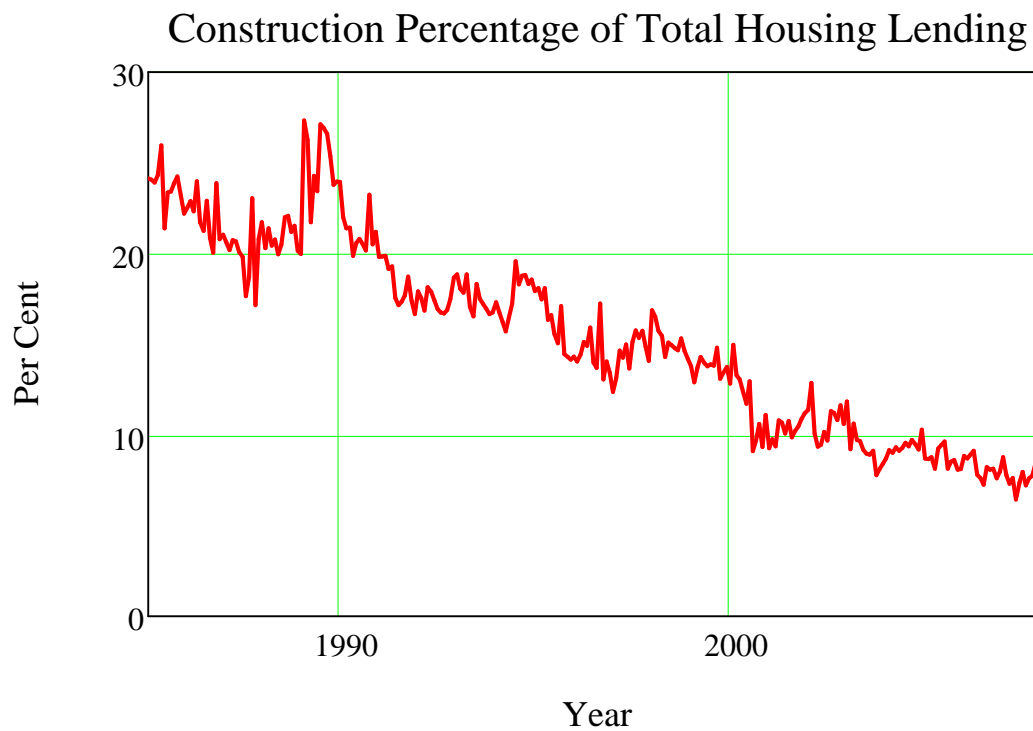
▢ Investment Percent Total Housing Lending

Figure 8

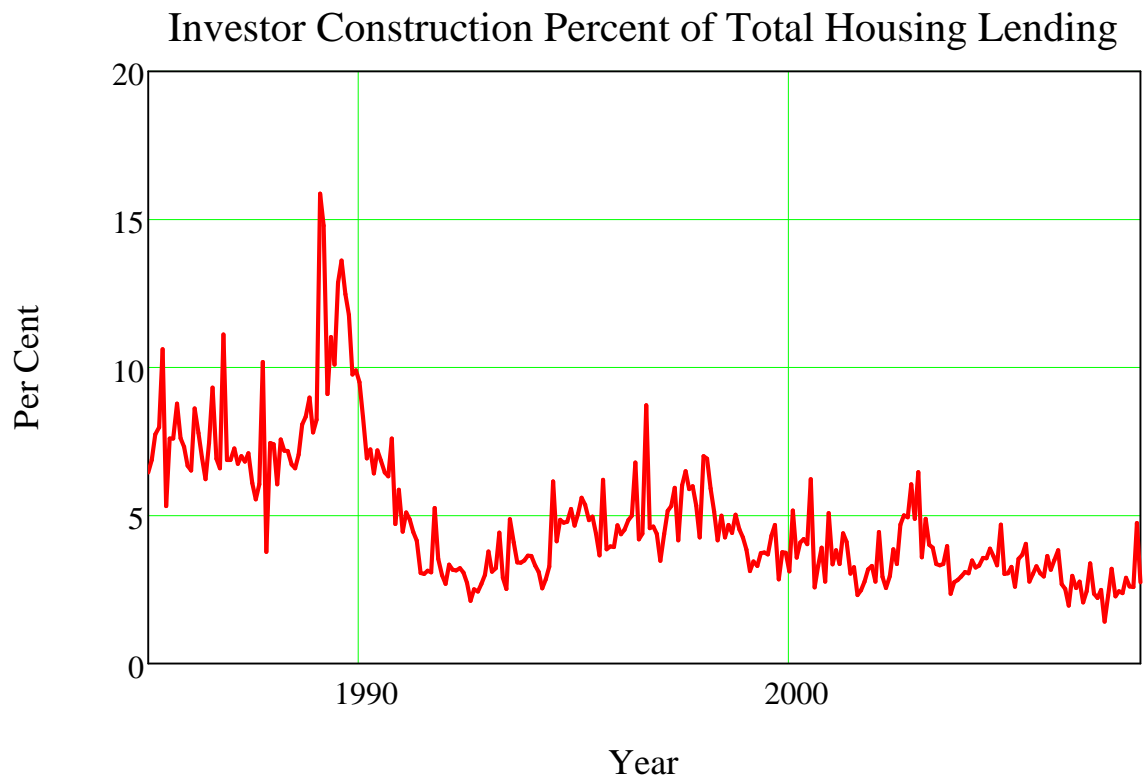
"Investor" Percentage of Total Housing Lending



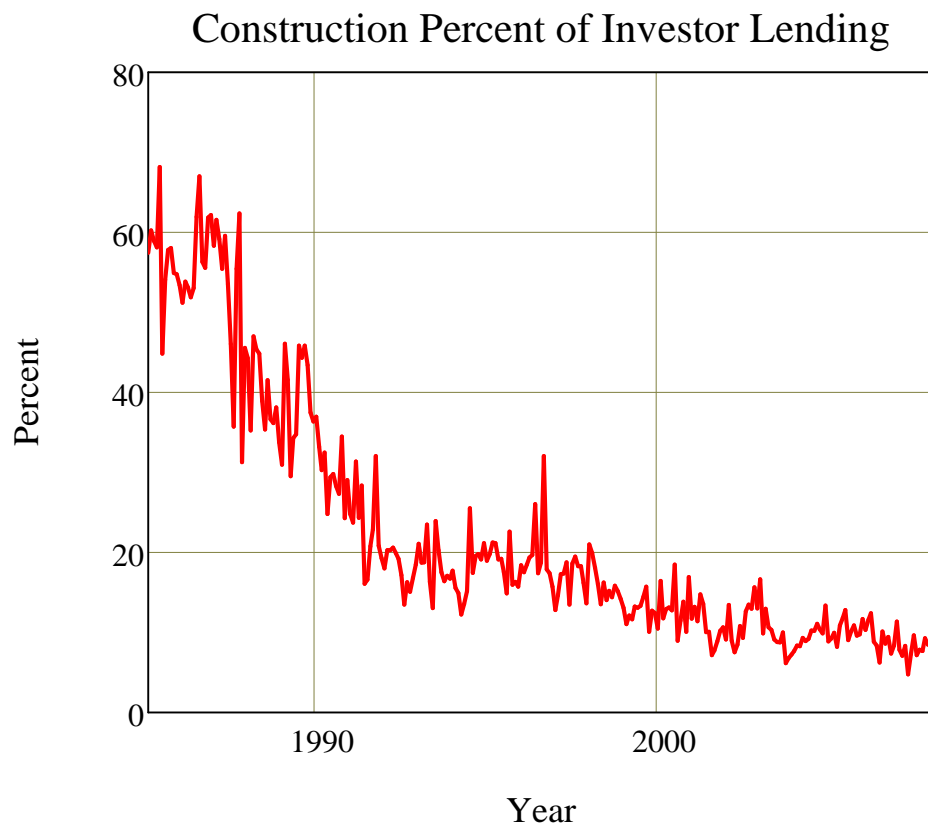
▢ Construction Percent Total Housing Lending

Figure 9

▣ Investment Construction Percent Total Housing Lending

Figure 10

▣ Construction Percent of Investor Lending

Figure 11

Personal Finance Analysis
Figure 12

▢ Credit Card Data

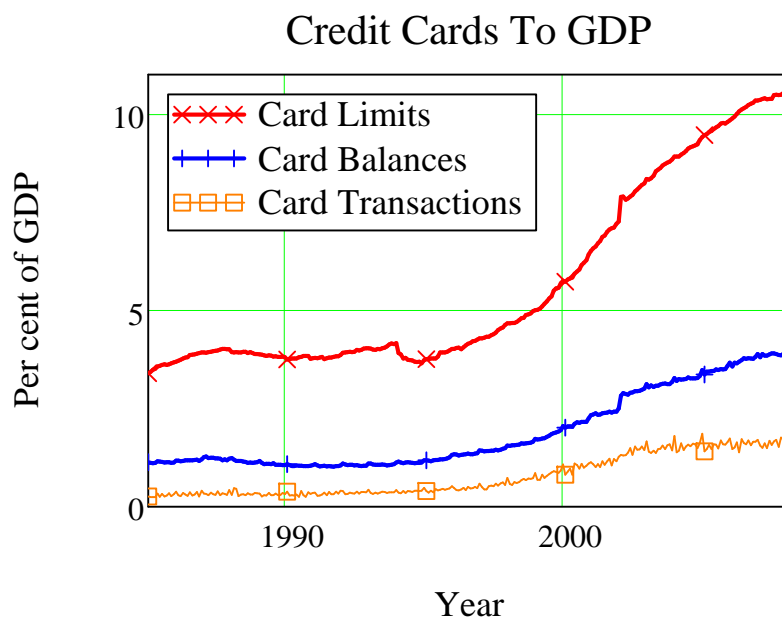
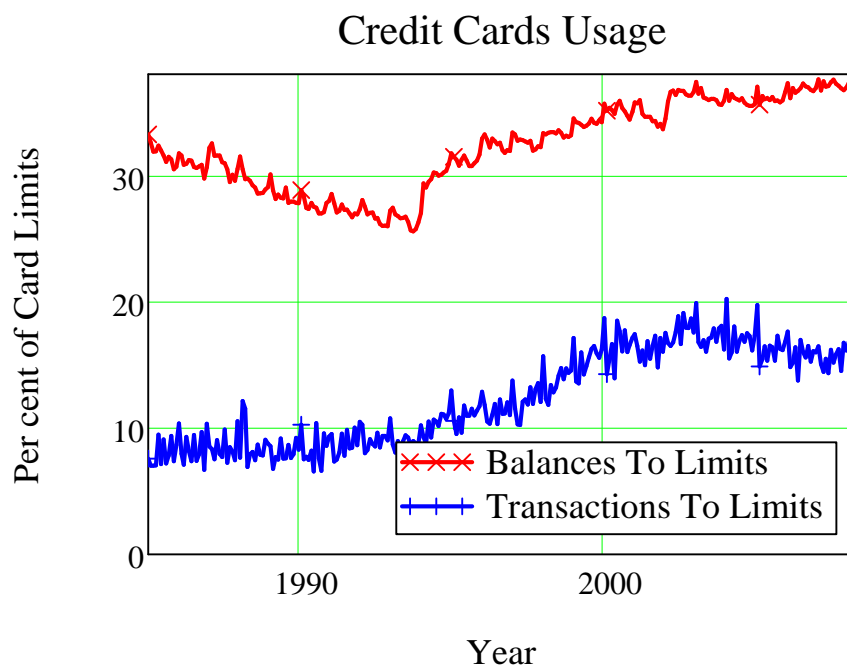
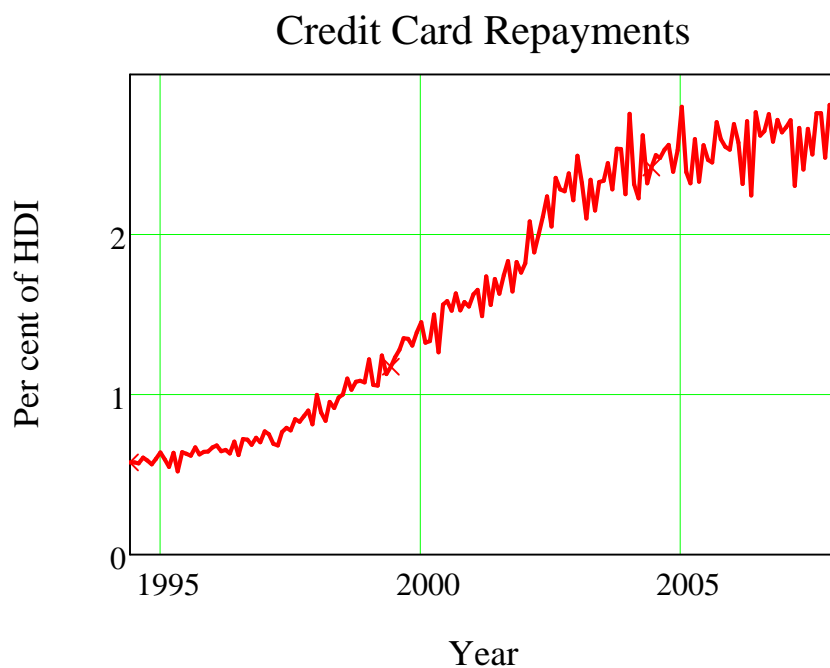


Figure 13

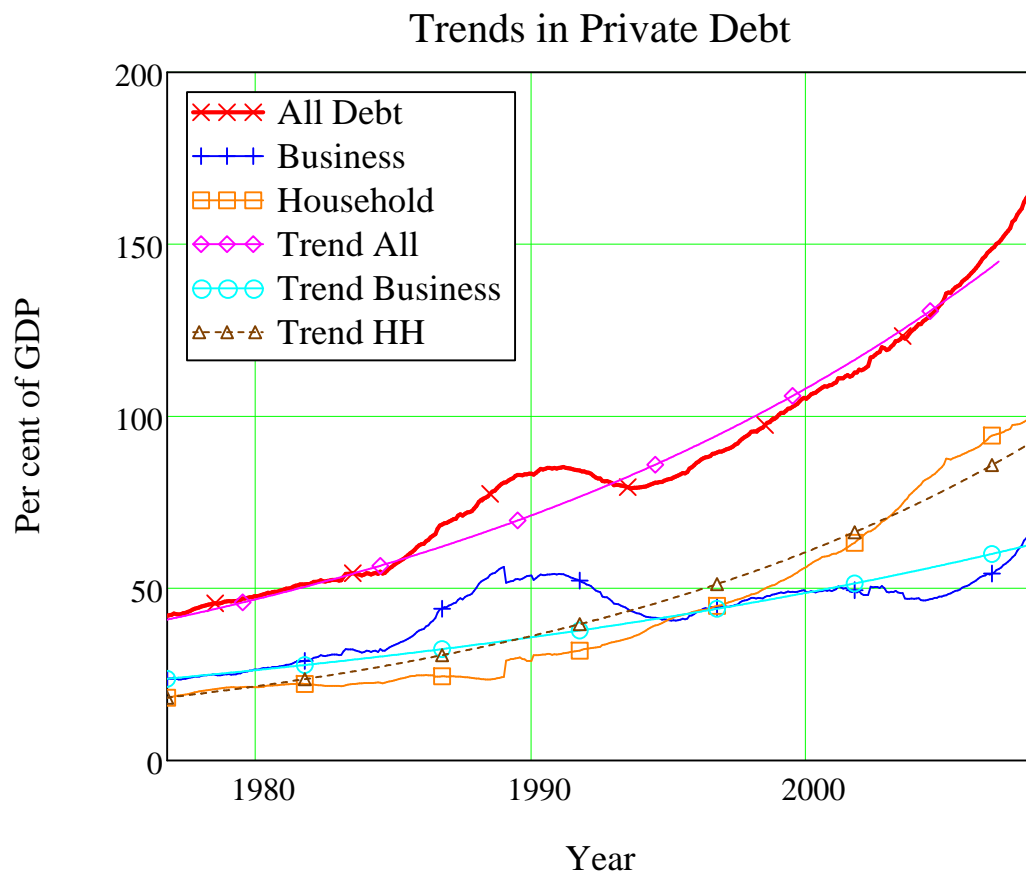
▢ Credit Card Data

**Figure 14**

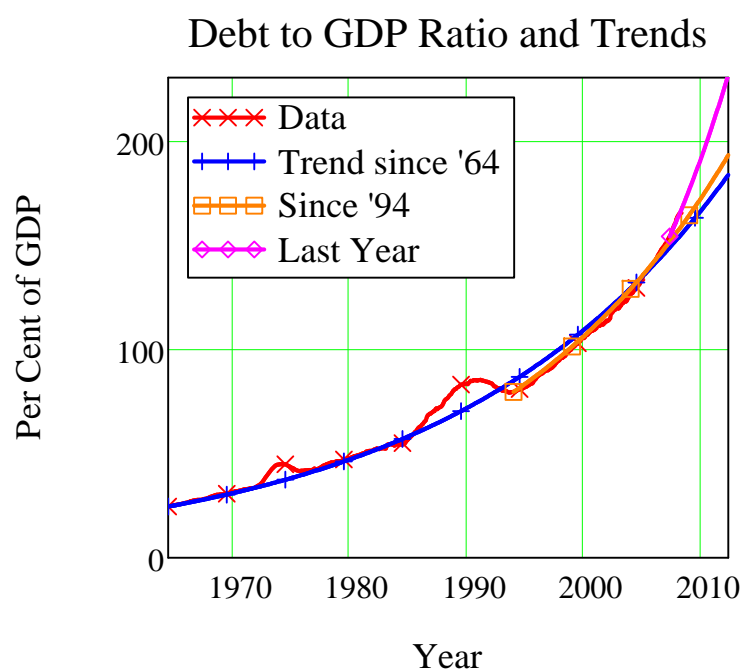
▢ Credit Card Repayments



▢ Debt components to Income

Figure 14

▶ Debt to GDP Trends

Figure 15

► Debt to GDP Exponential Growth Correlation Ratios

These tables show the approximate exponential rate of growth of debt from various starting dates, and the correlation coefficient between this exponential approximation and the data. The correlation is staggeringly high, especially for a data series which, from an equilibrium point of view, should have no trend, or at worst should move in the opposite direction to changes in the official rate of interest--thus keeping the debt repayment burden constant.

Table Three: Exponential Growth Rates & Correlations since 1964 & 1977

	0	1	2	3	4	5
0	"Debt ratios"	"All"	"All"	"Business"	"Household"	"Mortgage"
1	"Start Date"	"mid-1964"	1977	1977	1977	1977
2	Growth rate"	4.18	4.06	3.09	5.09	5.82
3	"Correlation"	99.12	98.44	73.37	98.12	98.35
4						

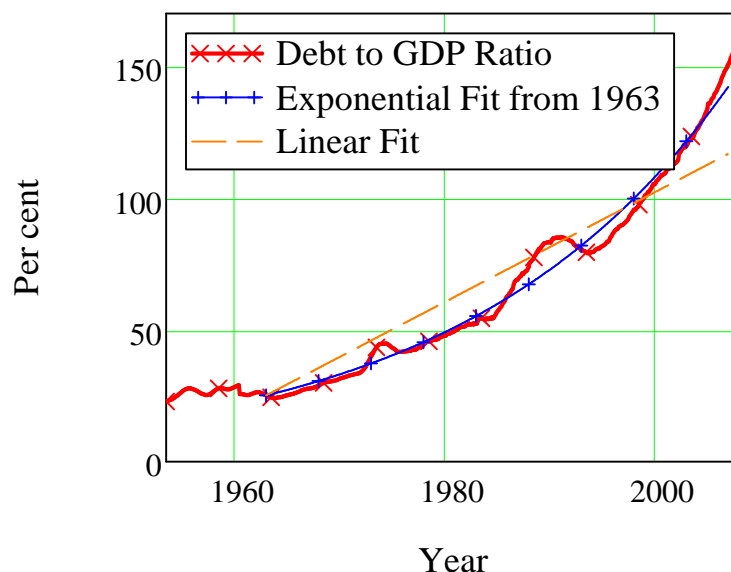
Table Four: Exponential Growth Rates & Correlations since 1990

	0	1	2	3	4
0	"Debt ratios"	"All"	"Business"	"Household"	"Mortgage"
1	"Start Date"	1990	1990	1990	1990
2	"Growth rate"	2.81	-0.96	6.99	9.61
3	"Correlation"	96.48	-16.76	99.7	99.75

► Debt to GDP Linear vs Exponential Regressions

Figure 16

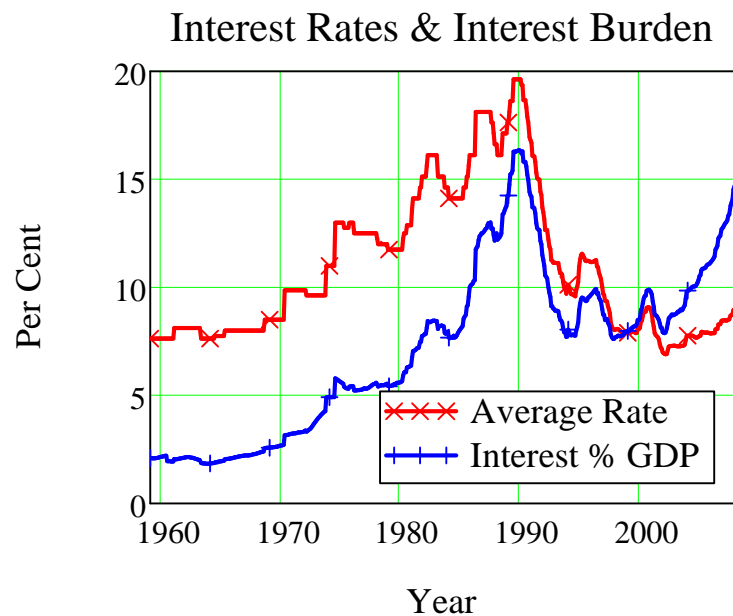
Australian Private Debt to GDP



Debt Servicing Burden

Interest Rates & Payments

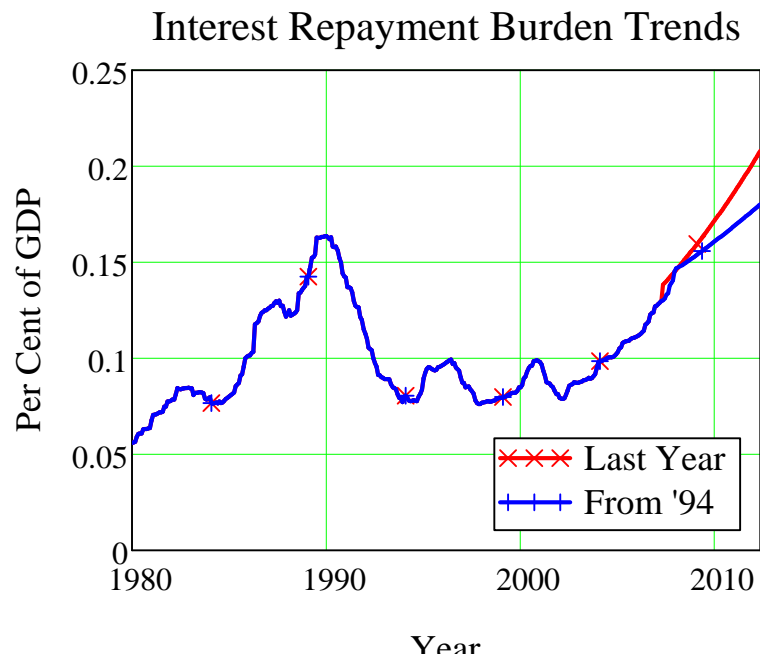
Figure 17



Interest Payment Trends

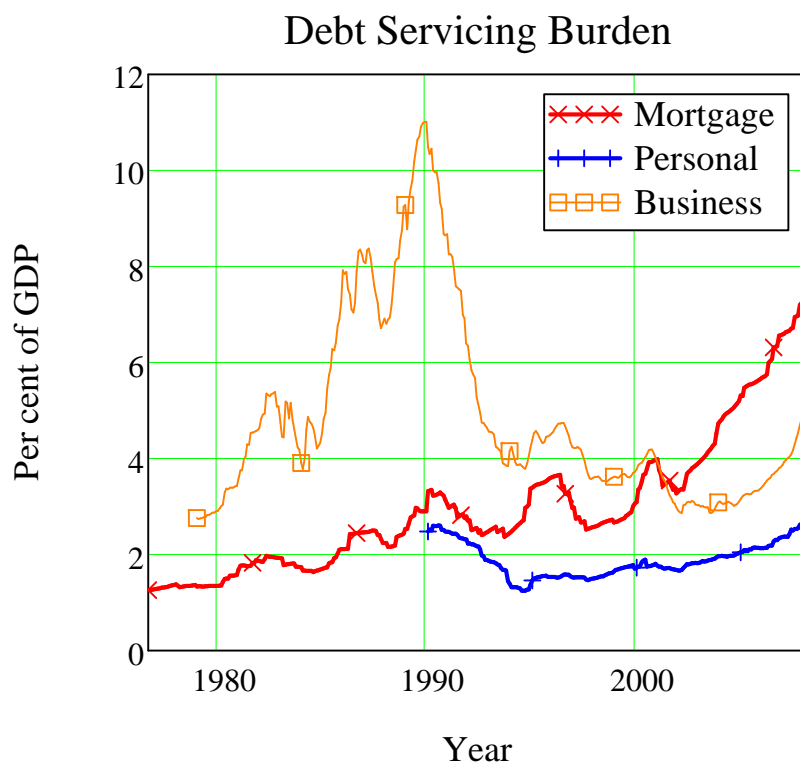
If trends in debt growth continue, then even without any increases in official interest rates, the interest repayment burden on the economy will exceed that of 1990 sometime between September 2008 and September 2009.

Figure 18



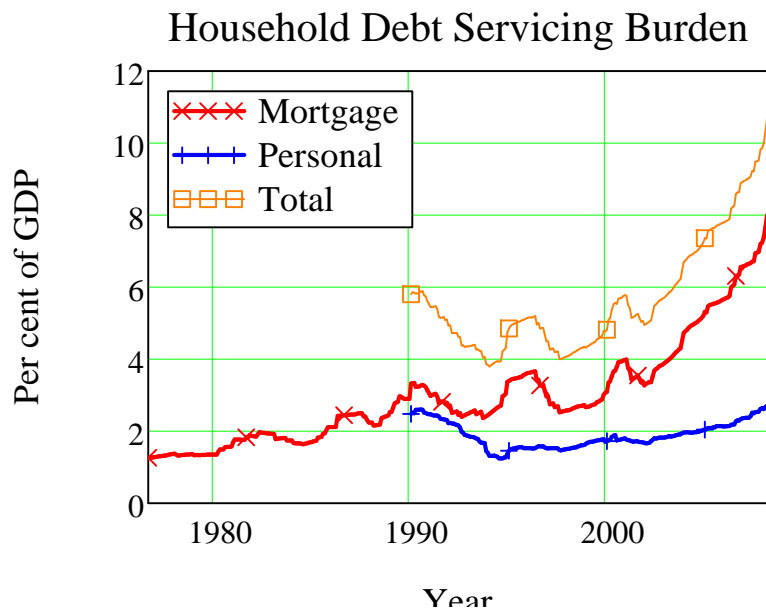
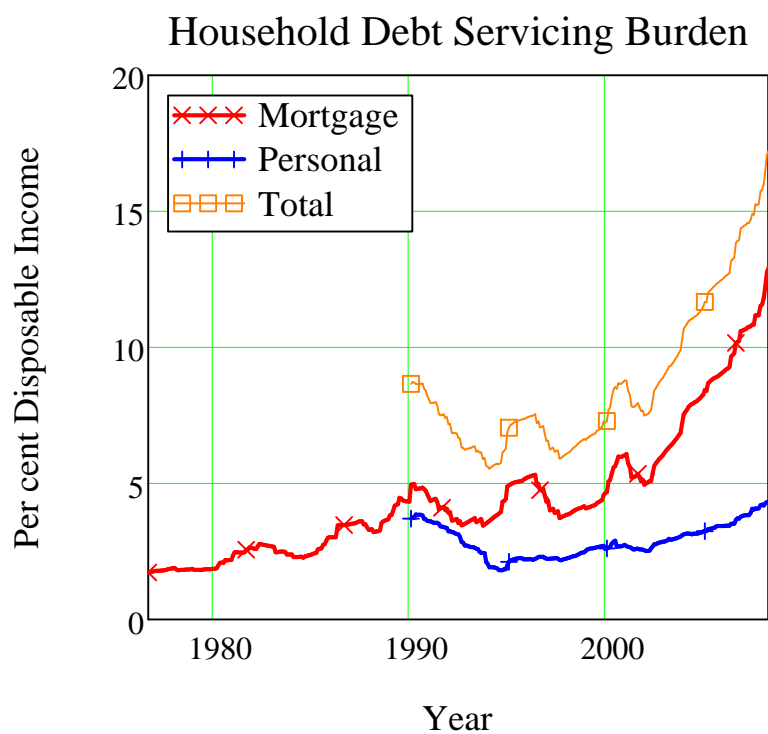
▶ Debt Servicing by Loan Type

Figure 19



▶ Household Debt Servicing

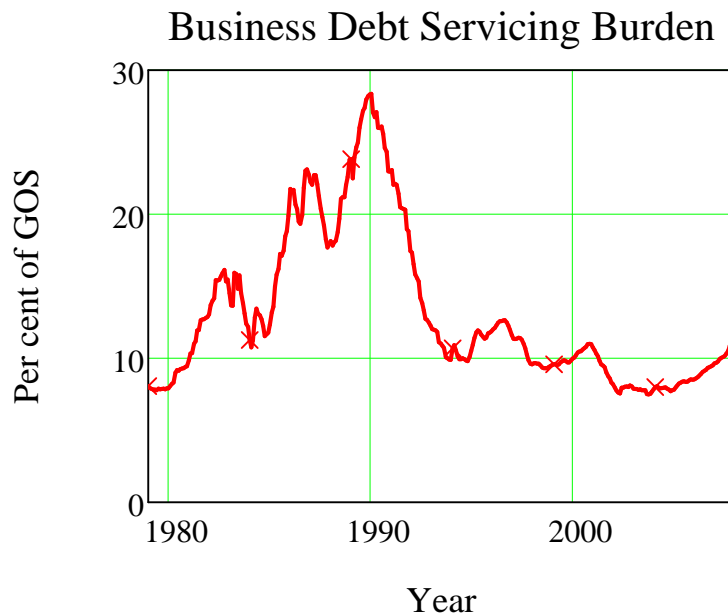
Figure 20

**Figure 21**

It's obvious why high interest rates prior to 1990 brought the economy to a standstill when one

sees the following graph: the interest servicing charge on business loans peaked at almost 30 per cent of Gross Operating Surplus. Even though business debt has recently started to rise as a proportion of GDP, the debt servicing burden remains in the range that applied in the early 1980s.

Figure 22



The debt repayment burden is affected by both the rate of interest, and the level of debt. This chart shows the percentage of GDP that is required to pay the interest on outstanding debt, as a function of average interest rates (the vertical axis) and the debt to GDP ratio (horizontal axis). We are approaching the pain threshold that applied back in 1990, when debt servicing consumed 16.7% of GDP. The dramatic rise in household debt in the last thirteen years has almost negated the impact of falling average interest rates.



Figure 23

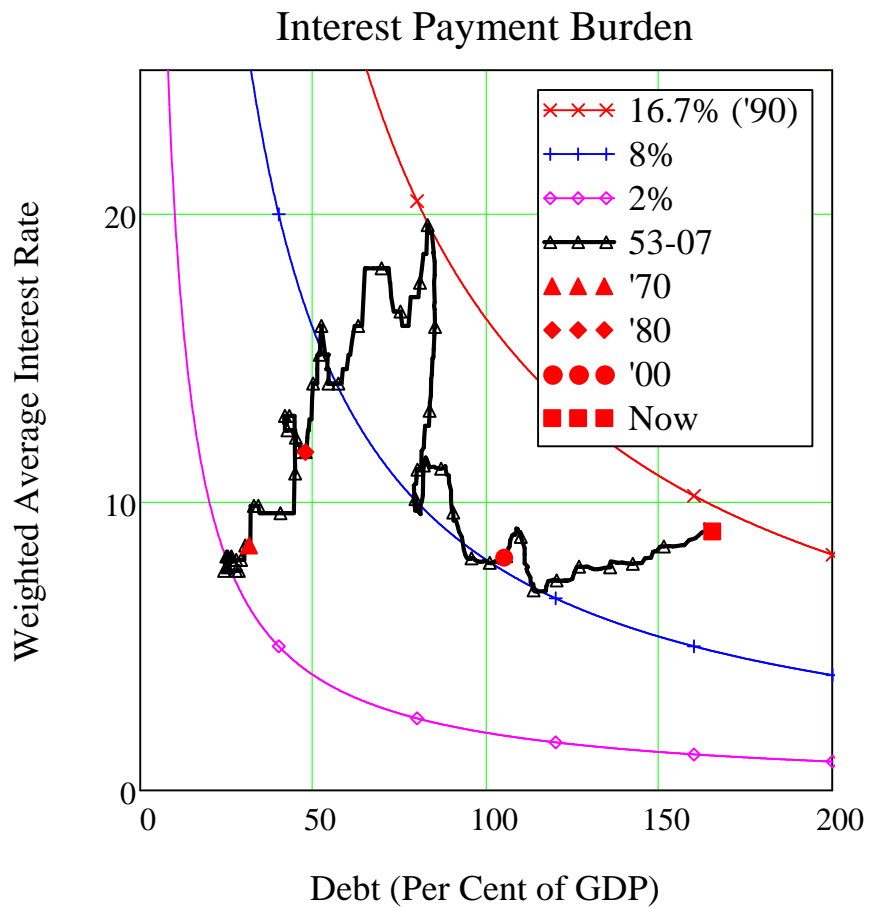
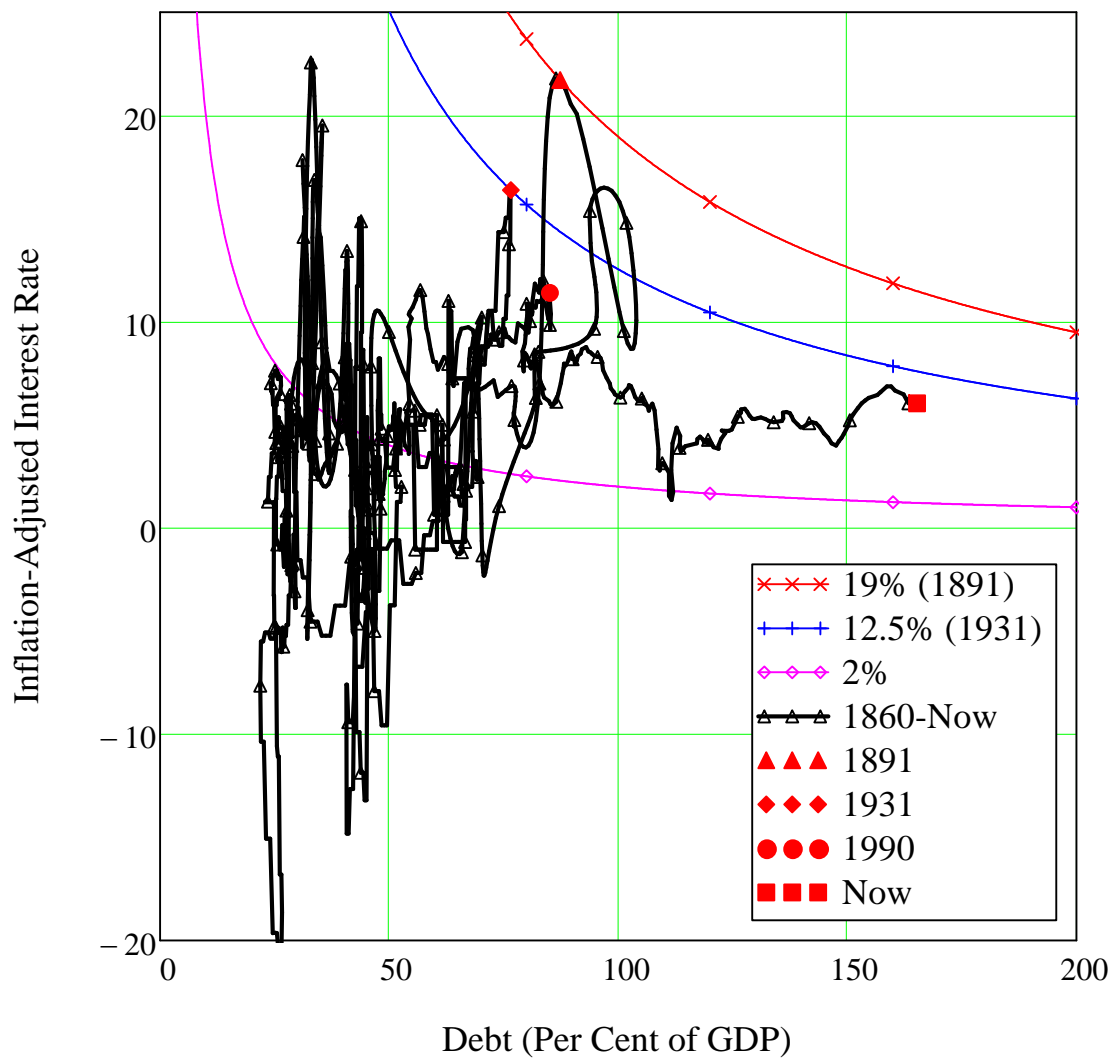
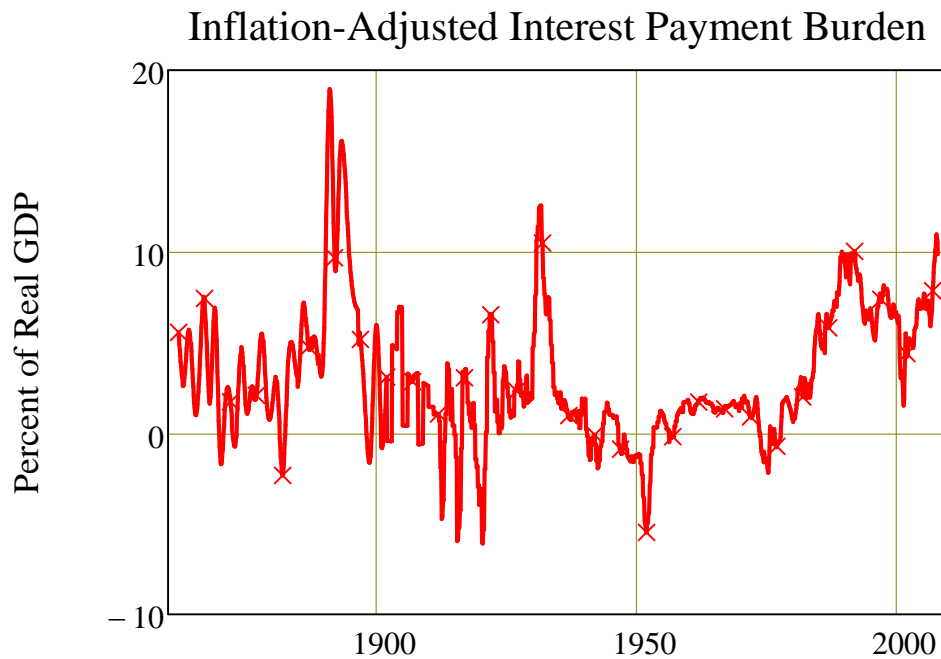


Figure 23

Inflation-Adjusted Interest Payment Burden

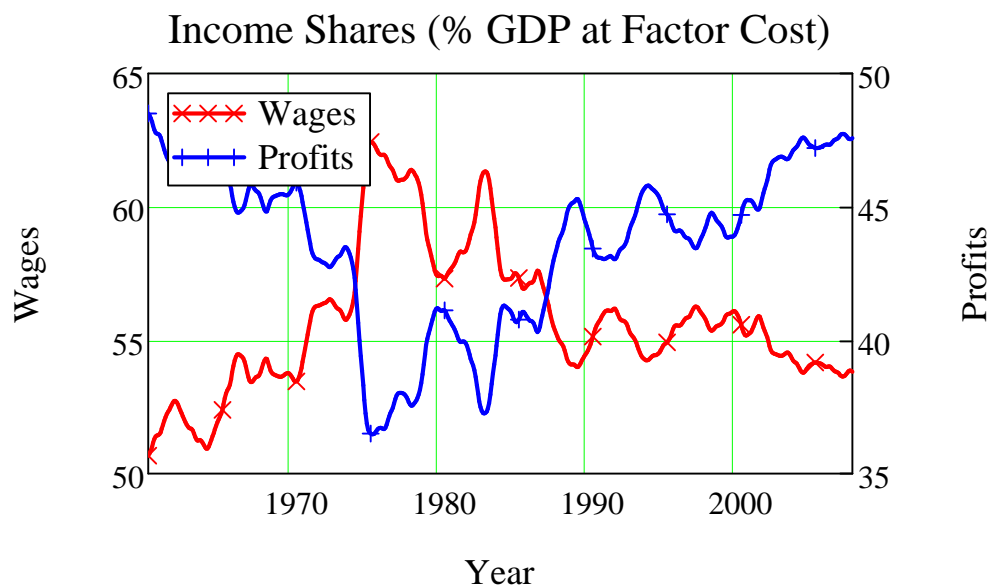




Income Shares



Figure 24



In the "it's an ill wind that blows no good" category falls the impact of rising debt levels on the share of income going to finance capital. Having shown no trend at all between 1960 and 1990, it has suddenly blown out in the last seventeen years, to almost four times the previous average level.

Somehow I doubt that this is a good thing for the rest of the economy. It is instead a very potent indicator of the extent to which financial commitments are a burden upon the productive

sectors of the economy.

Figure 25

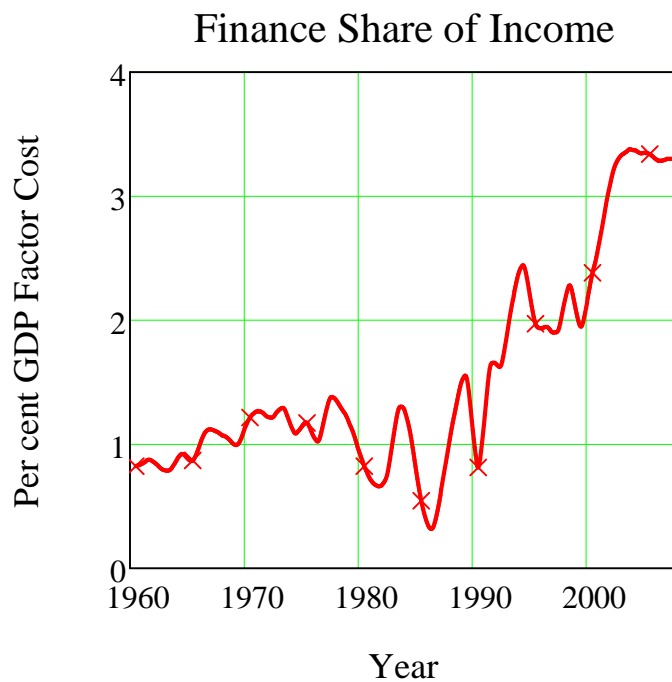
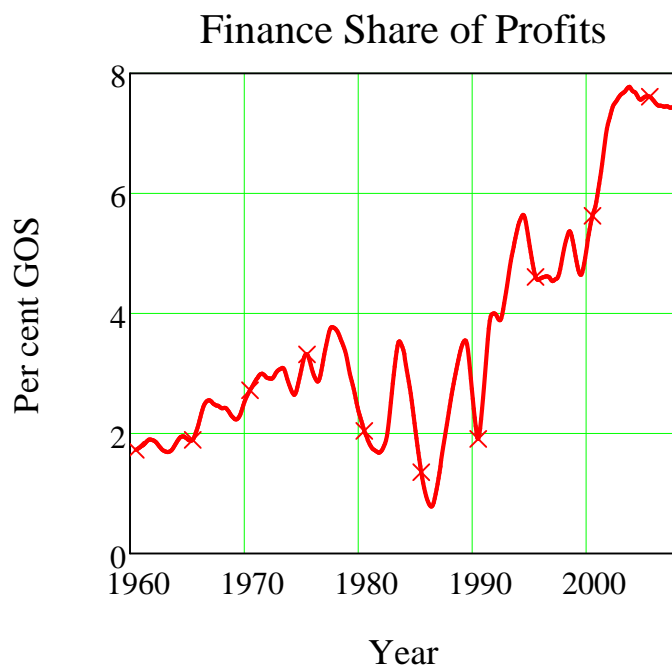


Figure 26



Debt contribution to Effective Demand

Figure 27



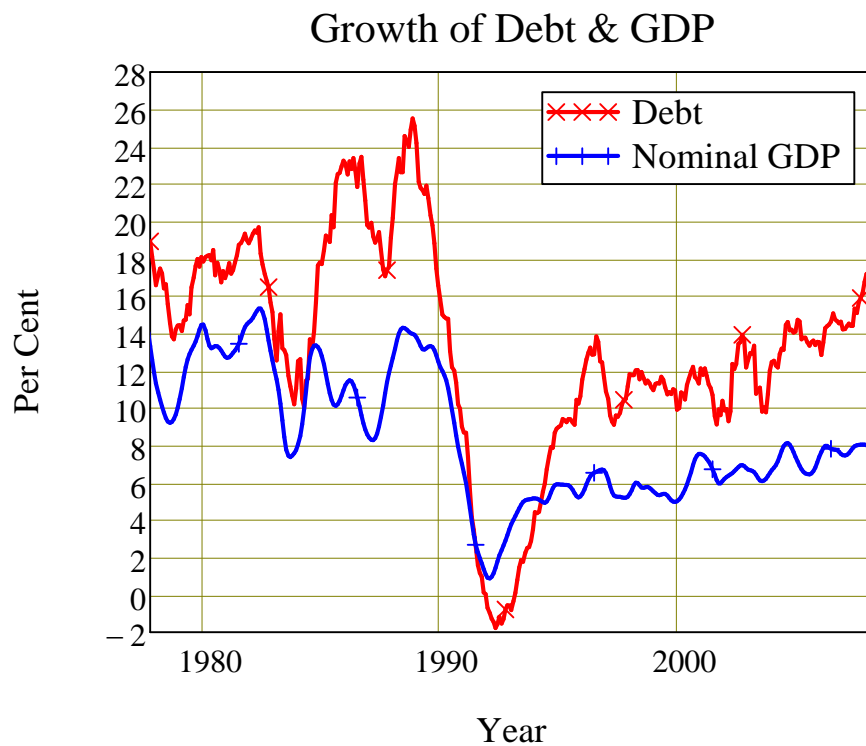
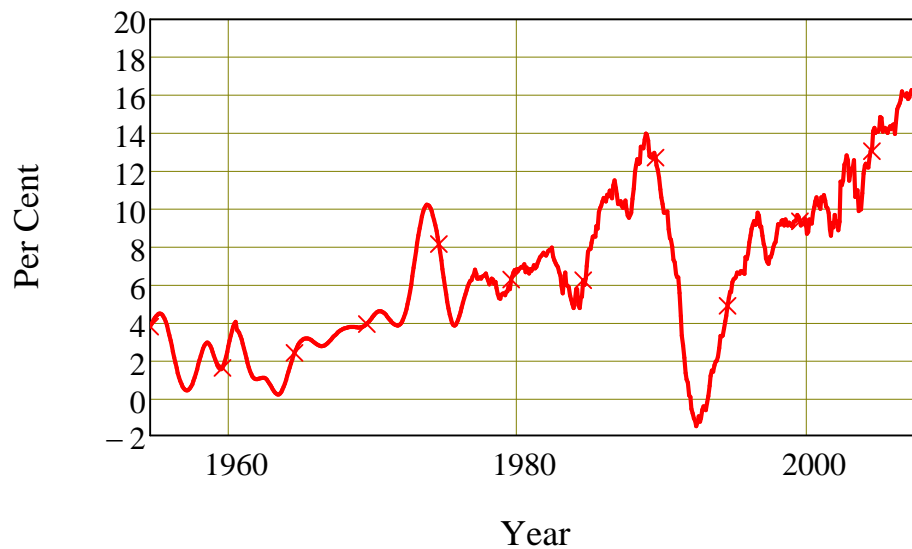
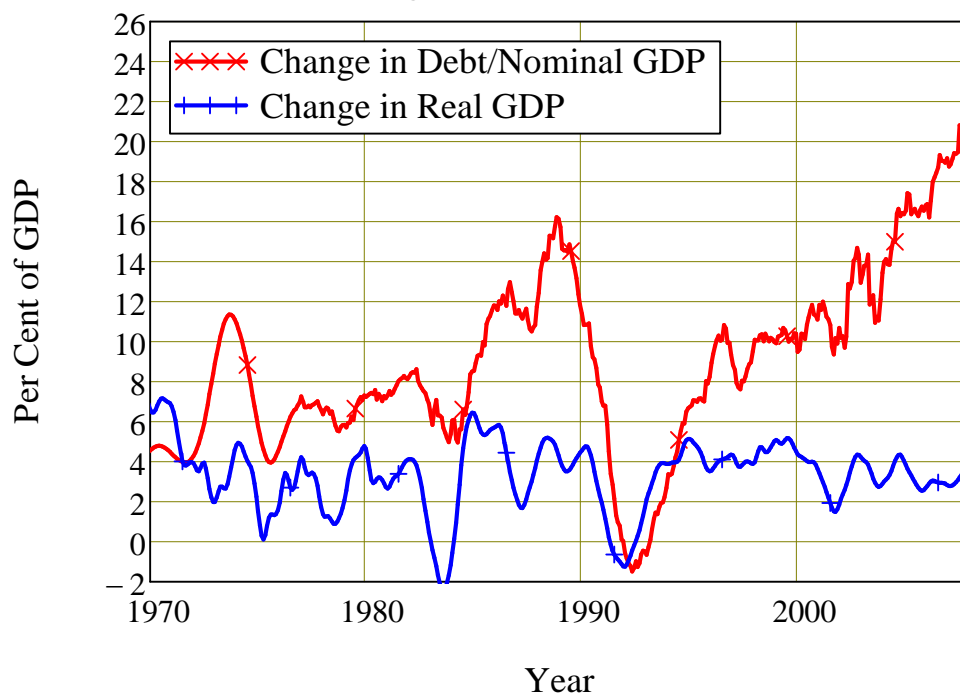
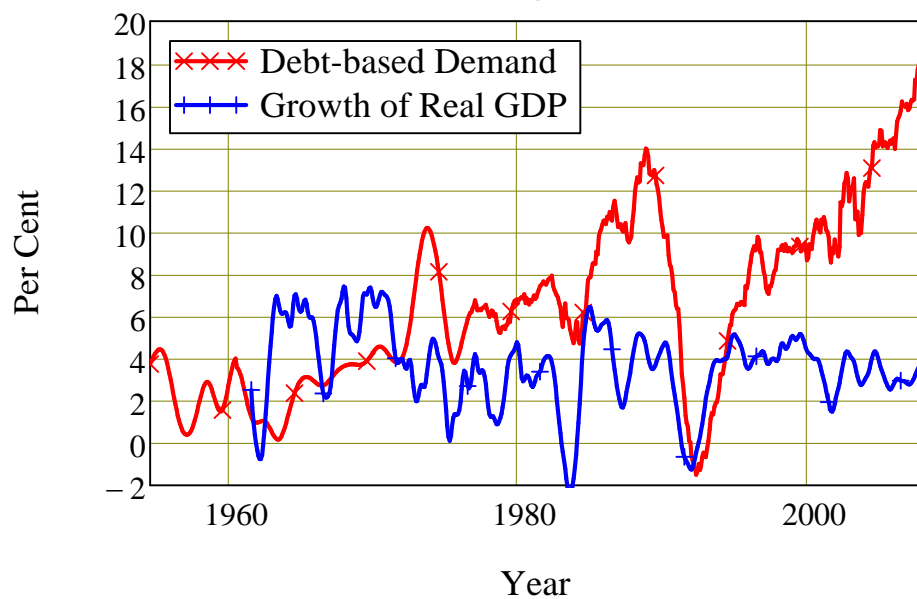


Figure 28

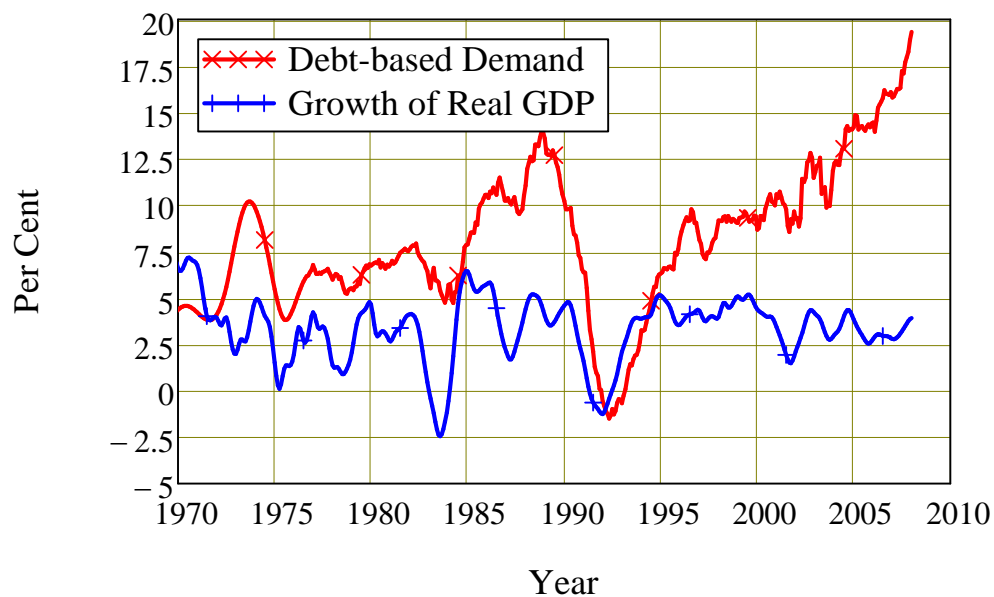


**Figure 29****Contribution of Change in Debt to Demand****Figure 30****Change in Debt & Real GDP**

Contribution of Change in Debt to Demand



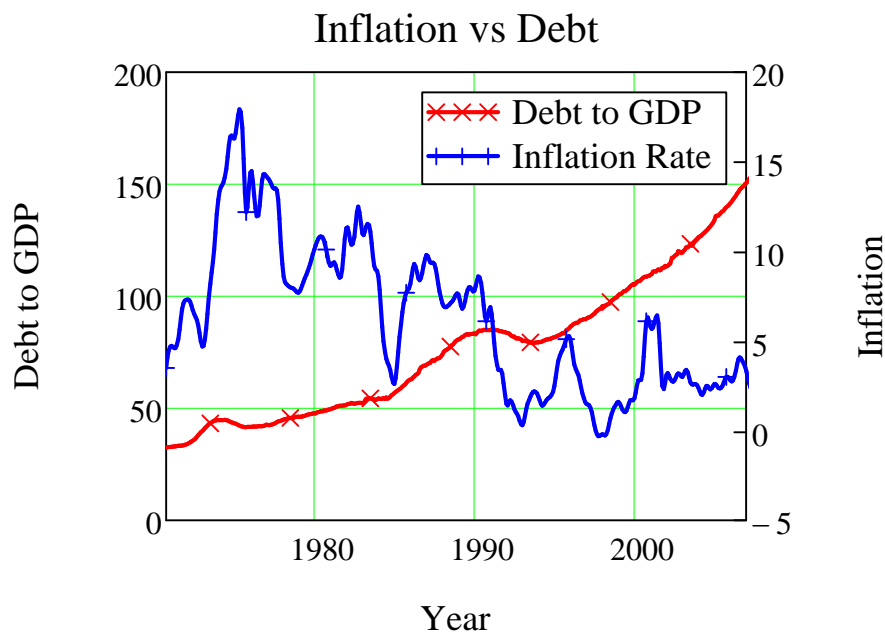
Contribution of Change in Debt to Demand



Ignore for a moment the labels on the next graph, and simply imagine that they were indicators on some medical or industrial gauge. Which series would imply an out of control process to you--the red one or the blue one?

Of course, with the bias economists have developed about inflation--and the related blind eye towards debt levels--they ignore the red line, see only the blue line, and worry that this has recently moved up somewhat (even though, over the longer term, it has clearly fallen substantially).

Figure 31

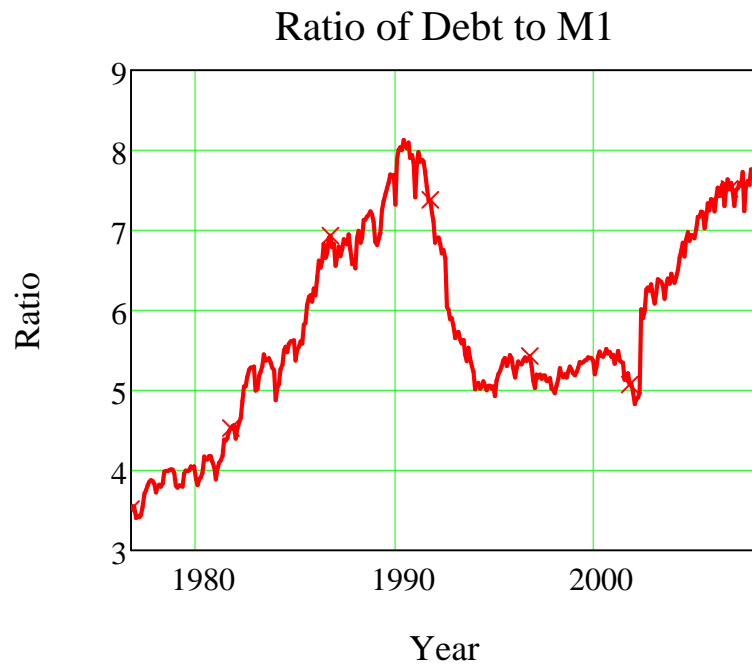


Monetary Aggregates

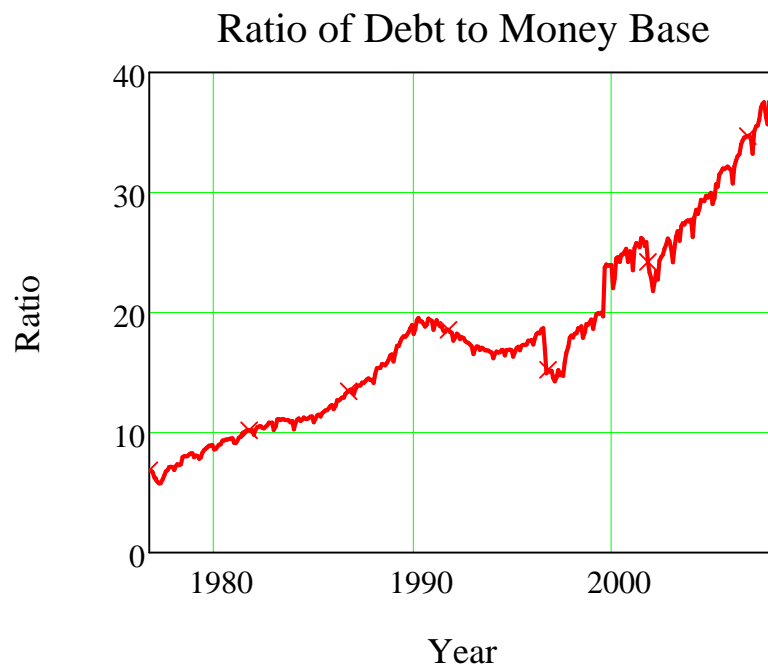
(The M1 series was affected by a substantial reclassification of assets in early 2002. I expect that the apparent downward trend in the debt to M1 ratio across 2001 can be ignored as a statistical anomaly, later corrected by the reclassification)

Figure 32

Debt to Money

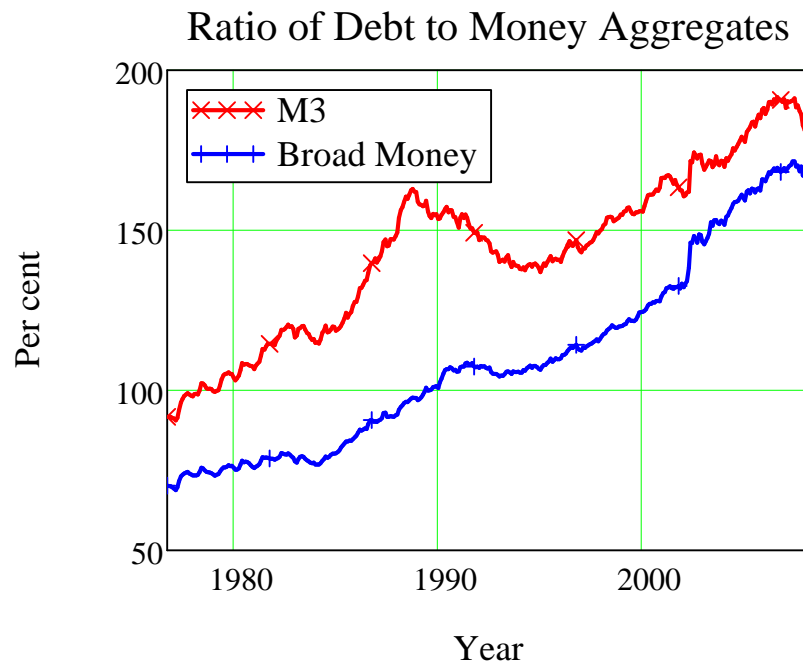
**Figure 33**

▶ Debt to Money

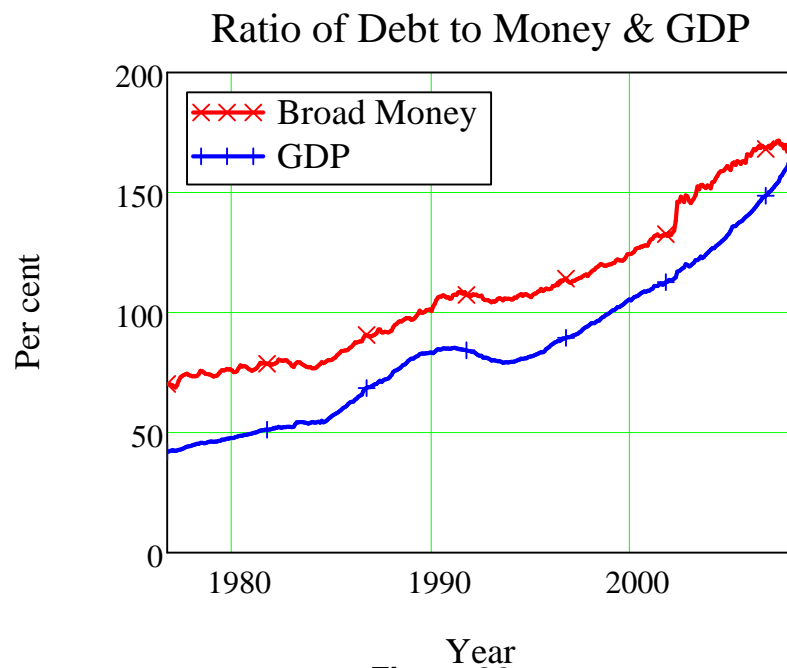


Year
Figure 34

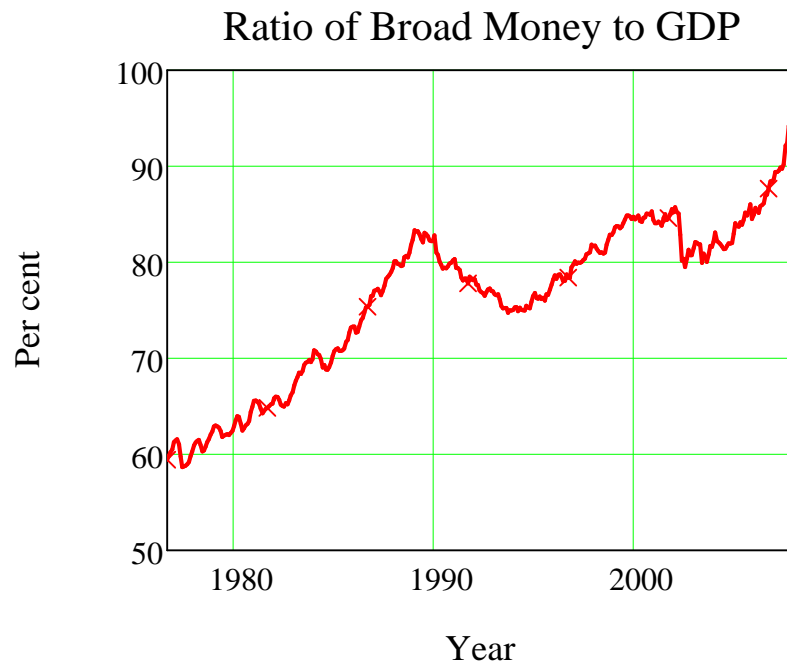
▶ Debt to Money

**Figure 35**

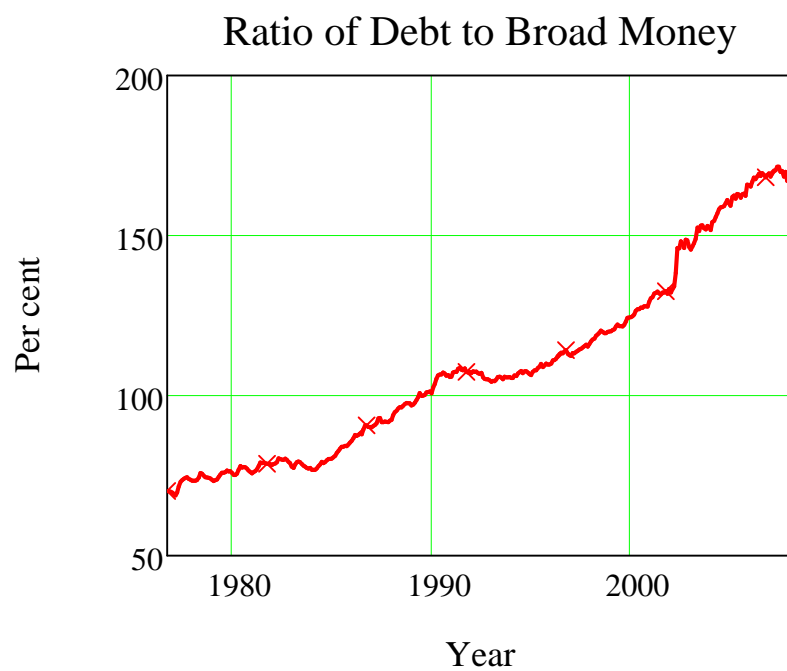
▶ Debt to Money

**Figure 36**

▶ Debt to Money

**Figure 37**

▶ Debt to Money



International Data

USA Data and USA-Australia Comparisons

Figure 38

▶ USA-Australia Household Debt Comparison

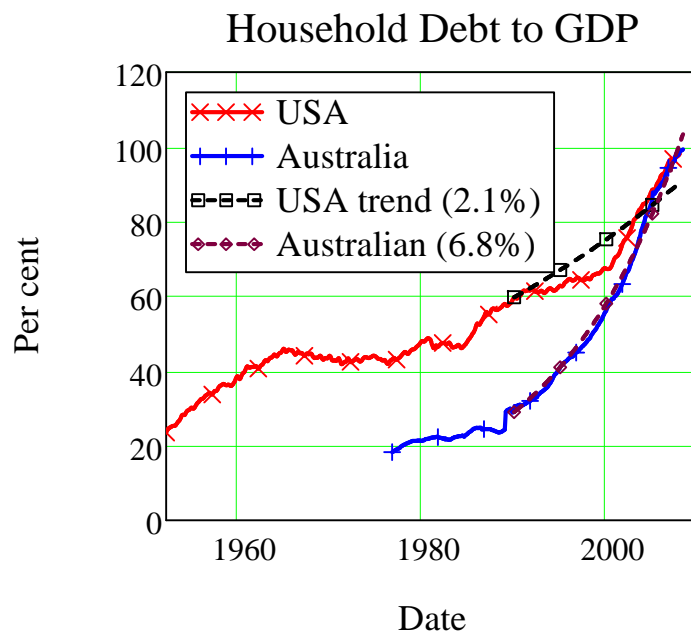


Figure 39

▶

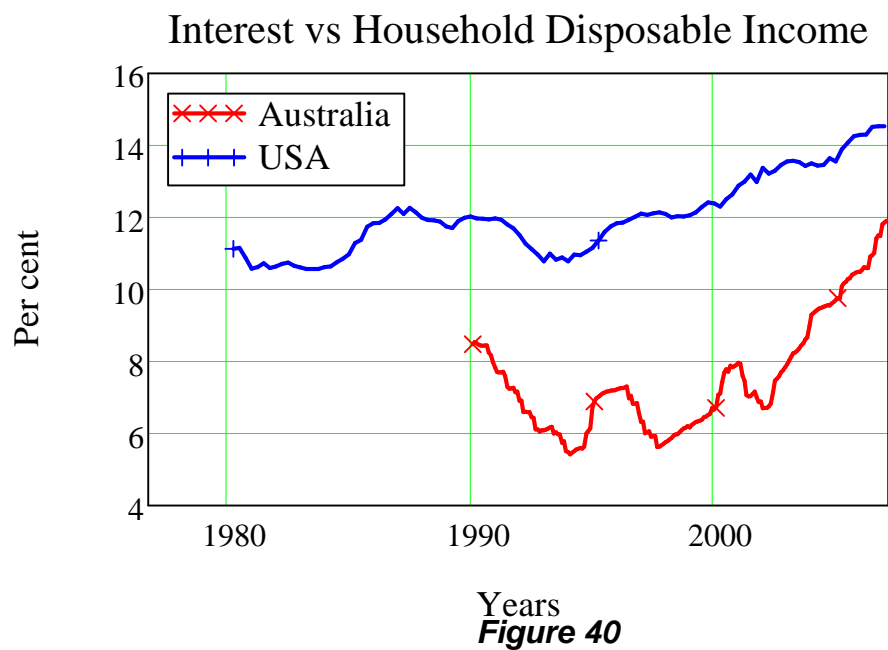
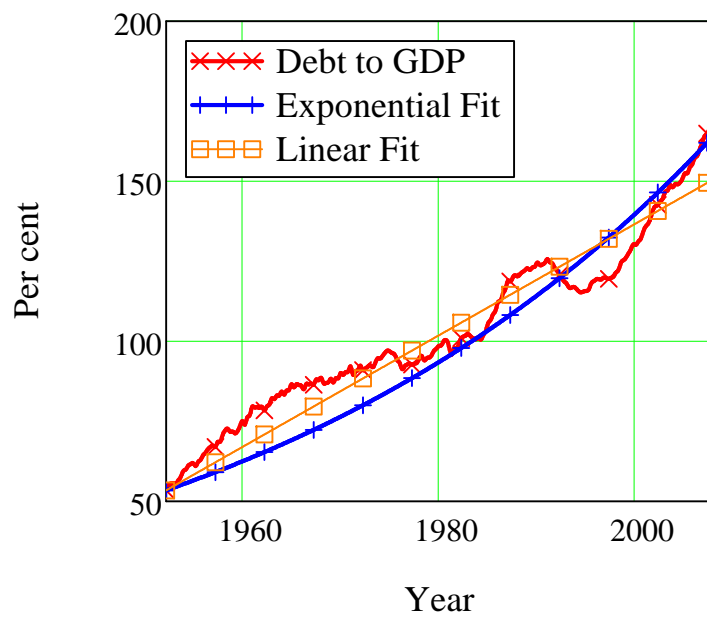


Figure 40

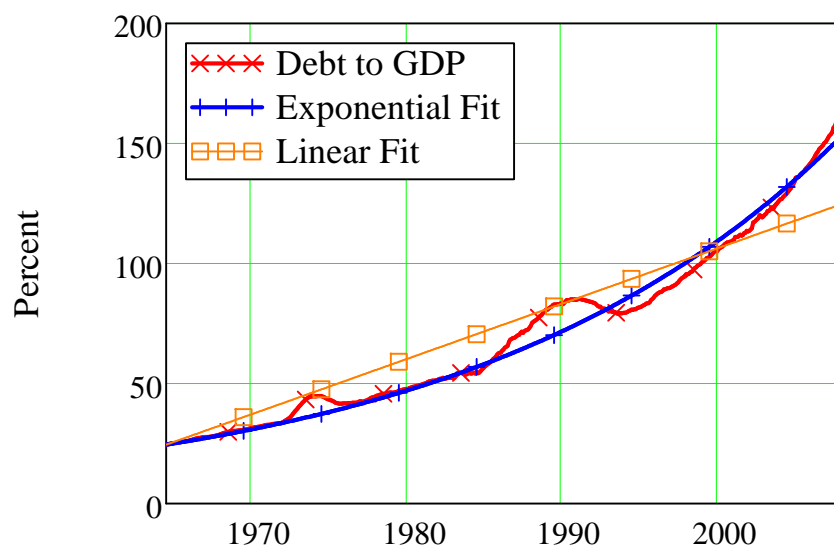
▶ USA Private Debt to GDP

USA Private Debt to GDP

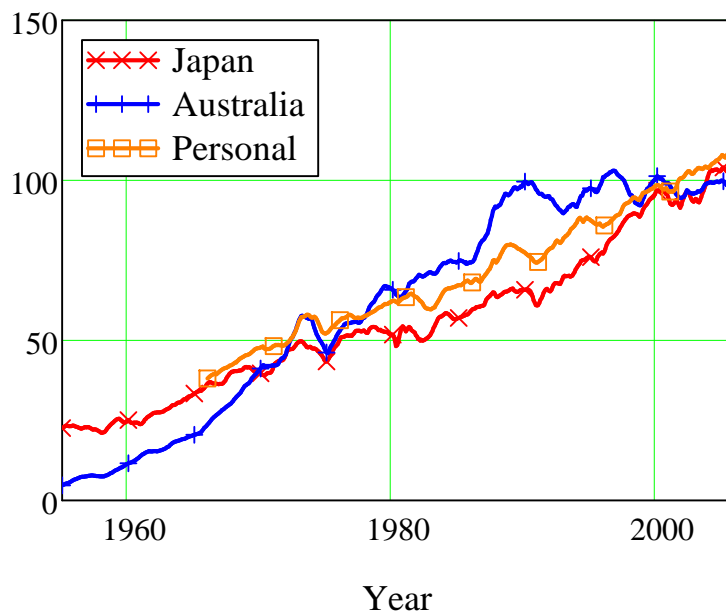
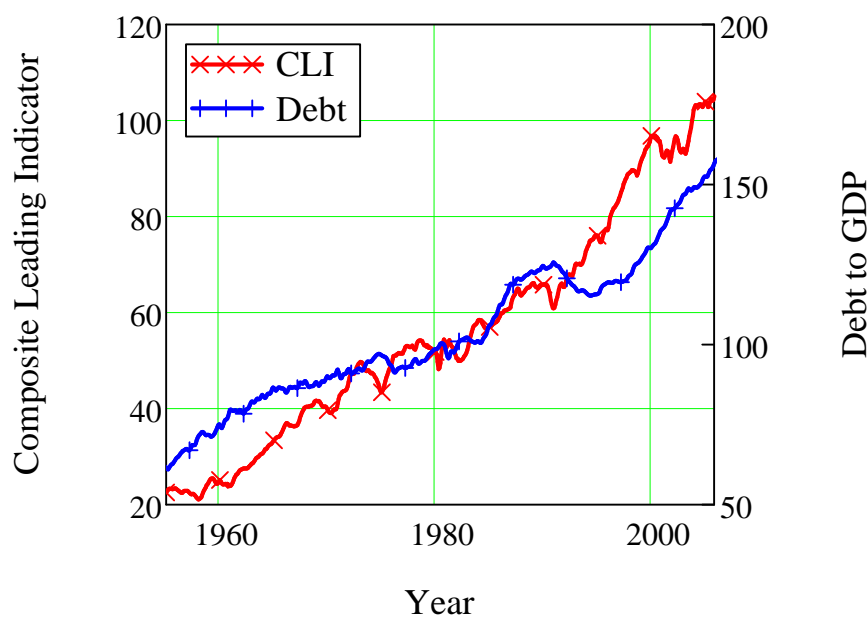


▶ Debt to GDP Regression

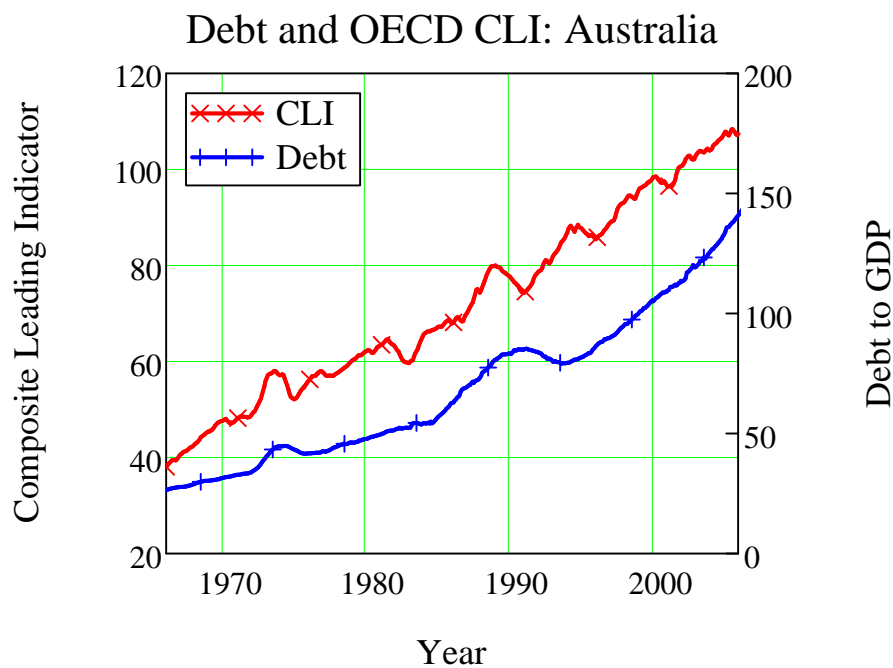
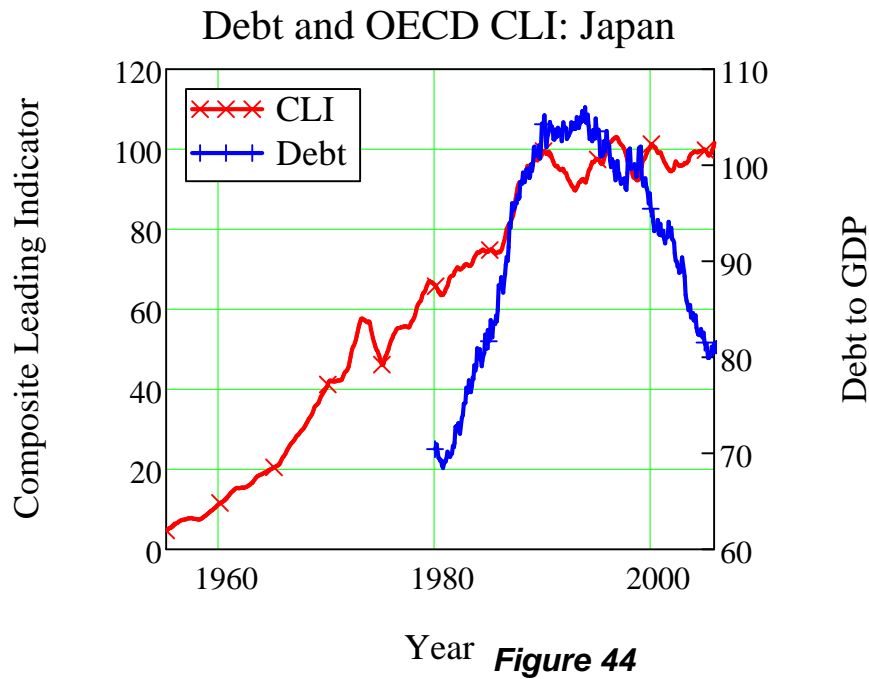
Australia's Private Debt to GDP Ratio



▶ OECD Composite Leading Indicators

Figure 41**OECD Composite Leading Indicators****Figure 42****Debt and OECD CLI: USA****Figure 43**

Japan was the last major economy to experience a debt deflation. Though I do not think the debt data here is comparable to that shown for the USA and Australia (which is sourced from their respective Central Banks), the role of debt in bringing the economy to a standstill is obvious from this chart. Equally obvious is how economically debilitating the process of reducing debt to income levels was--and also how necessary it was to be able to restore growth.

**Figure 45**

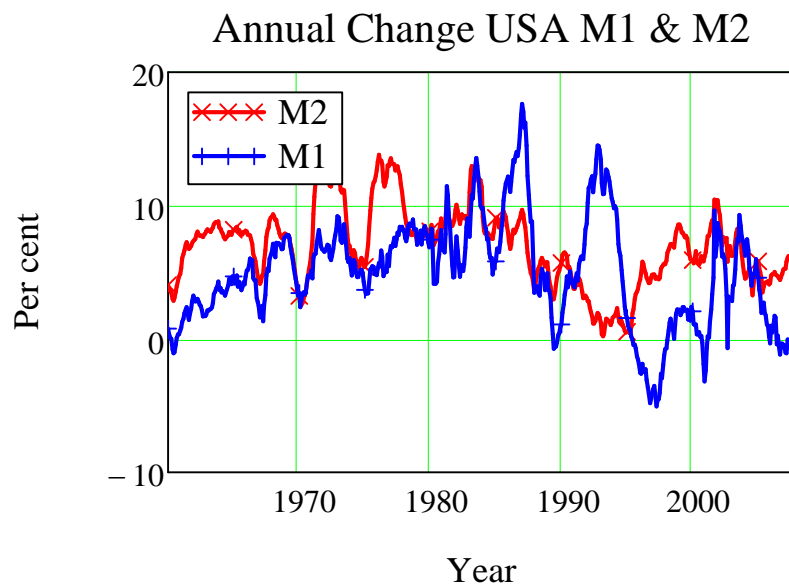
USA Monetary Data

▼ Change in USA Monetary Aggregates

$$\text{USAGE0}_{01} := \text{ToPercent}(\text{ChangePC}_{\text{Period}}(\text{USA}_{\text{M2_NSA}}, 12)) \quad \text{USAGE0}_{01}$$

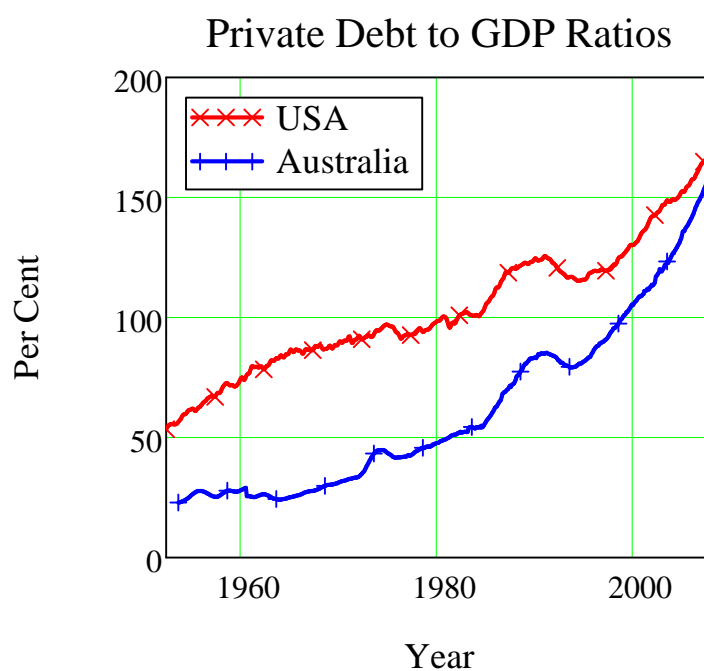
$$\text{USAGE0}_{02} := \text{ToPercent}(\text{ChangePC}_{\text{Period}}(\text{USA}_{\text{M1_NSA}}, 12)) \quad \text{USAGE0}_{02}$$

▲ Change in USA Monetary Aggregates



▶ USA & Aus Debt

Figure 46



☐ Exchange Rates: F11

$GI01_{01} := \text{ExRateUSA}$, $GI01_{02} := \text{ExRateJapanAus}$

$GI02_{01} := \text{ExRateTWI}$, $GI02_{02} := \text{ExRateSDRAus}$

$GI03_{01} := \text{ExRateUKA}$, $GI03_{02} := \text{ExRateNZAus}$

$GI04_{01} := \text{ExRateChin}$, $GI04_{02} := \text{ExRateHongKo}$, $GI04_{03} := \text{ExRateTaiw}$
 $\text{ExRateIndonesiaAus} := \text{DimData}(\text{F11}, 10)$

$GI05_{01} := \text{ExRateIndor}$, $GI05_{02} := \text{ExRateMalaysi}$, $GI05_{03} := \text{ExRateSKoreaAu}$

▲ Exchange Rates: F11

Figure 47

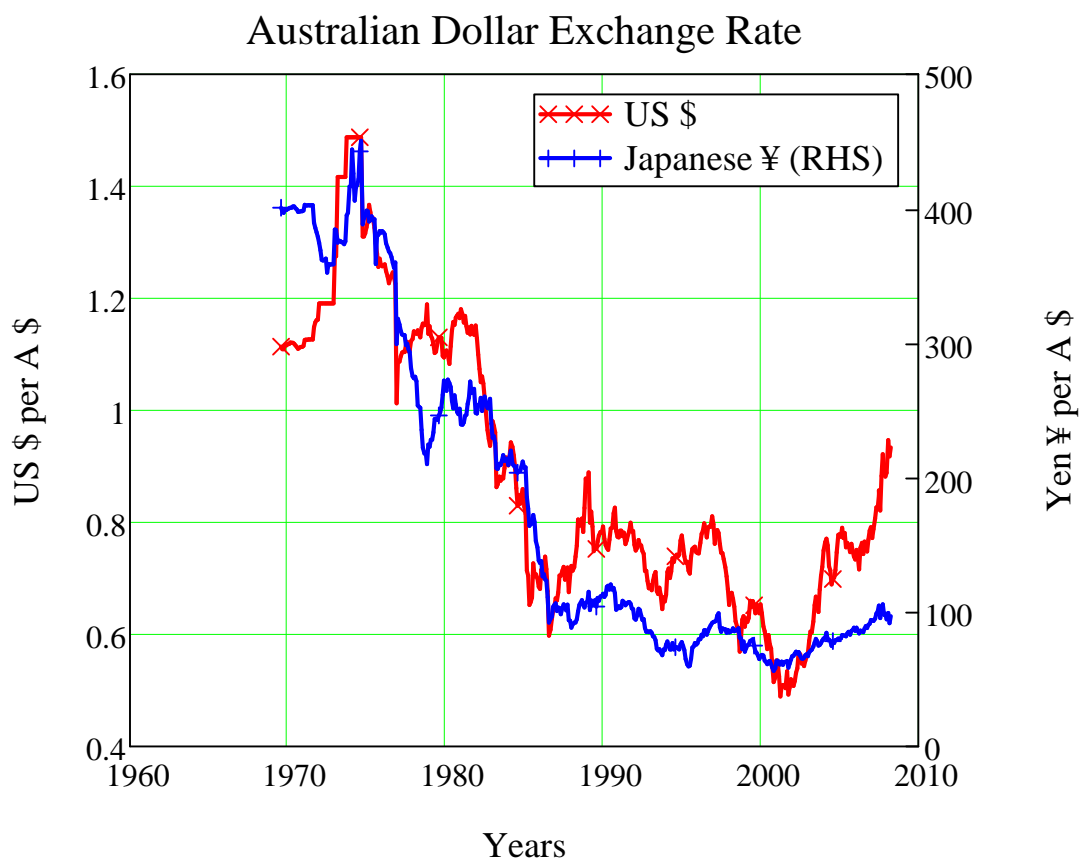
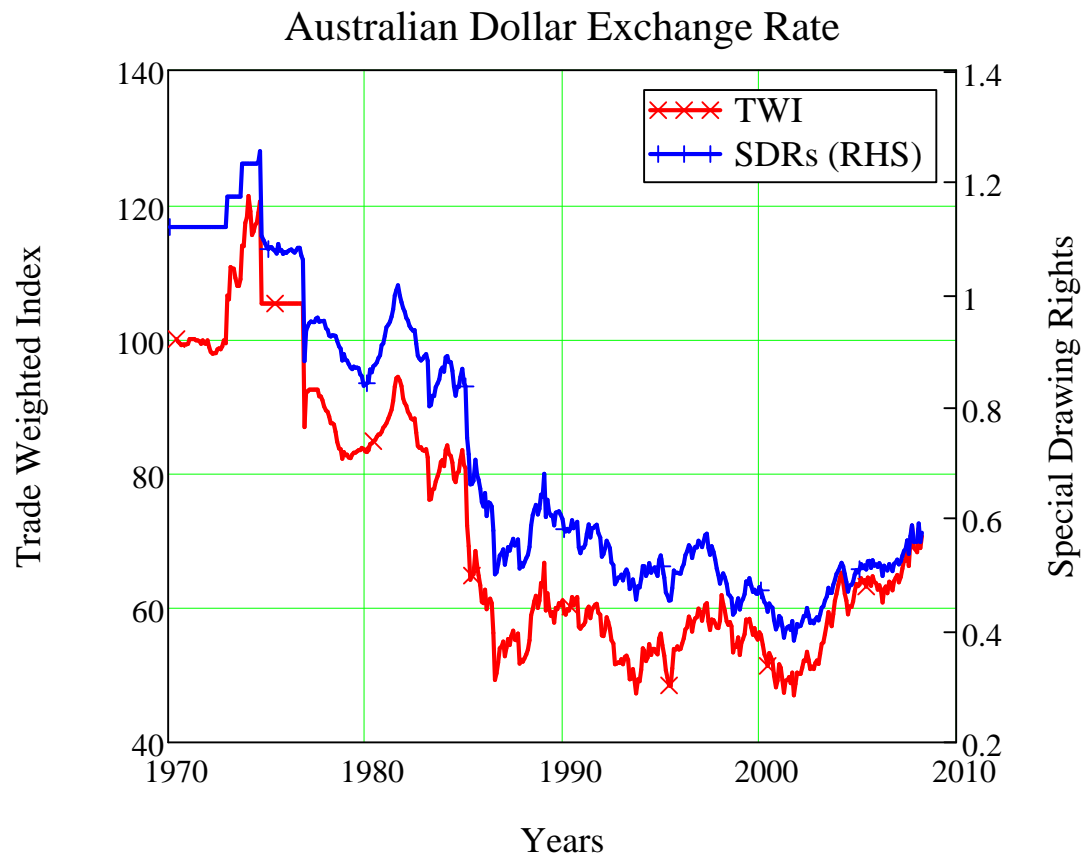
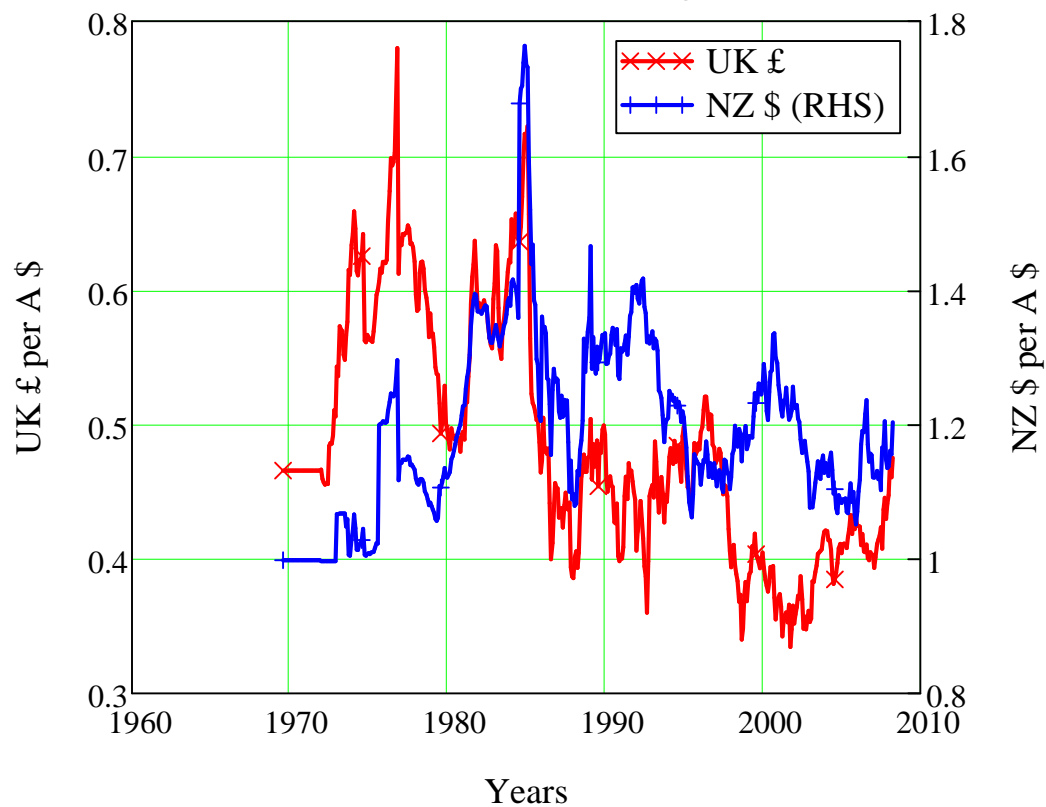


Figure 48



Australian Dollar Exchange Rate



Australian Dollar Exchange Rate

