Employment during the Great Recession: was this time different?

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Abstract

The Great Recession was the most severe recession experienced by the U.S. since the Great Depression. The labor market was particularly hard hit, setting new records in terms of job losses, increases in the unemployment rate and duration of unemployment. Some economists have expressed surprise as to the extent of job losses, even given the severity of the downturn. In this study, models are developed that incorporate alternative measures of the job market as well as economic growth. In addition, a risk premium is included to account for the impact of the availability of credit on the labor market. Results obtained indicate that the behavior of employment during the Great Recession can be explained by the factors included, given historical relationships.

Keywords: employment, economic growth, risk premium

INTRODUCTION

In 2008-2009, the US experienced its most severe recession since the Great Depression. While the contraction was significant in many respects, the labor market was particularly hit hard. Though the unemployment rate peaked at 10.1%, slightly less than the post-Depression high of 10.8% in 1982, by virtually every other measure the labor market deteriorated far more than any recession since the 1930s. Among the post-Depression records set were (all data are from the Bureau of Labor Statistics):

- Total job loss of 8.5 million, more than 6% of all jobs (previous post-Depression record was 5.2% in 1948-49)
- Loss of 11.4 million full-time jobs, nearly 9.5% of the total (previous record was 4% in 1981-82)
- Decline of 4.5 million service-sector jobs, 4.8% of the total (previous record was 2.5% in 1957-58)
- Aggregate hours worked down 9.7% (previous record was 7% in 1973-75)
- Largest increase in the unemployment rate, 5.7 percentage points (previous record was 4.4 percentage points in 1973-75)

Many economists are unsure why the job market performed so poorly even given the severity of the recession. Okun's law, which compares economic growth to changes in the unemployment rate, doesn't seem to be able to explain the rise in unemployment.

LITERATURE REVIEW

Various economists have explored the weakness of the labor market during the last few years. According to Brad Delong (2009), given the decline in GDP during the recession, the unemployment rate should have risen to about 8% instead of 10%. Uchitelle (2010) points out that Okun's law predicted that the unemployment rate should have risen from 7.4% at the start of 2009 to 9% by the end of the year.

Others have tried to explain why the relationship has changed or propose modifications that may prove more accurate. Wolfers (2010) suggests using Gross Domestic Income instead of GDP and concludes that it more accurately explains the steep rise in unemployment. Gordon (2010) suggests that Okun's Law broke down in 1986 as the cyclical behavior of productivity changed. Businesses became quicker to lay off workers than in prior times, resulting in a closer relationship between economic growth and employment. Fatas and Mihov (2010) suggest that when one considers employment growth instead of the unemployment rate, 2009 stands out as an outlier, though 2007 and 2008 fit the historical pattern. They suggest that structural changes and/or access to credit may help explain the aberration.

There's a body of literature that has explored employment elasticities – how economic growth affects employment growth. High levels of employment elasticity suggest that the labor market displays a relatively high response to economic growth. For example, if one country has a higher employment elasticity than another, the job market would expected to deteriorate more in the country with a relatively high elasticity during an economic downturn. Padalino and Vivarelli (1997) estimated an employment elasticity of 0.5 for the United States while elasticities for most of the other G7 countries were close to zero. Using data from 1970-1998 for the EU

and US, Walterskirchen (1999) found elasticities ranging from about 0.25 in Austria to 0.75 in Spain with the elasticity being about 0.5 in the US. Together this suggests that given the same decline in GDP, nations like Spain and the US would be expected to experience steeper declines in employment relative to other countries in the EU such as Austria. However, employment elasticities would not necessarily be static. For example, Pini (1997) found that the elasticity for the US didn't change from the period of 1960-79 compared to 1979-1995 while it did change in several other nations – rising in some while declining in others.

FOCUS OF STUDY

In this paper, we seek to explore the relationship between employment and economic growth in order to try to determine whether the relationship changed during the Great Recession. Two major measures of the number of jobs are considered: nonfarm payroll employment and private sector employment. Besides the traditional measure of economic growth, the percent change in real GDP, real Gross Domestic Income (GDI) will also be included in a separate model to see whether it is a superior predictor of job growth. In addition, other variables will be included to try to explain the behavior of employment. To capture the availability of credit (suggested by Fatas and Mihov, 2010), the risk premium will be included - defined as the difference between the average interest rate on the ten-year corporate bond rated Baa by Moody's and the comparable ten-year US Treasury bond. It should be noted that Baa bonds are investment-grade bonds and thus reflect the cost of credit for firms normally perceived as being relatively safe. Higher risk premiums are indicative of reduced access (or increased cost) of credit. One would expect that when firms face higher risk premiums, they are likely to be more cautious in the management of their payrolls.

DESCRIPTIVE STATISTICS

Quarterly data for all of the economic variables were obtained for the period from 1970 to 2009. Data for employment was obtained from the Bureau of Labor Statistics while the growth rate of GDP and growth rate of GDI were obtained from the Bureau of Economic Analysis, each of which is reported in terms of seasonally-adjusted annualized rates. Basic statistics for the variables can be found in table 1 (see appendix) followed by a discussion of the behavior of each.

The most widely watched measure of job growth is nonfarm payrolls, estimated from the establishment survey. Quarterly growth averaged 1.53% for the period, with a median growth rate of 1.92%. As can be seen in figure 1 (see appendix), the largest decline, 6.56%, occurred in the first quarter of 2009 while the biggest increase in jobs, 7.16%, took place in the second quarter of 1978. Growth in payroll employment occurred about 78% of the time.

Another way of examining the labor market is to consider only private jobs. Similar to overall job growth, private employment rose by 1.56% on average, with a median growth rate of 2.15% per quarter. The steepest decline in employment, 8.86%, occurred in the fourth quarter of 1974 while the most rapid increase, 8.26%, was in the first quarter of 1978 (see figure 2 in appendix).

Economic growth, as measured by the percent change in real GDP, grew by 2.89% on average, with a median growth rate of 3.05%. The highest economic growth rate was 16.7% in the second quarter of 1978 while the economy plunged by 7.9% in the second quarter of 1980 (see figure 3 in appendix). The economy grew about 85% of the time.

An alternative measure of economic growth, the percent increase in real gross domestic income, increased by 2.87% on average, with a median of 3.20%. The weakest quarter was a decline of 7.7% in the first quarter of 2009 while the strongest quarter was 12.8% in the second quarter of 1978 (see figure 4 in appendix).

Perceptions of risk can be subjectively measured by surveys, for example surveys of consumer and business confidence. However, a market-based estimate of risk can also be obtained. The risk premium (also known as the credit spread) is the difference between the yield on a bond and a US Treasury bond of the same maturity. The US government is generally considered to be the least risky borrower (as evidenced by funds flowing to US Treasuries when there are "flights to safety"). The higher the yield on a bond relative to a comparable Treasury bond, the more return an investor is demanding to compensate for perceived risk. A common measure of the average risk premium for corporations is the yield on Baa corporate bonds, which are bonds rated as minimum investment grade by Moody's. Both corporate and Treasury bond yields were obtained from the Alfred database maintained by the Saint Louis Federal Reserve. The risk premium averaged about 2% (a mean of 2.11% and median of 1.95%), reaching a low of 0.98% in the first quarter of 1979 and a high of 5.68% in the fourth quarter of 2008 (note: the risk premium exceeded 6% briefly, but the quarterly average peaked at 5.68%). As can be seen in figure 5 (see appendix), the risk premium was significantly higher during the financial crisis of 2008-2009 than any other period under consideration. In fact, it was the highest since the early 1930s.

EMPIRICAL MODEL AND RESULTS

When considering factors that affect job growth, growth in the overall economy clearly is an important factor. When the economy is growing, companies will hire more workers in order to increase production. Thus a positive relationship is expected, but the question is about the magnitude of the relationship. Does negative economic growth lead to slightly fewer jobs or a disproportionate decline in jobs? In addition to including economic growth, the change in economic growth is also included to account for acceleration or deceleration of economic growth. If economic growth is accelerating, firms are more likely to have confidence in the economic expansion and thus increase hiring. Another factor involves the persistence of job growth. In other words, does job growth in one period tend to lead to job growth in the subsequent period? If so, how much persistence exists? Thus, lagged employment growth is included in the model.

Many times, economists ignore the effect of financial markets on the overall economy. However, as shown by the financial crisis, credit availability has a direct impact on business. The risk premium estimates the cost of credit for corporations relative to the US government. In addition, the risk premium can also be seen as a market-based measure of fear. When the risk premium is high, companies may become more cautious, resulting in increased layoffs and/or not hiring new workers. Thus, one would expect higher risk premiums to lead to less employment growth both due to tightness of credit and also more cautious business practices in terms of managing payrolls. Two measures of the risk premium are included: the lagged risk premium and the change in the risk premium from the previous quarter. A high risk premium is a sign of

tight credit and fear, thus having a negative effect on job growth. In addition, an increase in the risk premium indicates deteriorating credit conditions and thus should also hinder job creation. The model estimated can be described as follows:

(1) Employment growth$_t$ = f(employment growth$_{t-1}$, economic growth$_{t-1}$, change in economic growth$_t$, risk premium$_{t-1}$, change in risk premium$_t$)

Four versions of the model were estimated, two exploring the behavior of the growth in payroll employment, once using GDP to measure economic growth and once using GDI to represent economic growth. The model was estimated to examine the behavior of private employment growth, using the alternative measures of economic growth. In each case, results were tested for econometric problems. The only problem detected was the existence of ARCH effects. Thus, the models were re-estimated to correct for ARCH effects with the results as seen in tables 2 and 3 (see appendix).

Overall, the models contained significant explanatory power, with adjusted R-squares of 0.79 and 0.83 when considering payroll employment and 0.67 and 0.70 for private employment. Thus, using GDI marginally improved the explanatory power of the model. All coefficients were highly significant, at the 1% level in most cases. As expected, lagged employment growth was significant in every case, with coefficients just above 0.5. This suggests that there is moderate persistence in terms of employment growth. In other words, labor markets display some momentum, whether to the upside or to the downside. Economic growth, from the previous period as well as the change in economic growth positively affected job growth. The effect was similar whether one used GDP or GDI to represent economic growth. Economic growth in terms of GDP had a marginally higher effect on private employment compared to overall employment while no difference was detected when using GDI. The acceleration of economic growth in terms of GDI had a slightly higher impact than when using GDP.

Though it receives scant attention from many economists, the risk premium had a very significant effect on the growth in employment, both in terms of the lagged risk premium as well as the change in the risk premium from the preceding period. Whether due to tight credit for investment-grade corporations or as a measure of fear, high risk premiums significantly hindered job growth with rising risk premiums having an effect even larger in magnitude. Given the record-high risk premiums in late 2008 and early 2009, this helps to explain why those who didn't account for this effect may have missed the deterioration in the labor market. Examination of the predicted employment growth compared to the actual employment growth during the depths of the recession, confirm that this time was not different, based on the models estimated.

SUMMARY AND CONCLUSIONS

Though most economists think that the Great Recession ended in the summer of 2009, the lingering effects are still being felt more than a year later, particularly in the labor market as it tries to recover from a loss of more than 8 millions jobs. Some economists express surprise as to the dramatic loss of jobs that took place during the recession. Models were developed that account for the average risk premium on investment-grade (Baa) corporate bonds in addition to more traditional factors such as the effects of economic growth, changes in economic growth,

and the persistence in employment growth. Economic growth, whether measured by gross domestic product of gross domestic income, had the expected impact on employment growth, but doesn't fully explain the behavior of the labor market. As suggested by Wolfers (2010), using gross domestic income instead of gross domestic product improved the explanatory power of the model, but only marginally. Though credit is affected somewhat during many recessions, the freezing of credit markets during the financial crisis of 2007-2009 appeared to have a powerful effect on the job market, as proposed by Fatas and Mihov (2010). The empirical results indicate that the dramatic rise in the risk premium during late 208 and early 2009 helps to explain the huge loss of jobs during the depths of the recession. For example, the model suggests that the rapid increase in the risk premium between the third and fourth quarter of 2008 was responsible for at least a third of the job losses during the fourth quarter of 2008. As seen in tables 4 and 5 (see appendix), the alternative versions of the model closely predict the severity of the job loss during the depths of the crisis in late 2008 and early 2009. Though economic growth is an important predictor of employment growth, the risk premium, whether as a measure of credit availability or as a market-based measure of fear on the part of corporations, is critical in understanding the behavior of the labor market during the Great Recession.

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DATA SOURCES

Bureau of Labor Statistics

- Full-Time Employment: http://www.bls.gov/webapps/legacy/cpsatab9.htm
- Service-Sector Employment: http://www.bls.gov/webapps/legacy/cesbtab1.htm
- Aggregate Hours Worked: http://www.bls.gov/webapps/legacy/cesbtab4.htm
- Unemployment Rate: http://www.bls.gov/webapps/legacy/cpsatab1.htm
- Nonfarm payrolls: http://www.bls.gov/webapps/legacy/cesbtab1.htm
- Private Employment: http://www.bls.gov/webapps/legacy/cesbtab1.htm

Bureau of Economic Analysis, National Economic Accounts

- GDP (Table 1.1.1): http://www.bea.gov/national/nipaweb/SelectTable.asp?Selected=Y
- GDI (Table 1.7.1): http://www.bea.gov/national/nipaweb/SelectTable.asp?Selected=Y

ArchivaL Federal Reserve Economic Data

- Risk Premium (Baa) = ten year Baa corporate bond yield – ten year Treasury bond yield
    - Baa corporate bond: http://alfred.stlouisfed.org/series?seid=BAA&cid=119
    - U.S. Treasury bond: http://alfred.stlouisfed.org/series?seid=GS10&cid=115

APPENDIX

Table 1: Descriptive Statistics

	Growth Rate of GDP	Growth Rate of GDI	Payroll Employment	Private Employment	Risk Premium
Mean	2.89%	2.87%	1.53%	1.56%	2.11%
Median	3.05%	3.20%	1.92%	2.15%	1.95%
Minimum	-7.9%	-7.7%	-6.56%	-8.86%	0.98%
Maximum	16.7%	12.8%	7.16%	8.26%	5.68%

Table 2: Empirical Results including GDP as Measure of Economic Growth

	Payroll Employment	Private Sector Employment
Constant	0.663* (2.06)	0.785 (1.71)
Lagged employment growth	0.564** (8.33)	0.526** (6.61)
Lagged risk premium	-0.393** (3.12)	-0.456** (2.45)
Change in risk premium	-0.861** (4.80)	-1.232** (4.85)
Lagged growth in real GDP	0.265** (6.75)	0.286** (4.38)
Change in growth rate of real GDP	0.213** (8.03)	0.213** (5.32)
	Adjusted R^2= 0.79	Adjusted R^2 = 0.67

Note: z-statistics in parentheses; ** sig at 1% level, * sig at 5% level

Table 3: Empirical Results including GDI as Measure of Economic Growth

	Payroll Employment	Private Sector Employment
Constant	0.616 (1.51)	0.567 (1.40)
Lagged employment growth	0.553** (7.42)	0.550** (7.14)
Lagged risk premium	-0.359* (2.25)	-0.343* (2.09)
Change in risk premium	-0.708** (3.16)	-0.966** (3.72)
Lagged growth in real GDI	0.260** (6.21)	0.263** (4.15)
Change in growth rate of real GDI	0.244** (9.82)	0.245** (6.08)
	Adjusted R^2= 0.83	Adjusted R^2 = 0.70

Note: z-statistics in parentheses, ** sig at 1% level, * sig at 5% level

Table 4: Nonfarm Payroll Employment Growth

Quarter	Actual	Model Using GDP	Model Using GDI
2008.4	-5.6%	-6.0%	-5.7%
2009.1	-6.5%	-5.7%	-6.2%
2009.2	-4.3%	-5.1%	-4.7%
2009.3	-2.4%	-1.8%	-2.3%
2009.4	-0.8%	-0.6%	-0.5%

Table 5: Private Sector Employment Growth

Quarter	Actual	Model Using GDP	Model Using GDI
2008.4	-7.6%	-7.8%	-7.2%
2009.1	-7.3%	-6.8%	-7.1%
2009.2	-3.9%	-5.4%	-5.0%
2009.3	-2.4%	-1.0%	-1.6%
2009.4	0%	-0.6%	-0.5%

Figure 1: Growth Rate of Nonfarm Payroll Employment

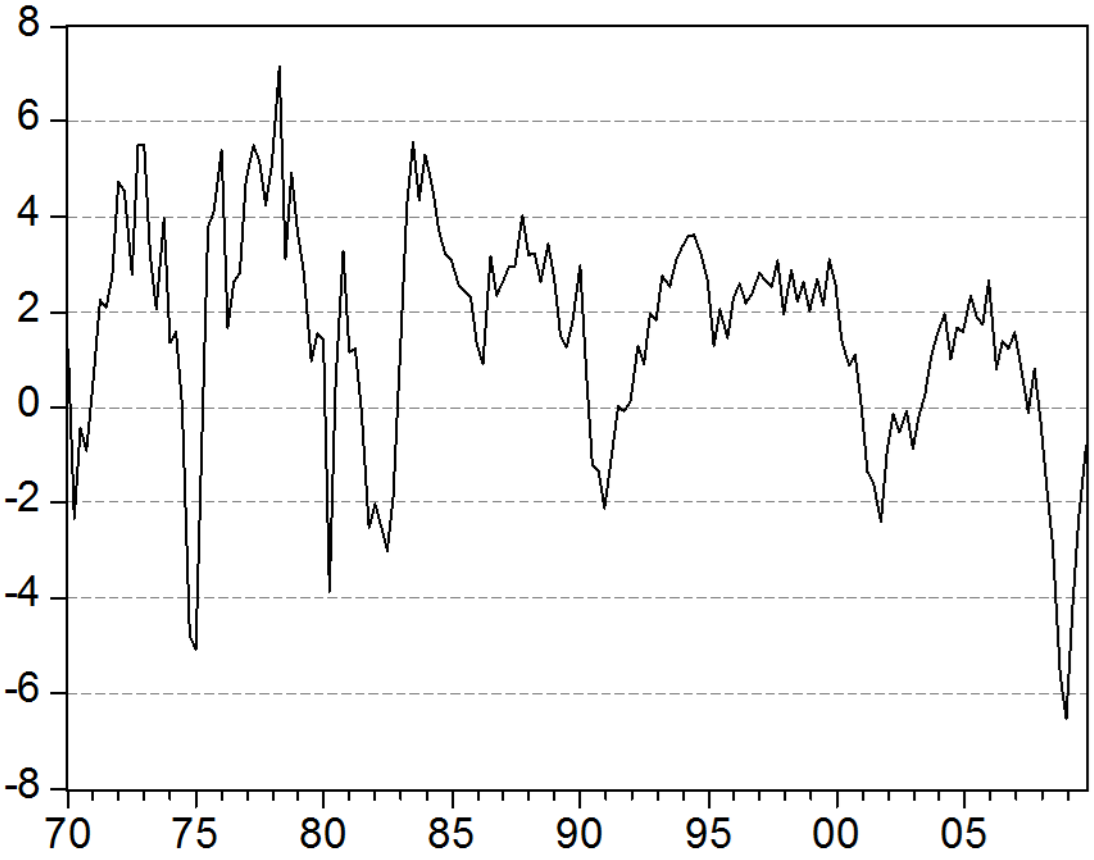

Figure 2: Growth Rate of Private Employment

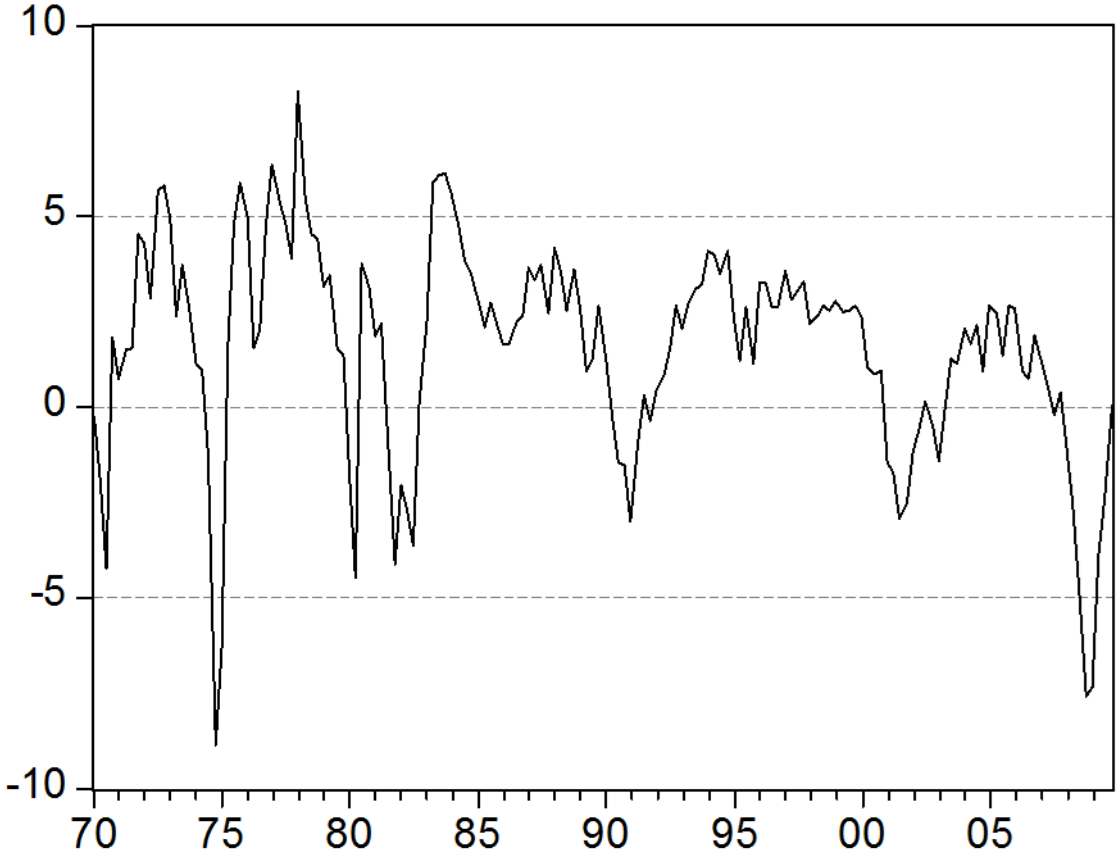

Figure 3: Growth Rate of Real Gross Domestic Product

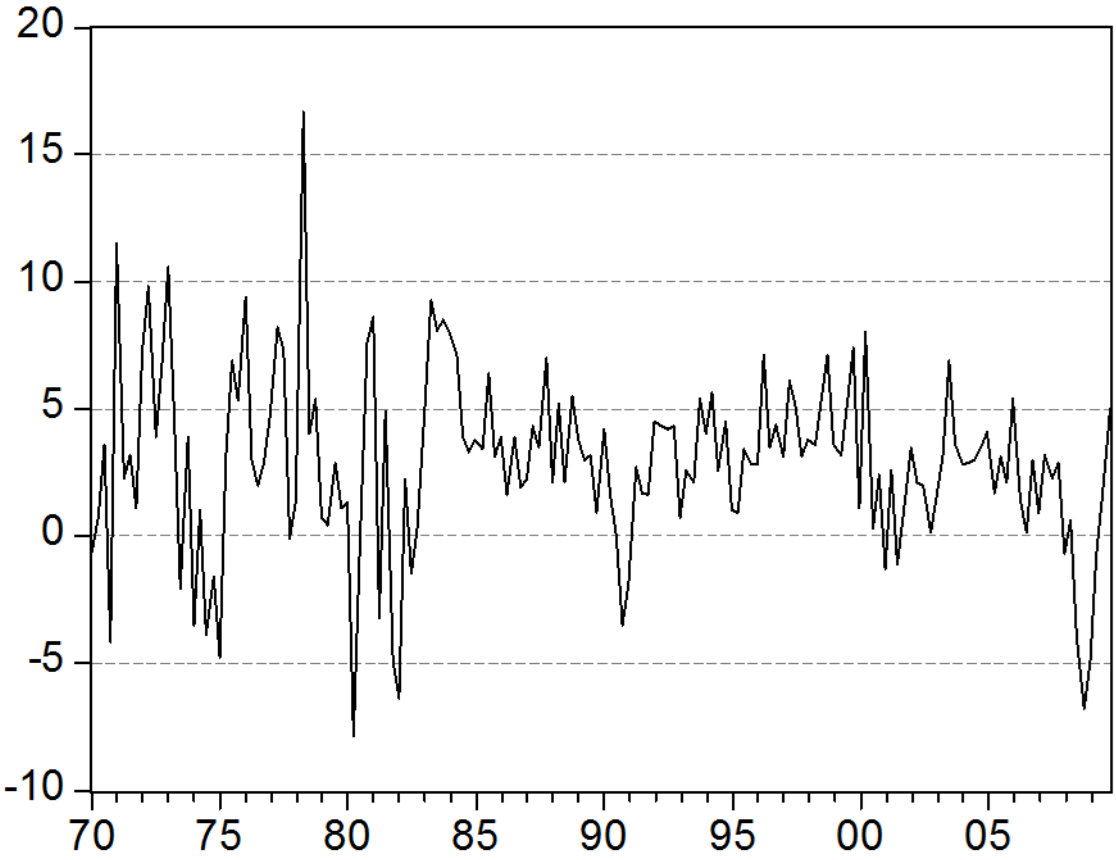

Figure 4: Growth Rate of Real Gross Domestic Income

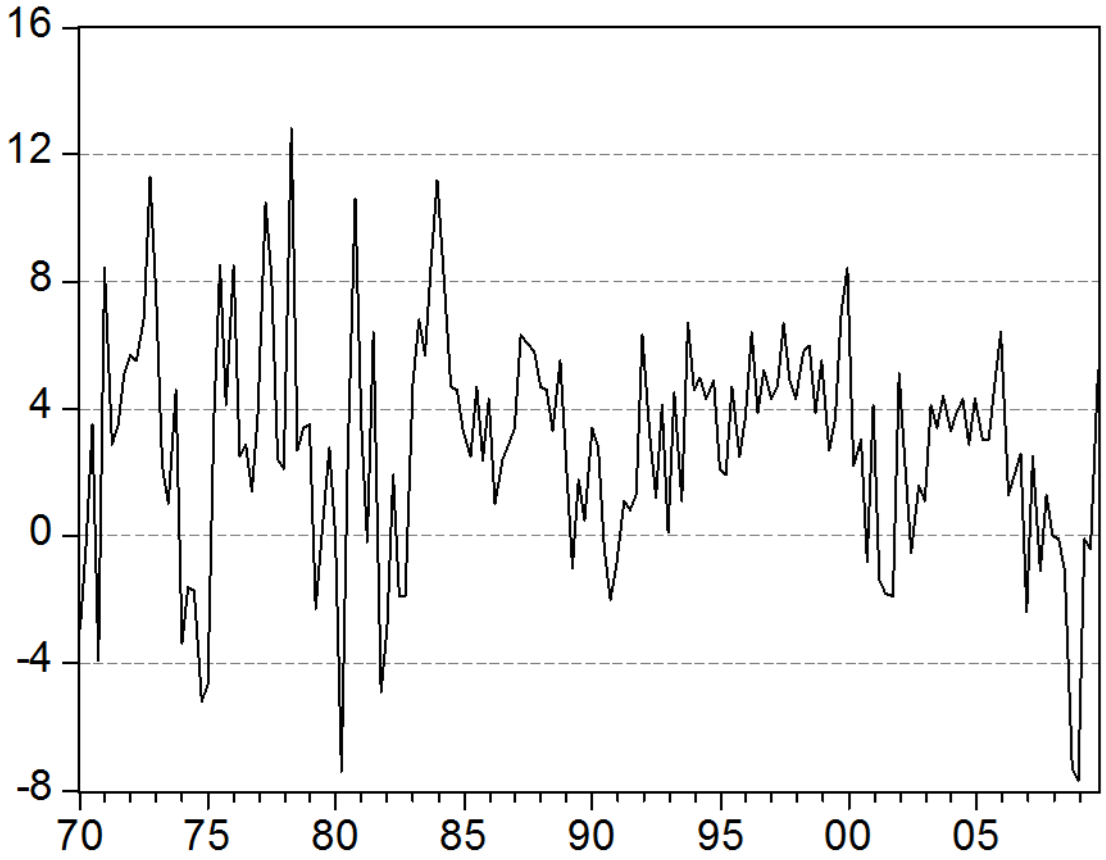

Figure 5: Risk Premium on 10-Year Baa Corporate Bonds