

**Remarks for the Panel Discussion on
“Recent Changes in Trend and Cycle”**

by

John B. Taylor¹
Stanford University

March 3, 2000

This panel discussion focuses on two defining features of the new economy: (1) a change in trend productivity growth, and (2) a change in cyclical volatility. No one knows for sure how long either feature will last, but a consensus has been building in the last three or four years that both are more than ephemeral phenomena. In these remarks, I focus on the change in cyclical volatility. I first document the change and its timing. I then discuss its probable cause.

The Change

No matter how you measure it, cyclical volatility from the early 1980s through the present in the United States has been much lower than during the period of similar length immediately before, and perhaps during any period of similar length in history. Whether you look at the size of real output fluctuations around trend, the size of the fluctuations in the growth rate, the length of expansions, the frequency and severity of recessions, or the softness of soft-landings, the story is the same.

¹Prepared for the conference “Structural Change and Monetary Policy” sponsored by the Federal Reserve Bank of San Francisco and the Stanford Institute for Economic Policy Research, March 3-4, 2000. Many of these remarks are based on ideas presented in the 1998 Homer Jones Lecture (Taylor (1998)) and go back to the theme of the 15th anniversary conference of the Stanford Institute for Economic Policy Research held in the summer of 1997 on, “The Long Boom: Causes, Effects, and Economic Policy.”

Consider first the volatility of real output measured as the percentage deviation of real GDP from potential GDP. Figure 1 shows this measure of volatility since 1959 using a Hodrick-Prescott (HP) trend as measure of potential GDP. The volatility of real output seems much smaller than in earlier periods, even than in the shorter period of the 1960s. The two horizontal lines showing the maximum and minimum deviations since the early 1980s are meant to help visualize the reduced volatility. The standard deviation of the percentage output gap fell by more than half, from 4.3 percent in the period from 1959.2 to 1982.4, to 1.8 percent in the period from 1982.4 to 1999.3. Although the HP trend is a purely statistical measure of potential GDP, theoretically based estimates taking account of productivity and labor force growth provide a similar picture.

If one uses quarterly growth rates of real GDP rather than the percentage deviation from trend, the same reduced volatility appears, as shown in Figure 2. The standard deviation of the growth rate of real GDP falls from 1.8 percent in the 1959.2-1982.4 period to 1.1 percent in the 1982.4-1999.3 period.

The decrease in real GDP volatility has been accompanied by a decline in the volatility of inflation (see Figure 3). Hence, there has either been a shifting in, or a movement towards, the inflation-output variability tradeoff frontier. There has also been a decline in the volatility of the major components of real GDP—real consumption, real investment, real exports, and real imports, (see Figures 4 and 5), regardless of whether the measure is growth fluctuations or gap fluctuations. For investment the decline in volatility is greater for the growth rate volatility measure; for consumption the decline in volatility is greater for the gap volatility measure.

One can also compare the length of expansions or the frequency of recessions. The period of the 1980s and 1990s contains the first and second longest peacetime expansions in U.S. history, back-to-back and separated by a relatively short recession. If one does not restrict oneself to peacetime, the period contains the first and third longest expansions in U.S. history. Such a long period of macroeconomic stability is unprecedented. During the period of similar length, from 1965 to 1982, prior to the recent period of stability, there were four recessions—five if you count the large growth slowdown in 1967. The second longest U.S. expansion occurred in the 1960s, but that long expansion was preceded and followed by short expansions.

It is always remarkable when a record breaker appears. But, like Sosa and McGwire, it is even more remarkable when record breakers appear together. It is for that reason that I called this remarkable macroeconomic episode the “Long Boom,” back when the 1990s expansion was still “only” the third longest in history.

The Watershed Dates

For the above numerical calculations of the standard deviations, the quarter 1982.4 was used as watershed date simply because that is the time of the start of the 1980s expansion. I do not think, however, we can pinpoint accurately the date of the change in real output volatility as closely as a quarter. McConnell and Quiros (2000)—in an updated version their 1998 working paper—apply the Andrews-Ploberger tests for structural change with an unknown break point. They originally found that a date five quarters later (1984.1) is the most likely, and confirm that date in the paper presented at this conference. In his comments for this panel, Watson (2000) chooses the watershed

dates to be between 1979 and 1984. Hence, even if we cannot pinpoint the quarter exactly, there seems to be agreement that there was a watershed change sometime in the early 1980s.

Could the change in the cycle have occurred been many years later? Brainard and Perry (1999) suggest that the breakpoint occurred the early 1990s, stating that “[The] long expansion of the 1990s was preceded by two decades in which inflation was a stubborn problem and estimates of attainable unemployment rates had drifted pessimistically higher.” Although the expansion starting in 1991 is the longest in American history, and therefore, by definition, represents a cyclical improvement over the expansion that began in 1982, I think the charts and the statistical tests argue that the more significant—economically and statistically—change was in the early 1980s. The high inflation referred to by Brainard and Perry (1999) was on its way down nearly a decade before the start of the 1990s, much closer to the break point preferred by McConnell and Quiros (2000), Taylor (1998), and Watson (2000).

The Probable Cause.

Determining that the change in cyclical volatility occurred in the early 1980s, rather than at some other time, helps to narrow the number of possible explanations for the change. Now I briefly discuss some of the explanations.

1. *A more service oriented economy.* The production of services is less cyclically volatile than the production of goods. Hence, when the production of goods declines as a share of GDP, overall volatility should decline.

The problem with this explanation is that nothing big happened to the services share at any time close to the early 1980s. As a share of GDP, services production has risen from 46 percent in 1950 to 70 percent in 1970 to 75 percent in 1997. So there was an even larger increase in the services share before the cyclically volatile period in the late 1960s and 1970s, than before or during the Long Boom.

2. *Better control of inventories.* There is no question that better inventory control and techniques for monitoring of sales and orders have been implemented as technology has improved. For the same volatility of sales demand, better inventory management would be expected to reduce the volatility of production, according to the production-smoothing model. But to the extent that better monitoring of sales and orders is absorbed in lower inventory sales ratios, one would not see as much of a decline in production volatility. On the other hand with accelerator models of inventories, the lower inventory sales ratios would reduce the volatility of production. McConnell and Quiros (2000) present evidence of reduced inventory sales ratios. But for the economy as a whole this has been a gradual process, rather than a sudden shift in the early 1980s.

A problem with the inventory explanation is that real final sales show nearly the same decrease in volatility as real GDP. The standard deviation of final sales growth declined from 3.4 percent in 1959.2-1982.4 to 2.1 percent in 1982.4-1999.3. That 38 percent decline in volatility is nearly the same as the 39 percent decline for real GDP mentioned above. The standard deviation of the percentage difference between final sales and trend (again an HP trend), fell from 1.5 percent to 0.9 percent for the same two periods, which is also similar to the change in the comparable measure of real GDP volatility.

If one uses the length of economic expansions as the measure of cyclical stability, then the inventory explanation seems to have even more problems. Figure 6 shows a plot of real GDP along with final sales from 1959.2 to 1999.3. The recessions and expansions in final sales are exactly the same as the recessions and expansions in real GDP. While more research is needed (on this point as well as the others) the marked reduction in the frequency of recessions in final sales raises doubts about the view that the lower frequency of recessions since the early 1980s has been due to better inventory management.

3. *Fewer or smaller exogenous shocks.* Some have argued that there have been fewer shocks to the U. S. economy during the 1980s and 1990s, and that some of the shocks that did hit have been benign. It is true that oil price shocks have been an integral part of the macroeconomic history of the 1970s, but there were sizeable oil price shocks in 1990 and again in 1999, and there have been other types of shock in the 1980s and 1990s including the savings and loan crisis of the 1980s and the Asian financial crisis of the 1990s. Moreover, the increase in inflation and macroeconomic instability in the late 1960s and the 1970s preceded the oil shocks. To be sure, in retrospect the Asian crisis has been interpreted as a “good” shock for the United States because the U.S. economy needed to be cooled off and because the appreciation of the dollar helped keep inflation down, but on balance it seems hard to make the case that exogenous shocks have gotten smaller, less frequent, or more benign.

4. *Fiscal policy.* There are two aspects of fiscal policy to consider. *Budget deficit elimination* has been an important accomplishment, but its timing has had little in common with the timing of the consensus view of the break in macroeconomic stability

in the early 1980s. Budget deficits grew in the early 1980s, began to shrink again in the late 1980s, grew again in the early 1990s, and have disappeared in the late 1990s. Nor does *counter cyclical policy* seem to have strengthened. The *discretionary* stimulus packages submitted by Presidents Bush and Clinton in 1992 and 1993 were defeated by Congress. And Alan Auerbach (1999) shows that the *automatic stabilizers* have gotten weaker rather than stronger, though they remain a powerful counter cyclical force.

5. *Monetary policy*. Compared to these other possibilities, monetary policy is a more probable cause of the change in cyclical volatility. The timing is right, and the economic theory is supportive. There was in fact a big shift in U.S. monetary policy toward keeping inflation in check in the early 1980s. I am not referring solely to the 1980-82 disinflation—that was a necessary part of the transition toward a policy of price stability. I am also referring to the difference in the way monetary policy has been conducted during the period of time since the disinflation compared with the period before the disinflation.

You can see this difference with a monetary policy rule that describes Fed interest rate actions. Judd and Trehan (1995), Judd and Rudebusch (1999), Taylor (1999) and others have shown that the Fed was easier or less reactive to inflation in the late 1960s and 1970s than in the 1980s and 1990s. These studies also show that the Fed has gotten more responsive to real output changes in the 1980s and 1990s. The response of the Fed to inflation and real output in the more recent period is about twice as large as in the earlier period. Mark Watson (2000) stresses that the federal funds rate reacted more to real output in his prepared comments for this panel.

I illustrate the huge difference in interest rate responses to inflation graphically in Figure 3. When the inflation rate approached four percent in 1968, the federal funds rate was about five percent. When the inflation rate approached four percent in 1989, the federal funds rate was about ten percent.

It is not surprising that inflation volatility decreased as a result of a monetary policy that has focused so much more on inflation. What may appear more surprising is that there was a decrease in output volatility too. I think the reason is that a monetary policy that has focused more on inflation has prevented the large run ups of inflation that have preceded previous recessions. The problem of the boom-bust cycle has diminished as a result of the new policy. According to this interpretation, the policy has moved us closer to the frontier of the inflation-output variability tradeoff. Checchetti and Ehrmann (1999) have shown a similar improvement in both output and inflation stability as other countries focused more on targeting inflation.

Conclusion

In macroeconomics there is never only one accepted explanation for any big event—whether the Great Depression, the Great Inflation, or the Long Boom. By debating alternative explanations—the purpose of this panel—we learn and hopefully improve policy in the future. For now, my position in the debate is that a change in monetary policy is the major factor behind the period of reduced cyclical volatility from the early 1980s through the present.

References

Brainard, William C. and George L. Perry, (1999) "Making Policy in a Changing World," paper presented at the conference "Economic Events, Ideas, and Policies: The 1960s and After," Brookings Institution, November 12 and 13, 1999

Checchetti, Stephen and Michael Ehrmann (1999), "Does Inflation Targeting Increase Output Volatility? An International Comparison of Policymakers' Preferences and Outcomes." NBER Working Paper, 7426.

Judd, John F. and Glenn Rudebusch (1998), "Taylor's Rule and the Fed," *Economic Review*, Federal Reserve Bank of San Francisco., No. 3 pp. 3-16.

Judd, John F. and Bharat Trehan (1995), "Has the Fed Gotten Tougher on Inflation?" *Weekly Letter*, Federal Reserve Bank of San Francisco, Number 95-13.

McConnell, Margaret and Gabriel Perez Quiros, (2000) "Output Fluctuations in the United States: What Has Changed Since the Early 1980s?" Federal Reserve Bank of New York, paper presented at this conference.

Taylor, John B. (1998) "Monetary Policy and the Long Boom," *Review*, Federal Reserve Bank of St. Louis, December.

Taylor, John B. (1999) "A Historical Analysis of Monetary Policy Rules," in John B. Taylor (Ed), *Monetary Policy Rules*, University of Chicago Press.

Watson, Mark (2000), "Comments," prepared for this panel discussion.

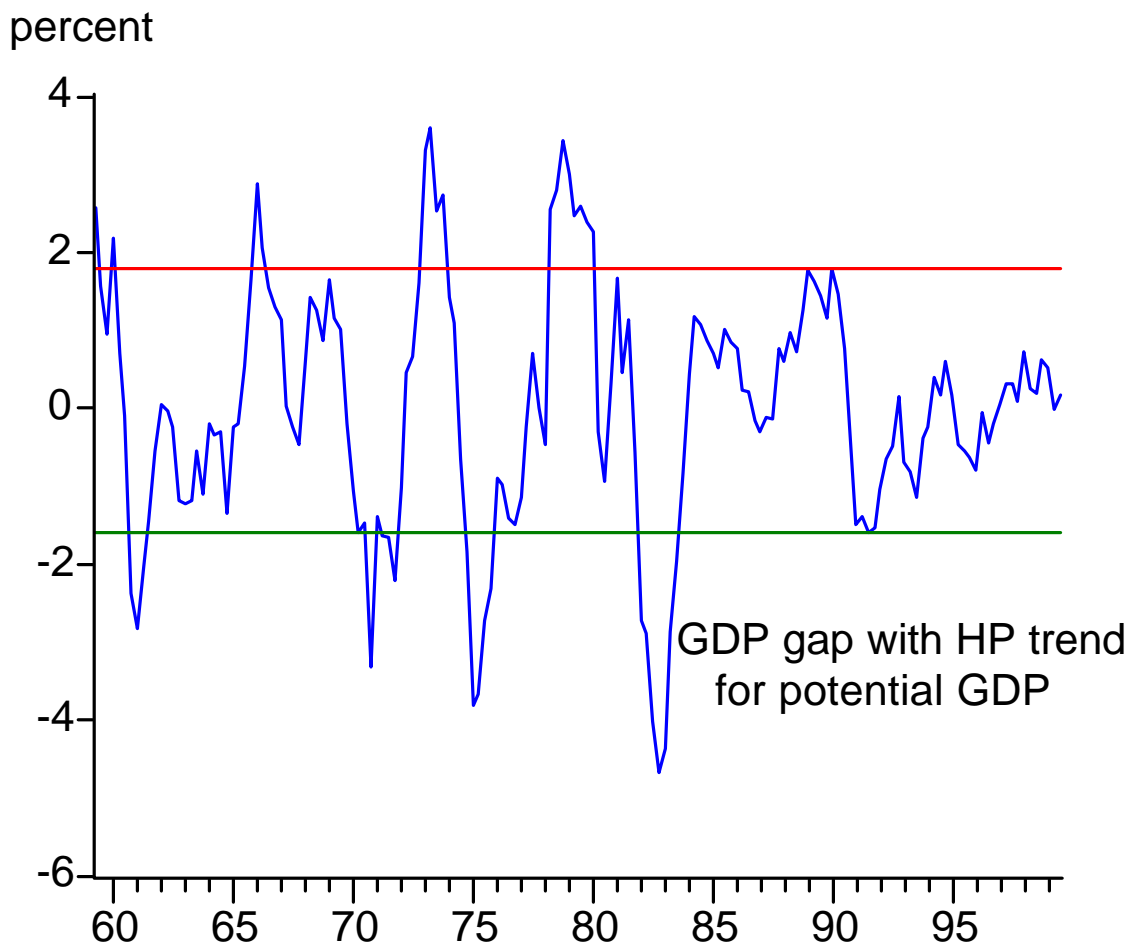


Figure 1. Percentage Deviation of Real GDP from Trend. The plotted series is $(\log(\text{real GDP}) - \text{HPTrend}) \cdot 100$, where HPTrend is the Hodrick-Prescott filter of $\log(\text{real GDP})$. Data as of November 3, 1999.

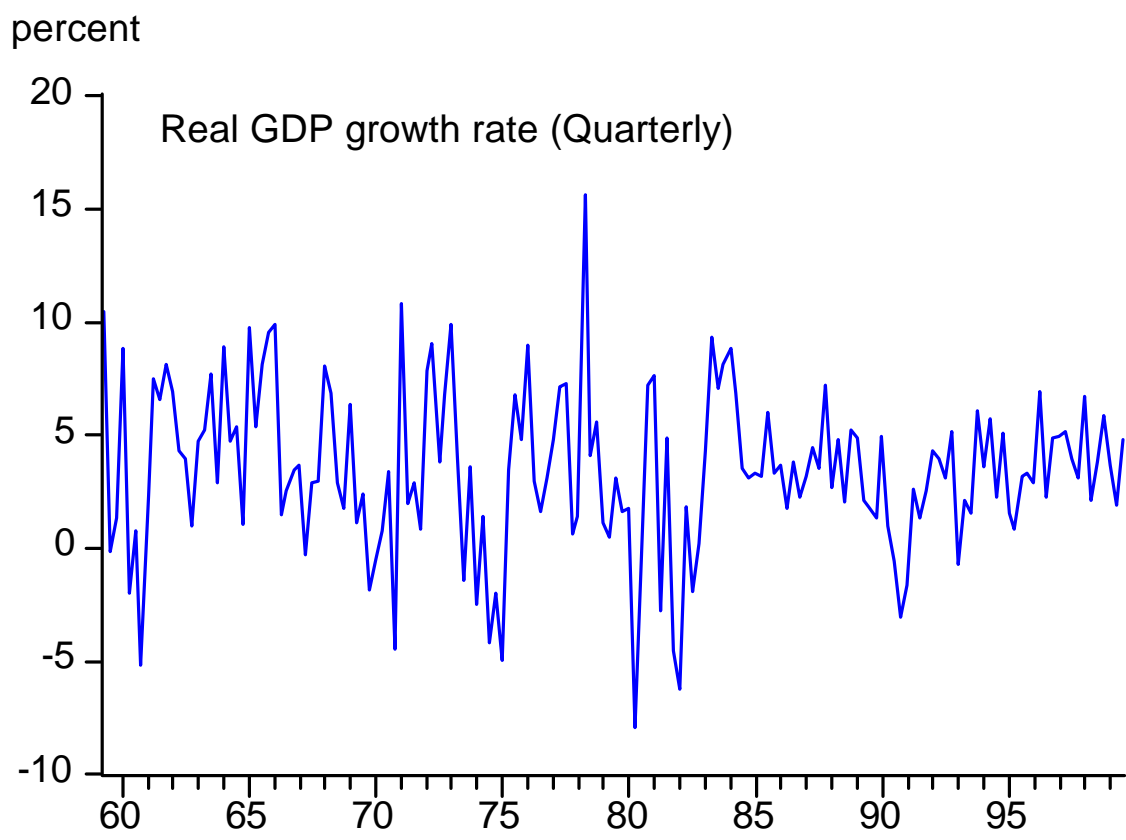


Figure 2. Quarterly Growth Rate of Real GDP.
Data as of November 3, 1999

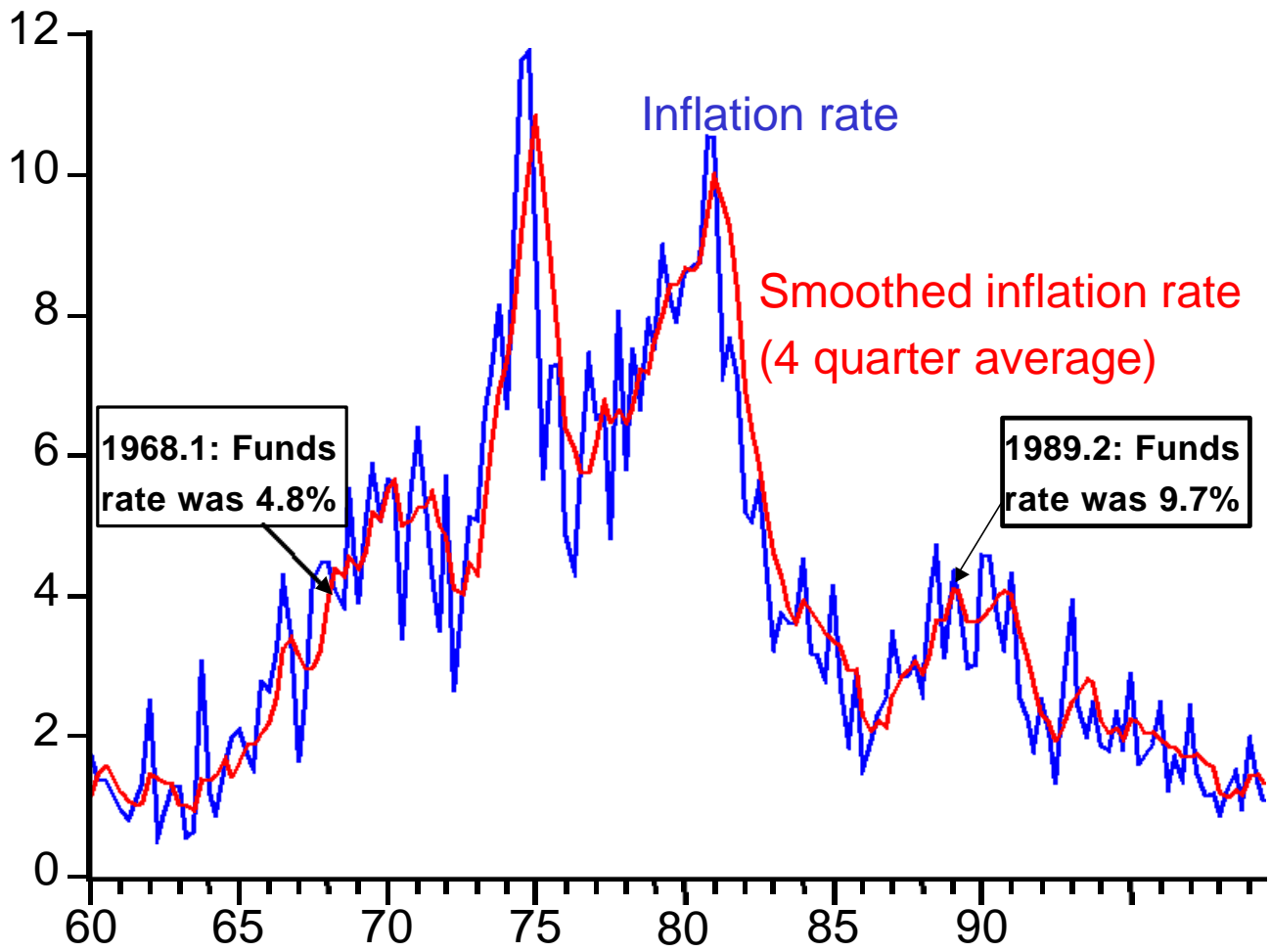


Figure 3. Inflation Performance 1959-1999. The arrows compare two events illustrating the change in monetary policy responses.

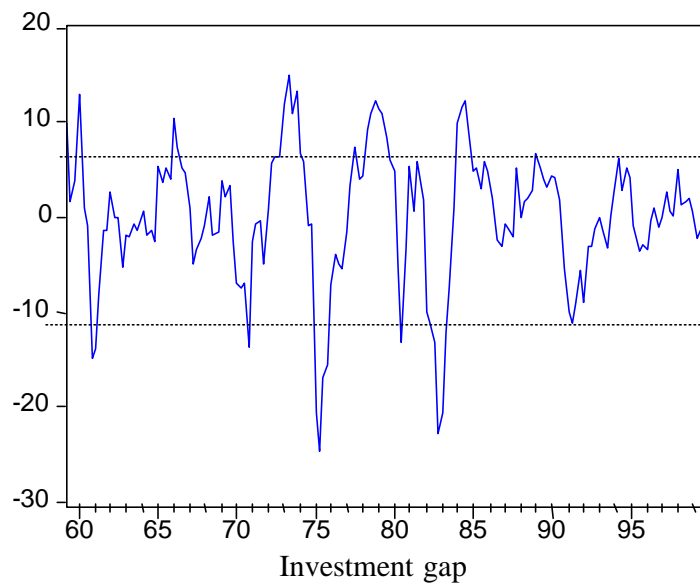
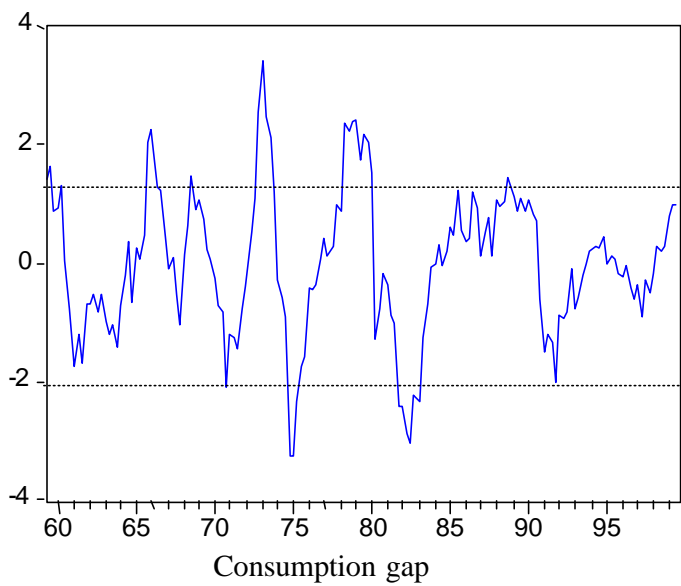
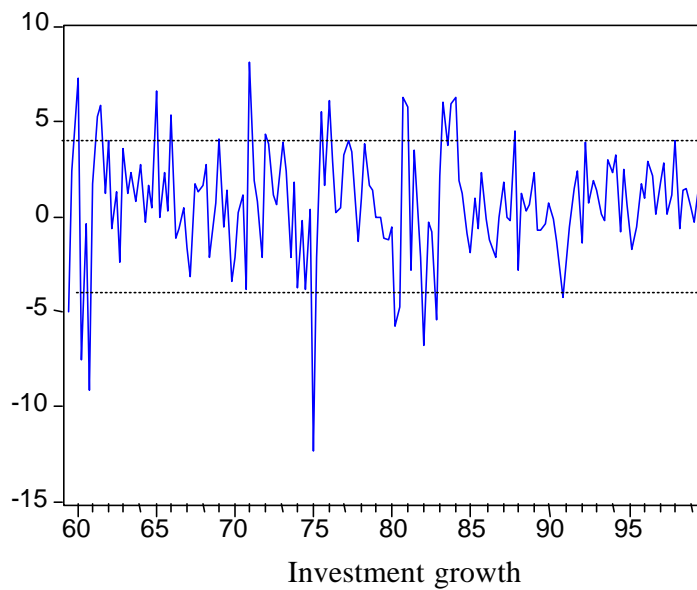
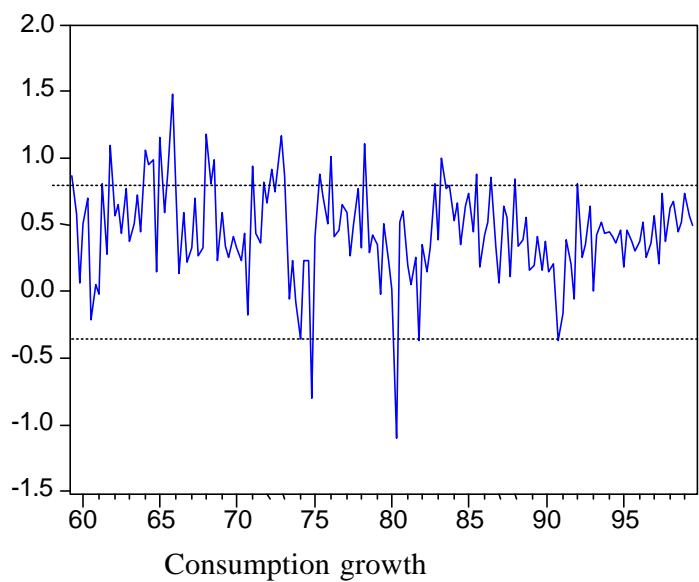
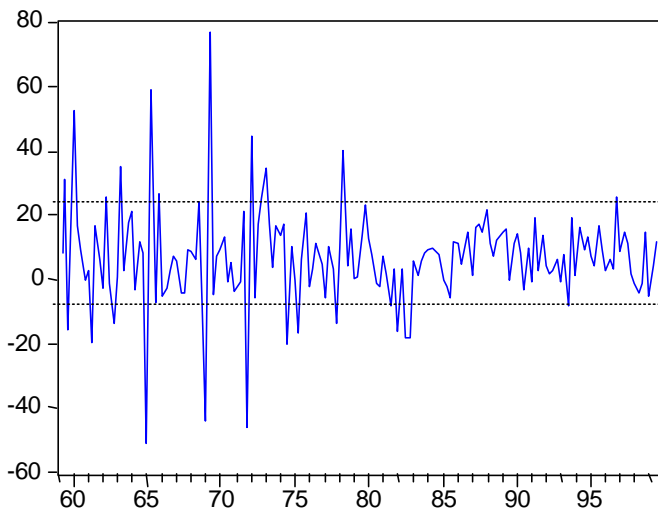
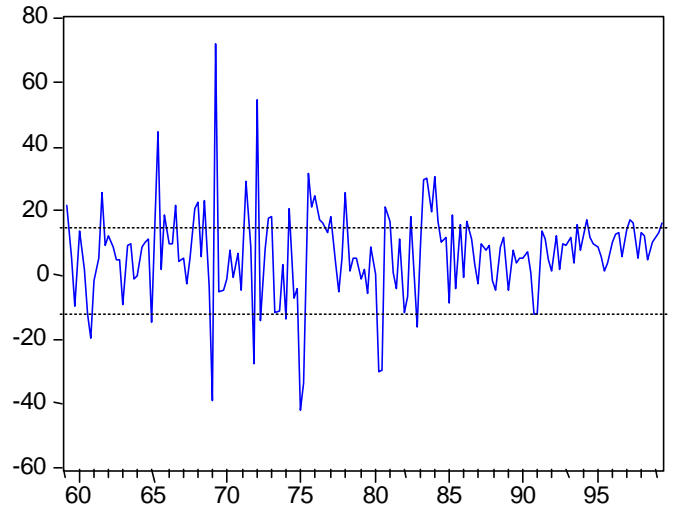


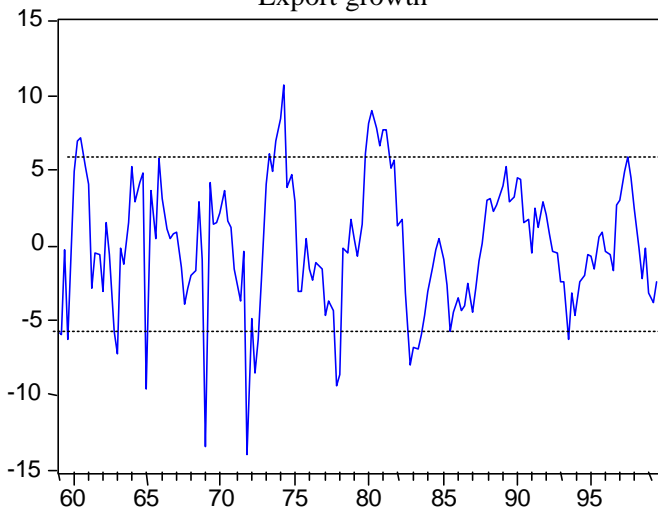
Figure 4. Volatility of Real Investment and Real Consumption



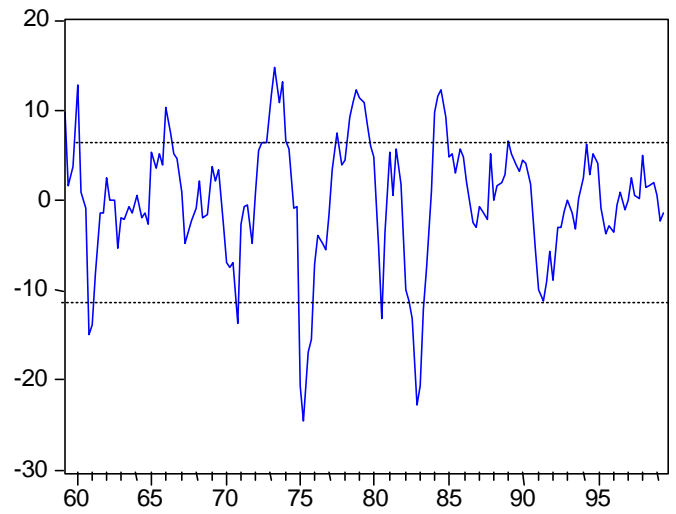
Export growth



Import growth



Export gap



Import gap

Figure 5. Volatility of Real Exports and Real Imports

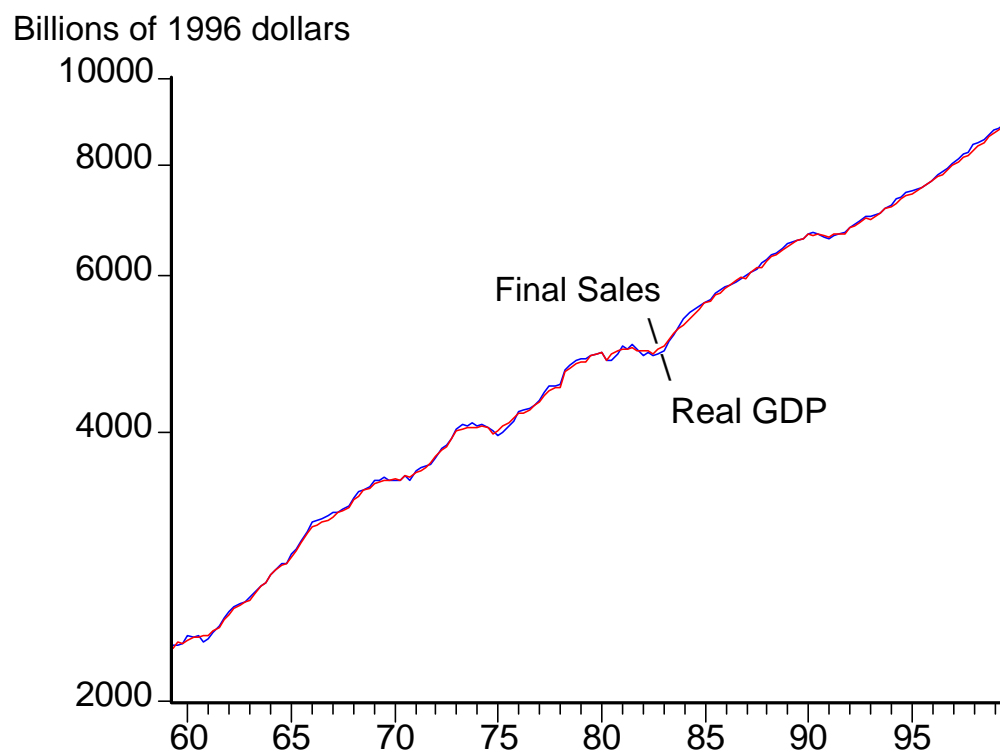


Figure 6. Real GDP and Final Sales: 1959.2-1999.3