

Japan's Lost Decade

- *An investigation into the causes* -

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Abstract:

Japan, the world's second largest economy for much of the late twentieth century, entered into a deep and prolonged recession in the last decade of the twentieth century. For most of the decade, real interest rates were nearly zero, and per capita GDP growth rates also stagnated.

Various hypotheses have been put forward to explain the reasons behind Japan's lost decade. Some of the hypotheses that have been put forward are the liquidity trap hypothesis (by Paul Krugman), external trade imbalance, decline in consumption and a decline in productivity among several others.

This project aims to carry out some empirical tests on these hypotheses and also apply concepts learnt in the IInd year macroeconomic classes to the last decade to test the real-life application of what we learn in class.

The first section is dedicated to a brief introduction of macroeconomic trends followed by an analysis of disaggregated data on consumption, productivity and investment. This is followed by an analysis of the external sector.

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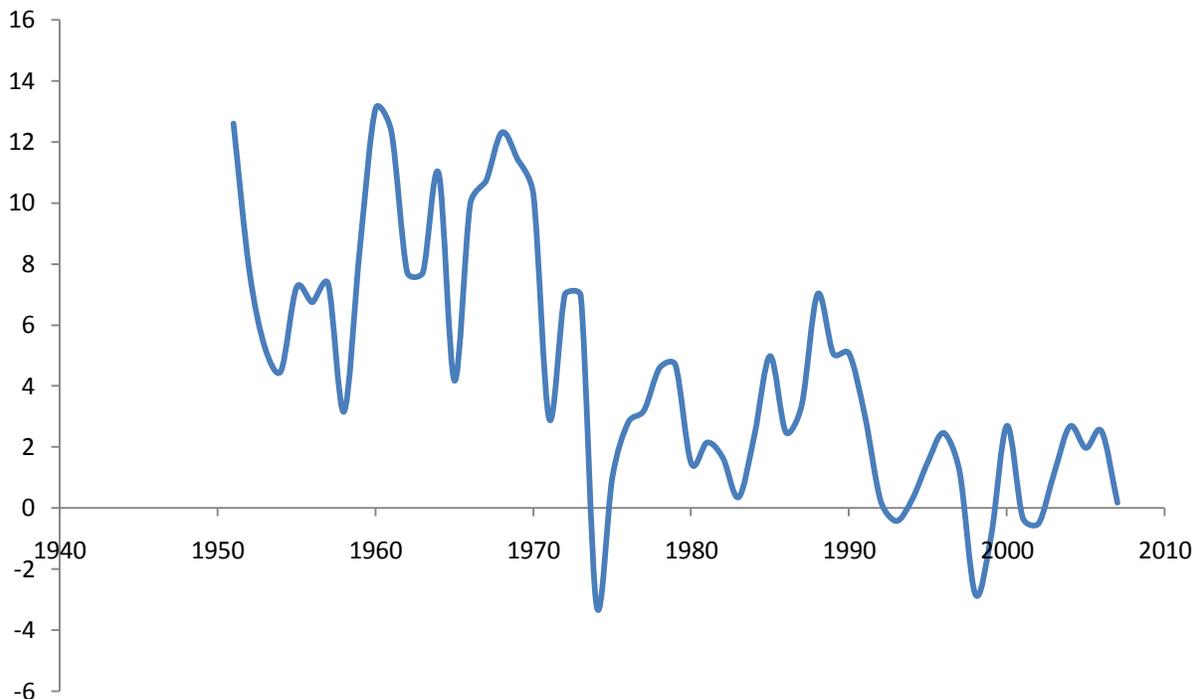
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Introduction

Post World War – II, where it was on the losing side of the war, Japan consistently registered high rates of economic growth for at least 20-30 years, unseen in the modern era (only recently replicated by China). Several hypothesis have been put forward to explain the reasons for Japan’s high growth – for example, the destruction of capital stock as a result of the war, that took the economy far from the steady state level of income. However, discussion of those reasons is not of much interest to economists.

What is of more research interest is the sharp and prolonged downturn in growth rates in the 1990s. While Japan also saw a deceleration in growth in the 1970s on account of the oil shocks, it recovered in the 1980s to moderate growth rates of 4-6% on an average. However, till date Japan has been unable to recover from the downturn in the 1970s.

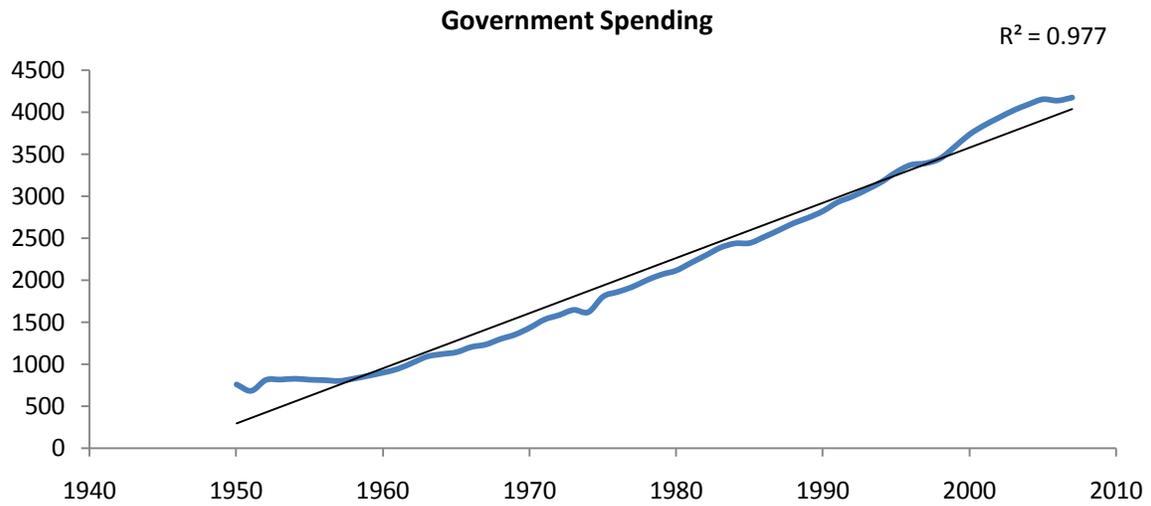
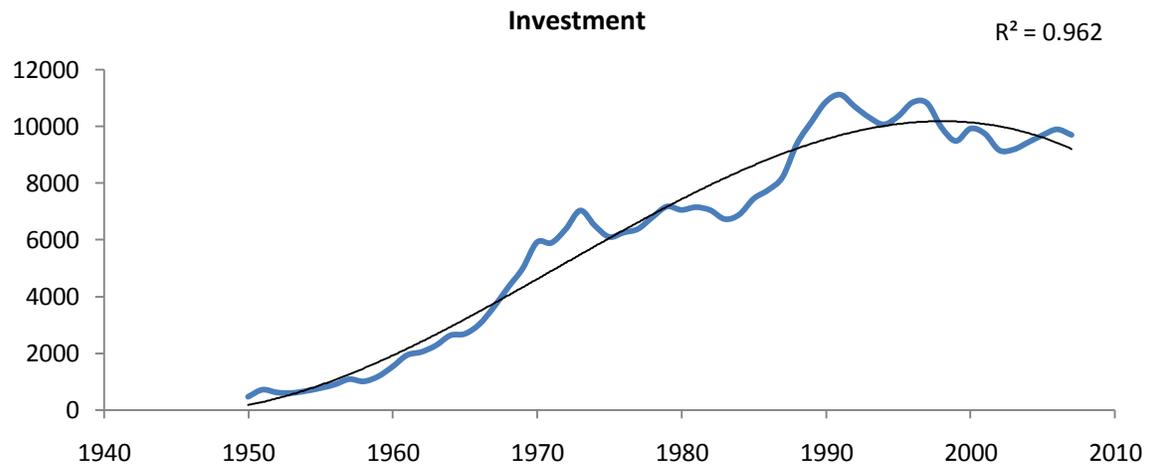
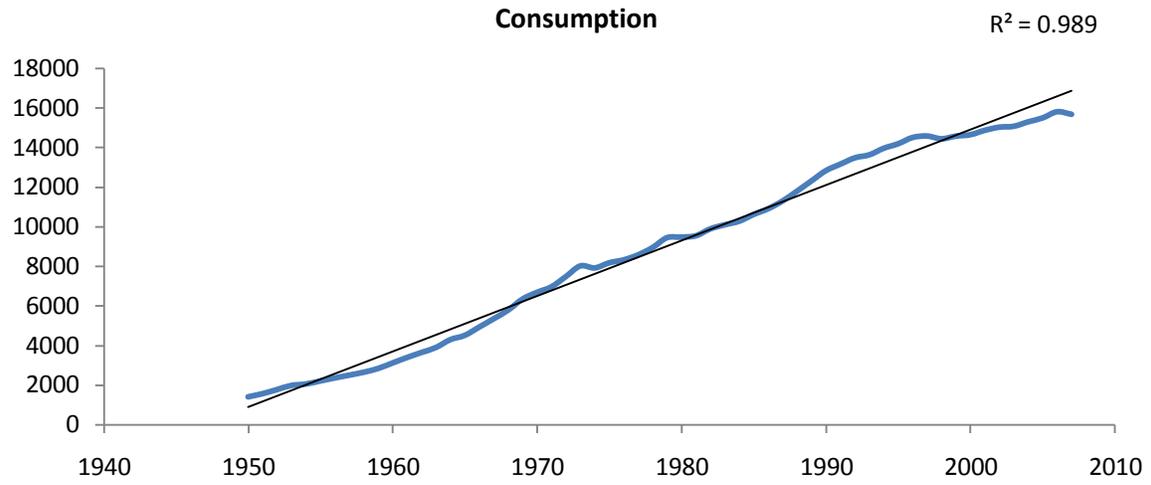
FIGURE 1.1: REAL GDP PER CAPITA GROWTH RATE



Source: The Penn World Tables

An analysis of Japan’s poor performance has to begin by looking at the disaggregated data of GDP components. According to standard economics, GDP (Y) can be expressed as the sum of consumption (C), investment (I), government expenditure (G) and net exports (NX). Since the external sector is dealt with in a separate section, here we look only at C, G and NX.

FIGURE 1.2: CONSUMPTION, INVESTMENT AND GOVERNMENT SPENDING IN JAPAN (US \$)



Hence, we can make the following conclusions at the preliminary stage:

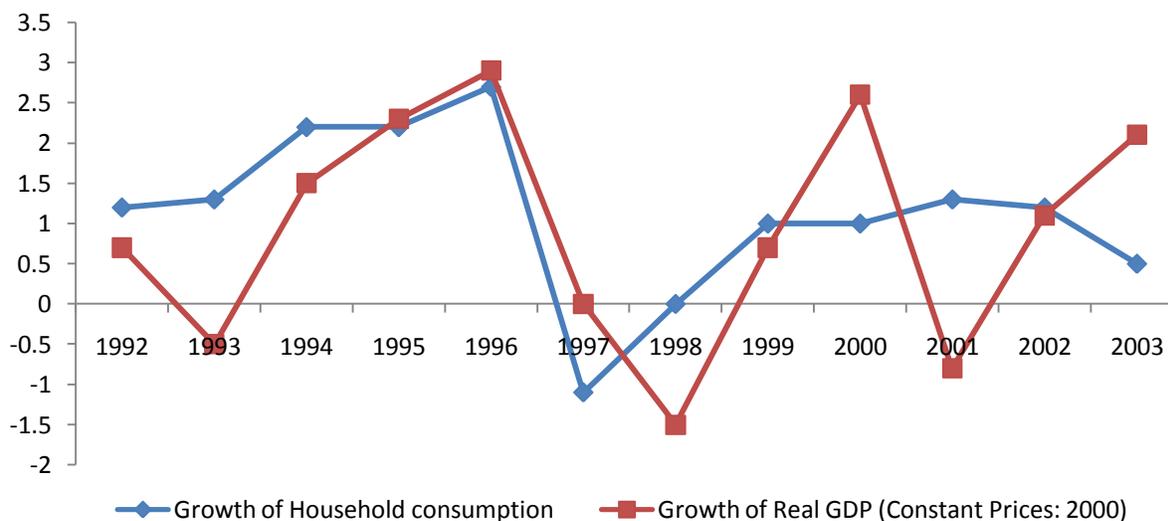
- (1) Consumption: Consumption was more or less stable throughout Japanese economic history. The only significant upswing in consumption above trend was seen in the lost decade of the 1990s. Why this increase in consumption spending was unable to boost the economy needs further investigation.
- (2) Investment: Investment has been highly variable throughout Japanese economic history. However, the two significant phases of economic growth in Japan – the late 1960s and late 1980s – have been associated with a sharp upswing in investment spending. Hence, *prima facie*, it appears that a decline in investment spending was the cause of the lost decade. If so, then why did investment spending decline and why did monetary policy fail to work?
- (3) Government Spending: Government spending in Japan contributes to about 12-15% of GDP, and even though it shows a largely stable growth rate, its effect on output would be marginal. Hence, we come to the question of why fiscal stimuli undertaken by the Japanese Government was unable to pump up the economy.

Consumption

The average consumption share of the real GDP per capita was about 51% during the Lost Decade, indicating that like most economies, consumption played a significant role in determining the aggregate demand in Japan. Hence, it is instructive to take a closer look at the growth of consumption and its components during the Lost Decade.

Household consumption grew at an **average rate of 1.2% per annum during 1991-2003** in contrast to the **average 4.04% during the 1980s**. Given the slow growth rate and the relative share in the overall contribution to GDP it is plausible that household consumption was the major depressor during the Lost Decade. We take a closer look to see if this is true.

FIGURE 2.1: GROWTH RATE OF HOUSEHOLD CONSUMPTION AND REAL GDP (CONSTANT PRICES: 2000)



Source: Japanese Central Bank Website

Charles Yujo Hpropka (2006) has looked at the change in the average annualized growth rate of each component of GDP and the contribution of each component of GDP to the decline in the real growth between 1980-1991 and 1991-2003. His contention is that household consumption did not act as a drag on the economy. He justifies this by stating the following facts:

- (1) that the decline in the growth rate of GDP between 1980-91 and 1991-2003 (2.75 percentage points) is considerably more than the decline in the household consumption during the same period (2.03 percentage points) and correspondingly that the growth rate of real GDP in the 1991-2003 period (1.56 %) was greater than that of household consumption (1.14%).
- (2) In eight of the ten years the growth rate of household consumption was higher than that of the real GDP.

TABLE 2.1: SECTORAL CONTRIBUTION TO GDP GROWTH (IN %)

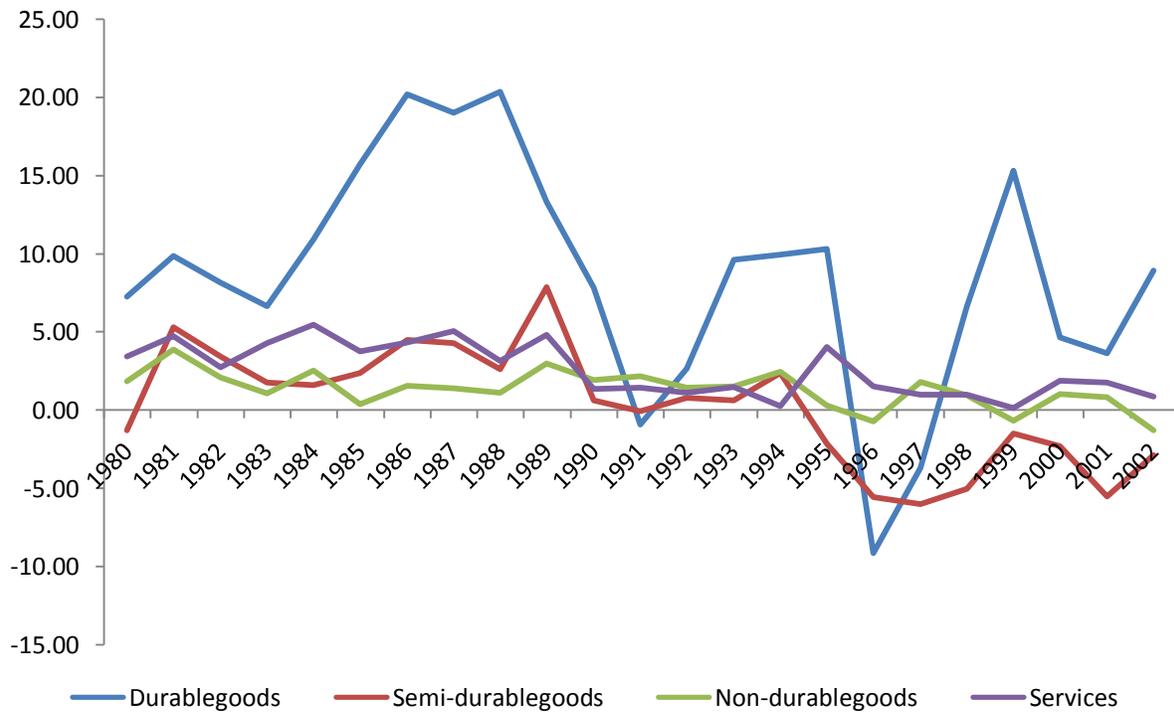
	1980-1991	1991 – 2003
Household Consumption	57.2	85.4
Government Consumption	5.5	18.6
Net Exports	0.4	13.8
Government Fixed Investment	1.7	- 1.3
Inventory Investment	1.1	- 4.4
Private Fixed Investment	34.1	- 11.5

Source: Charles Yujo Hpropka (2006)

We now move on to look at the composition of household consumption. Items are divided into four categories:

- (1) Durable goods: household furnishing and appliances, automobiles, entertainment, leisure, jewelry
- (2) Semi-durable goods: clothing and footwear
- (3) Non-durable goods: food and beverages, tobacco, water, electricity, fuels, rent, books and newspapers
- (4) Services: health, transport, communication, education, restaurants, financial services

FIGURE 1.2: GROWTH IN COMPONENTS OF CONSUMPTION EXPENDITURE



A look at the data in the aggregate categories seems to satisfy intuition.

- (1) Durable goods display high volatility suggesting the high elasticity of demand of its components which could be broadly classified as luxury items.
- (2) Semi durable goods follow a downward trend in their growth rates turning negative after the mid-90s and thus acting as a drag on consumption expenditure.

- (3) Non-Durable goods growth rate too follow a downward trend but not as steeply as Semi-Durable goods. This can be explained by stating that this category contains necessities such as food, electricity, water and gas and hence the elasticity of demand is low.
- (4) Services seem to be relatively stable with a positive rate of growth through-out the two decades.

A puzzle arises as we move past the aggregate categories and into the items themselves. This comes when we divide services into luxury and necessities. A safe remark in the previous analysis would be that non-durable goods and services protected the consumption demand from the volatility of durable goods and the contraction of semi-durables.

Intuitively, the necessities provided some stability to the household consumption. However when we break these categories up we find that the items that grew above the growth rate of household consumption were **communication** (11.69%), **health** (3.66%), **recreation and culture** (2.99%), **household, electricity, gas and water supply** (2.19%) and **restaurants and hotels** (1.88%). The items that acted as drags with growth rates below the growth rate of household consumption were transport (0.53%), food and non-alcoholic beverages (-0.02%), education (-1.15%) and clothing and footwear (-2.73%). This data seems to suggest that luxuries pulled the household demand while necessities acted as a damper.

There are several possible explanations for this which include demographic trends, technological change and the increase in income and wealth disparities in Japan. In respect to the changing income distribution, the OECD Economic Survey of Japan 2006 report states that the **Gini coefficient measure has risen** significantly since the mid 1980s from well below to slightly above the OECD average and the rate of relative poverty in Japan is now one of the highest in the OECD area. The report goes on to state that the 'key factor' appears to be increasing dualism in the labour market.

“Population ageing is partly responsible for boosting inequality as it raises the proportion of the labour force in the 50 to 65 age group, which is characterised by greater wage variation. However, the key factor appears to be increasing dualism in the labour market. The proportion of non-regular workers has risen from 19% of employees a decade ago to over 30%. Part-time workers earn on average only 40% as much per hour as full-time workers, a gap which appears too large to be explained by productivity differences. Although the increase in non-regular workers has been partly caused by cyclical factors, there is a risk that labour market dualism will become entrenched, given that thus far only a small proportion of non-regular workers have become regular workers.”

- (*Economic Survey of Japan 2006: Income inequality, poverty and social spending, OECD*)

This phenomenon reflected in changing consumption pattern could also have an effect on the productivity of firms, which we explore in the next section.

Productivity

In our study of the Lost Decade, Total Factor Productivity should be looked at because TFP is expected to act as a damper on economic fluctuations. TFP gains during booms can be accumulated by firms in the form of profits or capital gains and spent during recessionary periods. In this sense TFP acts as a buffer against shocks and as protection against extremities of the business cycle.

“The supply side shock of the first oil crisis was perfectly absorbed by TFP growth from 1970-1975.”

- Part II, National Reports, Japan

TABLE 3.1: GROWTH RATES, TFP FACOR AND CAPITAL INTENSITY

Period	Growth Rate	TFP Factor	Capital Intensity
1960 -73	7.20%	6.50%	2.30%
1973 – 83	2.20%	0.80%	2.10%
1983 – 91	3.60%	3.70%	0.20%
1991 – 00	0.50%	0.30%	1.40%

Source: Fumio Hayashi and Edward Prescott, The 1990's: Japan's Lost Decade-Page 11

Conclusions:

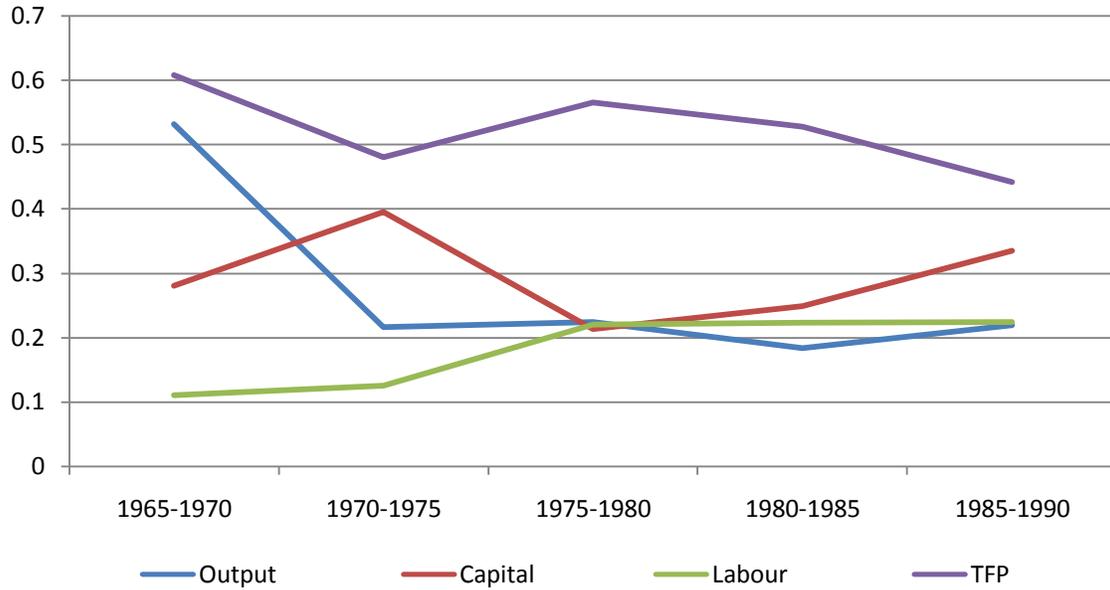
- (1) The contribution of TFP growth between 1983-1991 and 1991-2000 significantly accounts for the decline in the growth in output per working age person. If we look at the periods 1973-1983 and 1991-2000 we see low TFP contributions in both, yet the former period has a higher growth rate that cannot be fully accounted for by its corresponding TFP factor. Here, the capital intensity explains the growth rate in contrast to 1991-2000 where along with a slightly lower TFP there was lower capital intensity too.
- (2) Now look at the periods 1983-1991 and 1991-2000. The capital intensity in the latter period is much more than the former. The TFP, however, is 3.5 percentage points lower and we see this showing up in the growth rate difference. The growth rate of output per working age person is a little more than 3 percentage points. That is a significant difference and seems to be completely accounted for by the TFP difference. This confirms the earlier statement that TFP acts as a buffer and can help to sustain growth when, due to business cycle fluctuations, capital intensity in the economy falls.

Solow Decomposition:

There is one more observation that we need to make that is not obvious when we look at the TFP presented in decadal form. Therefore we have to look at the Solow decomposition of growth in Japan in five year periods from 1960 till 1990. This is the period *preceding* the Lost Decade.

Beginning from 1975-1980, that is a decade and a half, *preceding* the Lost Decade there has been a fall in the Total Factor Productivity contribution to the output growth rate. Notice here we are *not* talking about TFP growth per say, we're talking about Total factor Productivity's contribution to growth (however they are not mutually exclusive). Therefore it can be said that the relative importance of Total Factor Productivity decreased in the economy, while from the figure it is clear that the relative importance of capital increased. This is in line with our previous discussion in decadal terms that said that the capital intensity increased.

FIGURE 3.1: SOLOW DECOMPOSITION OF JAPAN'S GDP GROWTH

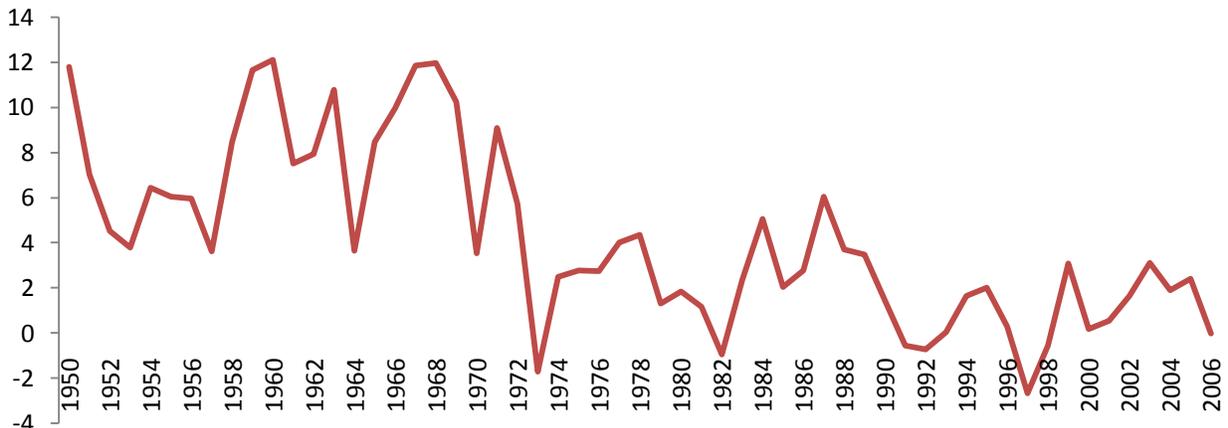


Source: Nirvikar Singh and Hung Trieu, Total Factor Productivity Growth in Japan, South Korea and Taiwan

Now that it is established that the role of TFP in sustaining growth declined as capital intensity increased, we move on to discuss what implication this could have for the Japanese economy over time, starting from around the early 70s.

After World War II, Japan has a reasonably high savings rate. Thus the simple Solow model would imply a high steady state level of output. Japan initially experienced high growth rates both because capital intensity grew as well as because the TFP growth was high i.e. Japan's production curve shifted out. As we come to the mid 70's there seems to be a slackening of TFP, though it was high enough to absorb the shock of the first oil crisis. Capital intensity continued to grow and dominated the slackening of the Japan's TFP. In the early 80's the TFP decline starts to show up. However towards the end of the decade there is a spurt in growth which is primarily a result of the bubble. After the bubble bursts the economy collapses into the Lost Decade characterized by high capital intensity but low TFP growth.

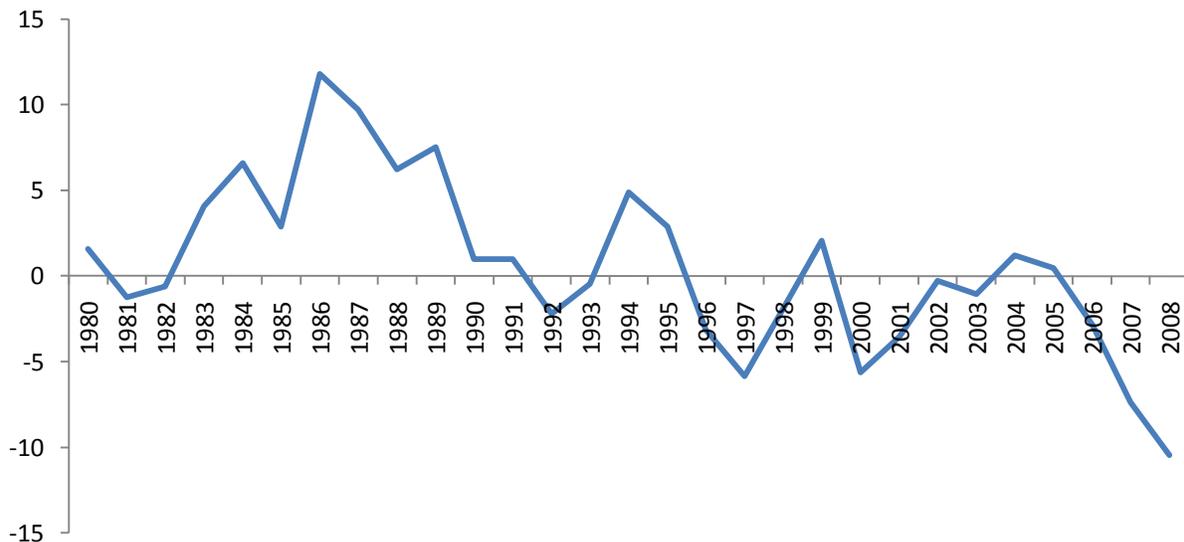
FIGURE 3.1: REAL GDP PER CAPITA



Investment

In her paper, 'Accounting for the Lost Decade in Japan', Suparna Chakraborty tests different factors namely labour, investment and efficiency that may have an effect on the economy in a consolidated growth model. Her results partially confirm the conclusions reached by Dr. Hayashi and Dr. Prescott. However, her model suggests that investment had a major role in Japan's Lost Decade. She further states that, 'ignoring (the) investment wedge when trying to explain what went wrong in Japan in the 1990s would be a serious flaw.' Therefore we set forth to look at investment during the Lost Decade.

FIGURE 4.1: INVESTMENT GROWTH IN JAPAN

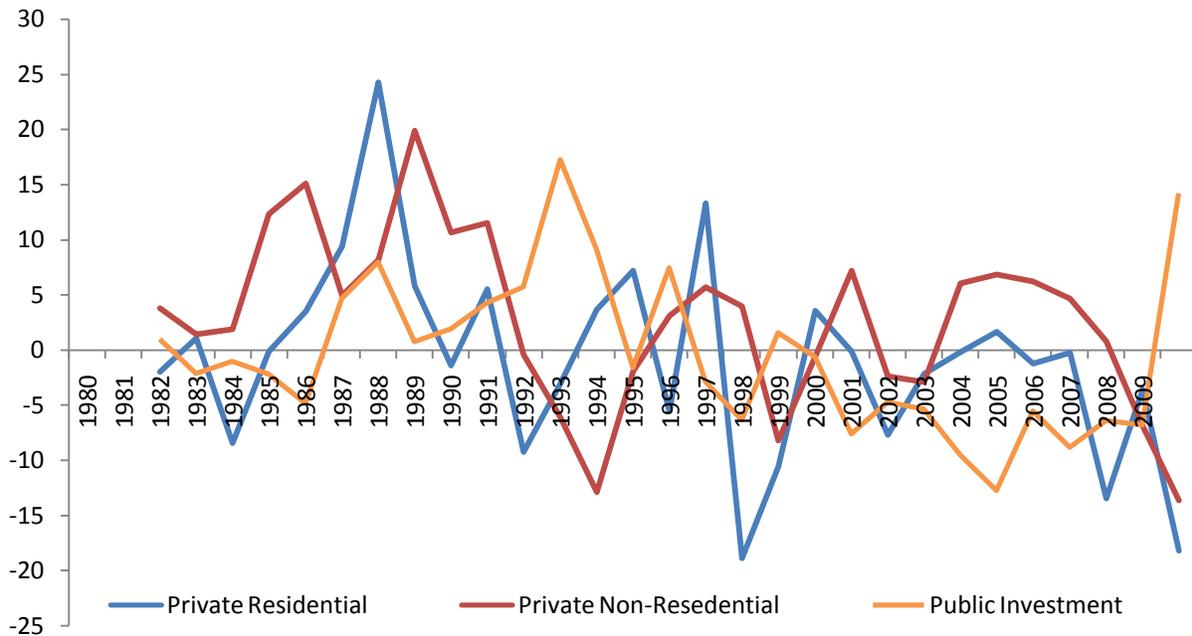


Source: The Penn World Tables

The Second half on the decade preceding the 90s saw a spike in investment growth with an average of 7.45% per annum in striking contrast to the first half that witnessed negative growth in one year and that had an average of 1% per annum. The massive growth of investment from 1985 to 1991 is viewed as a response to and cause of the bubble economy. Some economists have attributed this growth in the late 80s to the fall in investment in the 1990s.

To further analyse the trends in investment, it is necessary to look at the disaggregated investment data. The growth rates plotted in Figure 4.2 suggest that the spike in investment was brought by the shoot in **private residential investment** in 1986 (9%) and 1987 (24%) which was followed by the jump of **private non-residential investment**. This lag could be due to the fact that with the value of land increasing and investment in it increasing the wealth that could be held as collateral increased, leading to growth in private non-residential investment. The downward spiral of residential investment after that suggests that the bubble burst around 1989-1990. From there on both residential and non-residential investment took a tumble with some years having negative growth rates. The government in its effort to mitigate the crisis boosted its investment in the early 90s but subsequently that showed a negative trend too.

FIGURE 4.2: GROWTH RATES OF COMPONENTS OF INVESTMENT



Source: Bank of Japan (BoJ) Website

Several reasons have been put forward for the decline in investment post bubble period. Some of these are:

1. **Sharp curtailment of bank lending** and increase in systemic risk, both of which were caused by the financial asset bubble and the proliferation of non-performing loans, which in turn was caused by the collapse of the bubble economy in the late 1980s
2. A further curtailment of bank lending due to untimely **introduction of the Basel guidelines** for capital adequacy in 1993.
3. The **inadequacy of government actions** aimed at resolving the financial crisis and the non-performing loan problem.
4. The inadequacy of aggregate demand due in large part to the **inadequacy of monetary and fiscal stimuli**
5. **Increased uncertainty** about future prospects for the Japanese economy as well as increased volatility
6. **Massive overinvestment** in corporate plant and equipment during the bubble years, which induced firms to sharply curtail fixed investment during the post bubble years as well as a way of reducing excess capacity in the corporate sector.

The External Economy

A possible explanation for Japan's real GDP decline in the 1990s can be found in its international linkages.

Openness on the eve of the lost decade

TABLE 5.1: OPENNESS RATIO OF SELECT ECONOMIES
1990, Constant Prices

Italy	42.58
Germany	40.66
United Kingdom	36.97
France	32.71
China	23.81
India	17.05
Japan	16.86
USA	16.47
Russia	11.17

Source: Penn World Tables

As we can see, as of 1990, Japan's foreign trade as a ratio of its GDP was not extremely high, and was in fact lower than part-communist China and a yet-to-be-liberalised India. The reason for Japan and USA ranking very low on the openness ratio is the fact that their domestic economies were extremely large, and hence the base on which the openness ratio is calculated was large.

Hence, any kind of fluctuations in the foreign exchange rate should *ideally* not lead to too much of a downturn in the real economy. With this fact in mind, we now take a look at the international linkages of Japan over time.

Evolution of openness over time

Since the end of the Second World War, Japan has continuously shown an increasingly open economy over time. Given that the Japanese economy was relatively small in the 1950s, it is remarkable that Japan's foreign trade has more than kept pace with the growth of its economy. Some basic calculations show that Japan's openness ratio has increased, on an average, 0.4% every year. This means that every year the total imports plus exports have grown 0.4% more than the growth in GDP.

This uniform and consistent growth enabled us to fit an exponential trendline on Japan's openness ratio. This time-series regression shows an extremely high R^2 value of 0.96, which is an extremely high value for any time-series regression. Accordingly, Japan's openness can broadly be categorized into four distinct time phases:

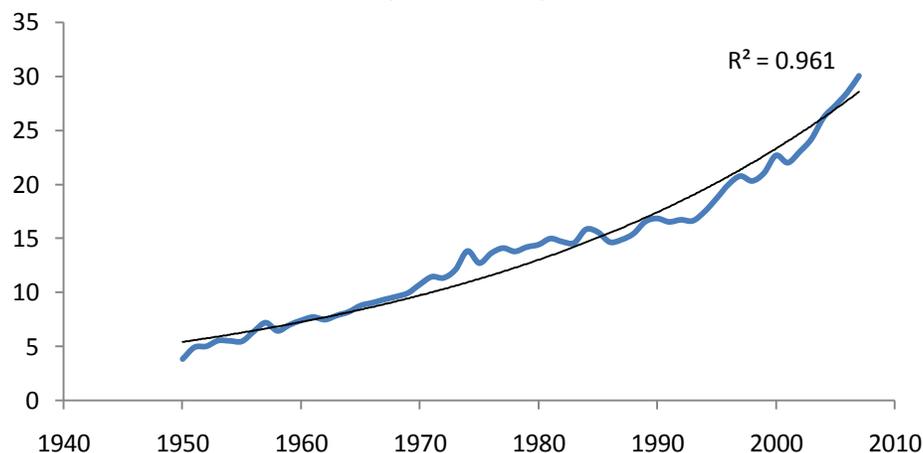
- (1) 1950 – 1970: Uniform growth in openness ratio
- (2) 1970 – 1990: Above-trend growth in openness ratio
- (3) 1990-2003: Below-trend growth, and frequent stagnation, in openness ratio
- (4) 2003 onwards: Recovery in growth trend of openness ratio

A point to be noted is that the openness ratio measures only the physical imports and exports, and ignores the capital flows. However, in the late 1980s, Japan was witnessing a massive asset price bubble, which was largely fuelled by foreign money. Hence, the openness ratio tends to understate the actual extent of openness of the Japanese economy.

Another point to be noted is that the openness ratio stagnated in the 1990s despite lower GDP growth rate, which should have reduced the base on which the ratio is calculated, and hence should have, in fact, increased the openness ratio had trade not suffered.

From these figures, we can make two conclusions. Firstly, that the Japanese economy was opening up at an increasing rate in the decade just preceding the lost decade. Secondly, the lost decade witnessed a slowdown in the rate of openness. The remaining part of this section aims to establish the causality, i.e. was it a reduction in foreign trade that led to the lost decade (and if so, they why), or was it the lost decade that led to a decline in openness?

FIGURE 5.1: EVOLUTION OF JAPAN'S OPENNESS RATIO
(Constant Prices)



Source: Penn World Tables

Effect of increasing openness on the domestic economy

We now briefly look at the exchange rate movements just before the lost decade. Following the Plaza Accord of 1985, the Yen saw a tremendous appreciation from around ¥240/\$ in 1982-84 to a high of ¥79/\$ in April 1985. This represented a tripling of the Yen's value. This would cause exports to reduce due to reduced competitiveness, and also the import bill to rise. As a direct consequence, the trade surplus should have declined, which it did, in the immediate aftermath of the Plaza accord (refer to figure 2).

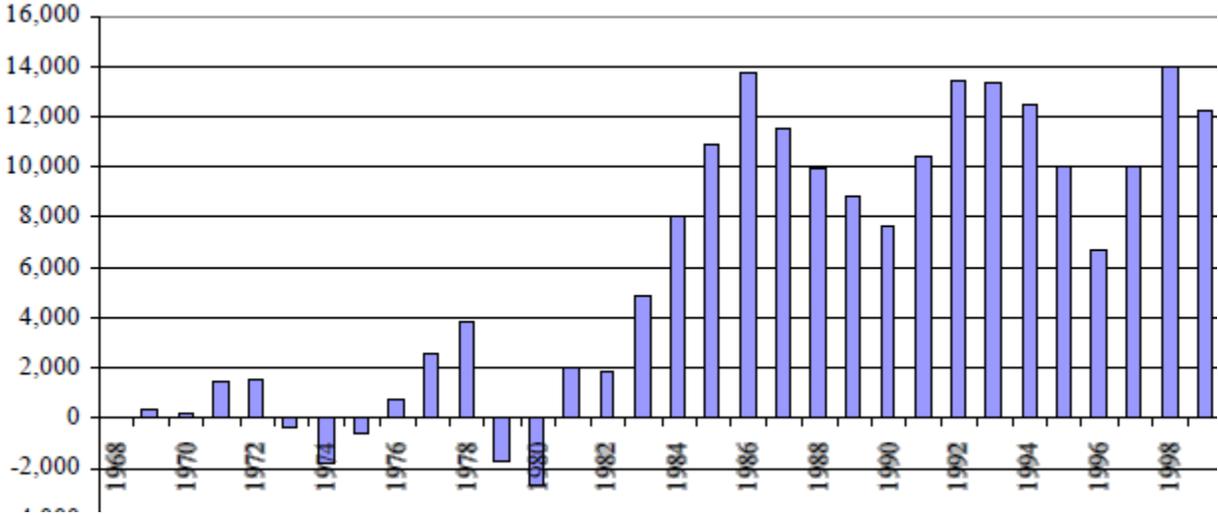
Around the late 1980s, there was also a massive asset price bubble in the Japanese economy. Foreign and domestic capital flowed freely into Japan. In fact, it is said that a square kilometer of land below the Imperial Palace in central Tokyo was valued more than the entire state of California! There can be ascribed two possible causes of this asset price bubble:

- (1) There were speculators investing in Japan, hoping to make a profit as the yen appreciated
- (2) As this increased asset prices, capital flowed into Japan in search of capital gains

In order to check this asset price bubble, the Bank of Japan followed a contractionary monetary policy briefly in 1989-1990. In the IS-LM space, this would correspond to an inward shift of the LM curve, which reduces the output in the short run, and also results in a trade surplus. This theory is borne out by the fact that the trade balance improved continuously starting 1990 (refer to figure 2). This would also lead to an appreciation of the Yen, which is also seen in figure 3.

As a result, the openness ratio would also decline, because the exports would get priced out of international markets, and imports would reduce because of a tight monetary policy. *This explains the below-trend growth in openness that we saw in figure 1.*

FIGURE 2: JAPAN'S TRADE BALANCE
(Billions of Yen)



Source: International Monetary Fund, International Financial Statistics Yearbook (various issues)

Hence, we are now in a position to conclude that the initial dip seen in the early 1990s was a result of a contractionary monetary policy followed by the BoJ.

The Policy Response and Effect on International Trade

In this sub-section, we check the effects of the policy response to the dip in growth on the exchange rate and balance of trade. First, we take a look at the underlying theory and then, we look at actual trends to ascertain whether the regular theory prescriptions held or not.

The lost decade was characterized by an expansionary monetary policy. The Bank of Japan (BoJ), though it was accused of being late to react to the crisis, did eventually cut interest rates in an attempt to boost investment expenditure. Macroeconomic theory dictates that this should have led to a flight of capital out of Japan, hence depreciating the Yen and increasing the trade competitiveness of Japanese exports.

At the same time, the Government was pursuing an expansionary fiscal policy. Under normal circumstances, this should have lead to an acceleration of growth, reduction in trade surplus and hence depreciation of the Japanese yen. However, we know that the expected price inflation did not happen, and hence the trade competitiveness of Japanese exports would not have been reduced. Hence, theory

demands that imports should have remained largely unaltered, exports would have increased (or at least not deteriorated). This would mean that the trade balance would move to greater surplus, and hence the Japanese yen would appreciate.

Which of these two contradictory effects was stronger? The data in the period 1992-1995 shows that the Japanese balance of trade remained fairly stable, and did not deteriorate much. In contrast, the Japanese Yen continued to appreciate. Hence, we can conclude that the expected effects of monetary policy did not materialize, and a price depreciation, for whatever reason it took place, lead to a further strengthening of the Yen.

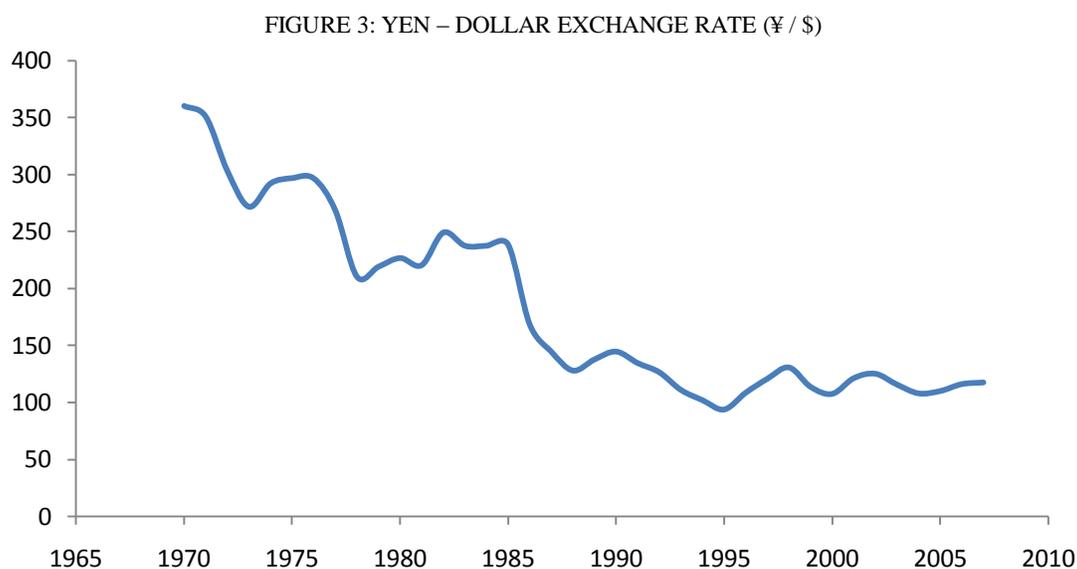
After the initial dip

Monetary contraction should have lead to an increase in interest rates. However, interest rates around this time declined. There can be two possible explanations of this failure of interest rates to rise:

- (1) A flat money demand schedule at the prevailing interest rate, i.e. a *liquidity trap*. This would mean that interest rates were too low to decrease further. However, this theory is unable to explain why real GDP would not grow, especially since interest rates have not reduced as a result of the contractionary monetary policy. Hence, we turn to our second hypothesis.
- (2) An *exogenous* decrease in money demand, caused probably because of a reduction in investment demand because of the burst in the asset price bubble. This would lead to a decrease in investment, and hence slowdown of GDP growth.

Conclusions

An over-priced Yen can be said to be one of the reasons for the initial dip in the GDP growth. However, the Dollar-Yen exchange rate since the mid-1990s has been fairly stable in the 120-140 range, and hence fails to explain why the lost decade did not end till well into the 2000s.



Source: Penn World Tables

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