

**A Comparative Policy Analysis on Stock Market,  
Money Supply and Interest Rates in US, China  
and Australia during 2000 – 2011**

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## **Abstract:**

This paper provides an analysis on the Real Gross Domestic Product (GDP) relationship to money supply, stock market and discount rate in the countries of China, United States, and Australia from 2000 - 2011. In addition, this paper provides a comparative analysis across the three countries. To provide the analysis, this paper showcases a regression analysis that was conducted to find correlations between the above mentioned economic variables; if there are strong correlations between these variable and if they have positive or negative relationships.

**Keywords:** Money Supply, GDP, Discount Rates, Share Prices, Regression Analysis

**JEL Codes:** E5

## **Introduction:**

Over the past decade, understanding Real Gross Domestic Product's relationship with the Money Supply, Stock Market, and Discount Rate has become increasingly important for economists, researchers, and policy makers. This is simply because understanding the relationship between these variables can be crucial to ensuring macro-economic stabilization policies are designed and implemented effectively. It can especially be crucial that these policies are implemented effectively if the relationship between two or more of the variables is strong as it gives insight where policymakers should focus their attention when developing new policies or adjusting existing ones that are put in place to boost GDP growth. Therefore, our group conducted a comparative policy analysis looking at the relationship of The Money Supply, Discount Rate, and Stock Market with Real Gross Domestic Product for the countries of China, Australia, and the United States during the years 2000-2011. These three countries were chosen as they are all in top economic positions across the world and maintain completely different economic and political systems. In addition, they are all world trade partners whose economies depend on one another. Therefore, the analysis was conducted between these three countries to identify if GDP is effected by the same variables at similar levels across all three countries.

This analysis was conducted with intentions to find and source which variables have strong correlations with GDP and which have weaker relationships. That being said, the strength of these relationships should give policymakers insight on where to focus attention when trying to boost the economic output. Therefore, using annual data gathered from the Federal Reserve Economic website we ran a simple regression analysis test to identify the correlation between the Real Gross Domestic Product, Money Supply, Share Prices and Discount Rate for The United States, China, and Australia during the years of 2000-2011. M2 was used to measure the money supply for the United States and China, while M3 was used for Australia as there is no public data for M2. Money supply is defined as the total amount of money in circulation or in existence in a country. The Total Share Prices for All Shares was used as the means to measure the performance of the stock market for all three countries.

The results of the simple regression analysis tests for each country are found within the tables placed at the beginning of the section for their corresponding country. This simple regression analysis is set up where the closer the number is to one, the stronger the correlation is between those variables. Not only does this analysis determine the strength of the correlation but it also determines if the correlation is positive or negative. If a variable is negatively correlated it means that the variables have an inverse effect. (For example, if comparing two variables that are negatively correlated, if one variable increases than the other variable would decrease.) The numbers that are negative in the table have a negative correlation. Coherently, if a variable is positively correlated, the closer the number is to 1, the stronger relationship between the variable and the stronger the similarities are when one variable changes.

## China:

*Table 1: Correlations between economic variables in China*

	<i>GDP</i>	<i>M2</i>	<i>Share Prices</i>	<i>Discount Rate</i>
<i>GDP</i>	1			
<i>M2</i>	0.994339082	1		
<i>Share Prices</i>	0.596882471	0.549865361	1	
<i>Discount Rate</i>	0.144354945	0.064648613	0.324004586	1

As we see by the numbers generated above in table 1 the regression analysis shows it is evident there is strong correlation between GDP and M2 at .9943. This extremely close to 1 which represents almost nearly a perfect correlation demonstrating that the two are positively correlated at a very strong level. Furthermore, it is assumed that if money supply increases it will have a weighty impact on GDP causing it to increase as well.

We can assume that GDP is affected by money supply from the monetary policy. If there is strict monetary policy that restricts new money supply, the transaction of money and money supply would decrease. When money supply decreased, investment may go down, and business may reduce workers by laying them off and incomes of workers would decrease. When this happens, GDP would undoubtedly go down.

The correlation between GDP and Share Prices was .5968 which is relatively lower than the relation of GDP and M2, but still proves a strong positive correlation. We are able to assume that increased stock market prices could bring more financial benefit to the stockholder which ultimately cause the amount GDP to increase.

We were also able to see the weakest correlation is between the GDP of China and its Discount Rate as it is only .1443. We assume that whether The Bank of China raises or decreases the Discount rate, or whether the GDP of China increase or decreases, those are not reflected on each other.

The line graph located directly below represents the annual percentage change in China's GDP, M2, Share Prices, and Discount Rate for the years 2000-2011. It can be noted that the percentage change in GDP and M2 move similarly and in the same direction which verifies their strong positive correlation. Furthermore, the same can relatively be seen in the movement of GDP and Share prices, while they do not move at the same rate, they do almost always move together with the exception of the years between 2006 and 2008. It is interesting during 2005 and 2008, there is magnificent increasing in Share Prices change, while there is not much change in Discount Rate or money supply. In addition, after 2007, there is significant change in share prices as finally decreases significantly in 2008. This can be attributed to the United States financial crisis that began in 2007, which is very interesting that even China had been considerably effected from the massive US recession.

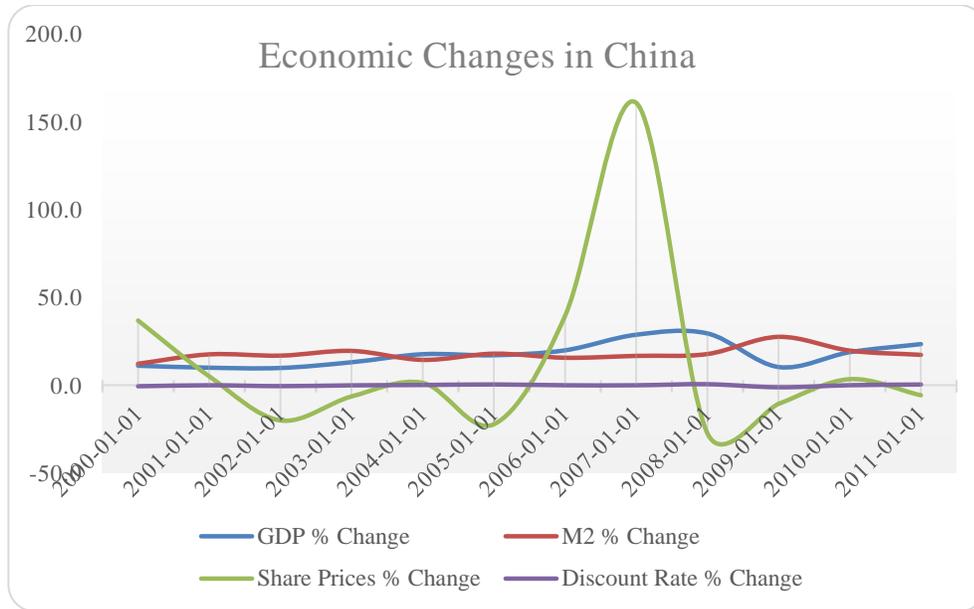


Figure 1: Percentage change rate for economic variables in China from 2000-2011

## United States:

Table 2: Correlations between economic variables in US

	GDP	Money Supply(M2)	Share Prices	Federal Fund Rate
GDP	1			
Money Supply (M2)	0.8985725846	1		
Share Prices	0.6968015196	0.40940654	1	
Federal Fund Rate	-0.321467351	-0.609667792	0.39773185	1

Based on the data collected and the simple regression analysis table, we recognize that United States' GDP has a strong positive correlation with money supply and share prices. Money supply is correlated with GDP by approximately 0.89, proving that the two have very strong effects on one another. When applying this number it means that when GDP increases, money supply will almost always increase

and will do so at a very similar rate. The same happens Vice versa, if GDP decreases, money supply will almost always decrease at a similar rate due to this strong positive correlation.

The relationship between Share prices and United States GDP Share also reflects a strong positive correlation. The 0.69 correlation is not as strong as the relationship between GDP and Money Supply however the two still have a significant influence on each other. This means that more often than not, when GDP increases, share prices will also increase indicating that when GDP improves so does the stock market. Furthermore, the same happens Vice versa if GDP decreases more often than not share prices will decrease indicating a decline in GDP results in a decline in the stock market.

Other findings from the US regression analysis that stuck out were the correlations between GDP and Federal fund rate as well as the correlation between money supply and Federal fund rate. When comparing GDP and Federal fund rate the regression found that they were negatively correlated by approximately -0.32. This correlation is fairly weak and proves that the two do not have much influence on one another however, what we can gather from this data is that when they do have an effect on each other it is inverse.

In addition, when comparing money supply and the federal fund rate they are also found to be negatively correlated. However, the relationship between these two is much stronger as they are correlated at approximately -0.609. This number points out that the two variables have a moderate to fairly strong correlation. That indicates that when money supply increases fairly often the Federal fund rate will decrease; Vice versa if money supply decreases more often than not Federal fund rate will increase.

## **Australia:**

*Table 3: Correlations between economic variables in Australia*

	<i>GDP</i>	<i>M3</i>	<i>Share Prices</i>	<i>Australia Discount Rate</i>
<b>GDP</b>	1			
<b>M3</b>	0.970046902	1		
<b>Share Prices</b>	0.699638621	0.565168259	1	
<b>Discount Rate</b>	-0.156234289	-0.273871053	0.429432304	1

Based on the numbers generated by the regression analysis one can observe that there is a strong positive correlation of approximately 0.97 between Australia's GDP and M3. Therefore, this strong relationship shows that when GDP increases M3 will almost undoubtedly increase as well, and when GDP decreases M3 will almost undoubtedly decrease. The connection between these variables is almost a perfect correlation which indicates that the two also move at similar rates meaning that when GDP moved by a certain percentage M3 will also move at a similar rate.

When looking at Australia's GDP and share prices there is also a moderately strong positive correlation at .699. Thus meaning that when GDP moves it is more than likely that Australia's share prices will move in the same direction at a similar rate. The two definitely have a strong effect on each other however, the relationship is not as direct as GDP and M3. Other factors could very well influence the direction either variable moves allowing for each one to not have as strong an effect on one another. However, the relationship between Australia's product output and their stock market is still quite significant.

Unlike the other correlations with GDP, there is a negative correlation of -.15 present between GDP and the discount rate. However, because the correlation is so weak there is not enough evidence to say for certain that fluctuations in GDP have much effect or influence the discount rate.

Figure 2 located below, represents the annual percentage change in Australia's GDP, M2, and Share Prices, and Discount Rate for the years 2000-2011. It can be noted that the percentage change in GDP and M2 move together for the most part which proves their positive correlation. Furthermore, the same can be noted for the movement of GDP and Share price, while they do not move at the same rate, they do almost always move together. When one variable increases or decreases the other acts in the same direction showcasing their fairly strong positive correlation.

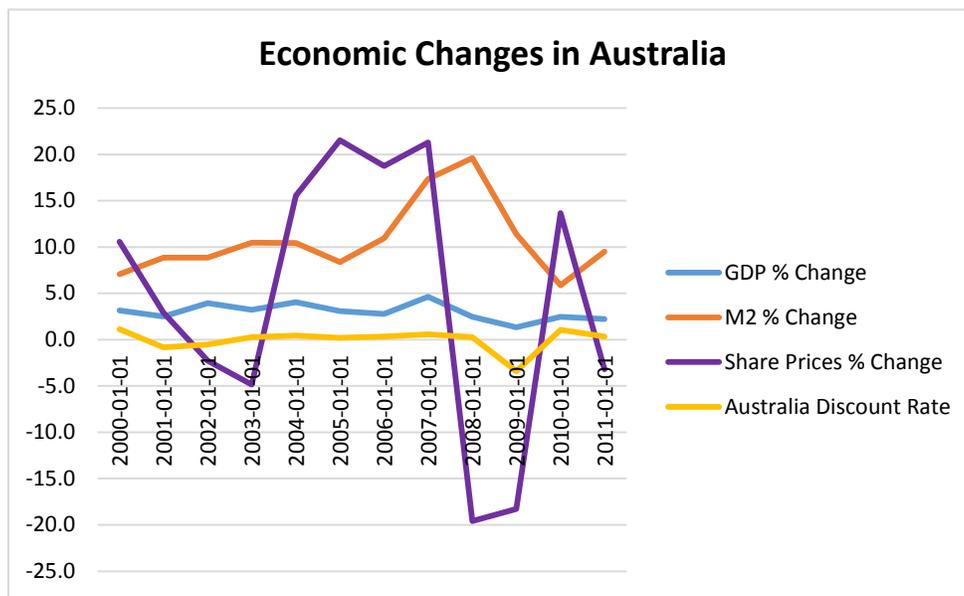


Figure 2: Percentage change rate for economic variables in Australia from 2000-2011

### Comparative Analysis:

After analyzing the Money Supply, Share Prices, and Discount Rates effect on GDP for the United States, China, and Australia we found many similarities in each country's correlations when comparing them to one another. For example, a consistent trend found between all three countries was that Money Supply has a very strong effect on GDP. The correlation for all three countries is very high as the United States is .895, Australia's holding is at .970, and China's is topping at .994. The fact that these

countries money supply has such a strong relationship with GDP is an indicator that they most likely use measures of the money supply as an important guide in the conduct of monetary policy. And as money supply is an important guide in the conducting the monetary policy it is safe to say that all three countries have operations or policies in place. This is to control the amount of money supply to make certain it is at a sufficient level to keep GDP growing at a satisfactory rate. For example, the US does this through open market operations such as buying and selling Treasuries and setting the reserve requirements, the Federal Bank does things to alter the money supply through its daily course of business. However, it should be noted that money supply and GDP do not automatically affect each other, but Money Supply can affect GDP depending on the monetary policy. Therefore, it is evident that these three countries have a monetary policy in place that significantly impacts GDP. The intention in economic management is to monitor the money supply to allow transactions to take place so that GDP grows. Due to the fact that there are strong correlations in all three countries if money supply is severely restricted it is likely to affect the GDP, reducing the volume of dealings taken place.

While the United States relationship of Money Supply to GDP is very strong, it is noted that it is expressively lower than Australia's and China's correlations of .970 and .994. difference can be attributed to that fact that over time, the close relationship between the United States' Money Supply and GDP started to break down slightly due to changes in banking accounts, the proliferation of financing companies, and more widespread investment among consumers (stock and bond investments are not captured in M1 and M2 aggregates) important indicator for predicting inflation and spending patterns among consumers (Barnes). China and Australia do not have widespread of investments allowing for more of the wealth to be accounted in M2 thus strengthening their correlation of GDP and Money Supply.

Another interesting similarity found when comparing the three countries is that their relationship between Share Prices and GDP are all positive and moderately strong Australia's at .699, the United States at .696, and China at .596. This represents the movement of each countries individual stock market has quite a significant influence on the GDP and will more likely than not cause GDP to move in its direction. When analyzing this correlation it makes fairly good sense considering that if corporations and

businesses are improving GDP should improve likewise. The same goes vice versa, if the economy is declining with a decrease in corporation performance dropping stock prices the number of products outputted should decline similarly.

Furthermore, all three countries have weak correlations for the relationship between Discount Rates and GDP as the highest correlation was at  $-.322$  which is very feeble. This weak correlation represents the Discounts Rates weak effect on GDP meaning that changes in the discount rate don't necessarily make significant change or movements in GDP.

One thought-provoking difference found in these regression analyses is that the United States has a fairly strong negative correlation between the Discount Rate and Money Supply at  $-.609$  compared to China's and Australia's very weak correlations of  $.064$  and  $-.273$ . The Discount rate in the US (Federal Funds Rate) has a significant influence on the amount of M2 compared the China and Australia where the discount rate does not really have much effect on the money supply.

After this analysis we have concluded that there are in fact very strong correlations between GDP and the Money Supply for all three countries thus showing that GDP is effected very similarly in that it is majorly effected by the monetary policy. It was also found that all three countries are alike in that GDP's relationship to the stock market is fairly strong and very weak in relation to the discount rate. It was particularly interesting to find that three countries who are quite different economically and politically still have similar relationships when it comes to different economic variable effects on GDP.

We are aware that many more factors play a role in the production of output than just these variables however, everything else held constant, from our findings we conclude that each country's policymakers assumingly should focus a great deal of attention to monitoring and stabilizing the money supply as GDP has such a strong reaction to its movements. Furthermore, the tests suggest that policymakers also should focus a great deal on the stock market and ensuring its stability as it also has a fairly strong effect on GDP. And lastly, when it comes to monitoring GDP, we would assume that policymakers not put much effort in changing the discount rate as for all three countries the regression analysis test proved that fluctuations in the discount rate did not have much effect on the movement of

GDP. From our results it is evident that some of these macro-economic variables do have strong effects on GDP and play a key role in the stabilization of the economy and the amount of Real Gross Domestic Product. Therefore, they do deserve great amounts of attention when the countries' economies are formulating economic policies.

### **References:**

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