

###  SUPERIOR UNIVERSITY

**Quantity Techniques in Business**

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# Determinants of GDP in AUSTRAILIA

**Introduction:**

The economy of Australia is a developed, modern market economy with a GDP of approximately US$1.2 trillion. In 2009, it was the 13th largest national economy by nominal GDP representing about 1.7% of the World economy. Australia was also ranked the 19th largest importer and 19th largest exporter. Economic growth is an increase in real gross domestic product (GDP) (that is, GDP adjusted for inflation). The growth rate of real GDP is the percentage change in real GDP from one year to the next. Economic is a basic factor or component which effect directly to its country. One of the most important areas of determinant of GDP in Australia is to identify the major factors. These factors are both direct and indirect, and internal and external and they differ from country to country. Due to the different socioeconomic conditions the factors of economic growth may be different in the cases of developing and developed countries. One major area of research in economics is to identify the major factors that affect the economics of a country.

The economic growth is a complex phenomenon, which involves several factors. One of the major areas of research in economics has been to identify factors of economic growth. There is ample literature on the subject matter. These factors differ from country to country. If these factors can be identified, it can help to accelerate growth by focusing on the major leading sources of growth. A sample of economic growth of Australia has been taken from World Development Indicators. Sample period of this country data 29 years selected for the period of 1980 to 2008 with annual frequency. In this study we select Country Australia topic we select GDP and one dependent variable and four independent variable select. Dependent variable is GGP deflator (inflation) and Independent variables are GDP growth (annual %), Money and quasi money (M2) as % of GDP, Imports of goods and services (% of GDP), Unemployment, total (% of total labor force).

**Research Question:**

How does the GDP deflator of Australia, annual% growth rate, Money and quasi money, Imports of goods and services, Unemployment, total % of total labor force affect the GDP growth rate in Australia?

**Objective of the Study:**

The purpose behind the study is to know or to explore the determinants of GDP growth in Australia. In this study we select variables to investigate or to know about the dependency of GDP deflator on other four independent variable.

**Data and Methodology**

**Data**

Sample period of this country data 29 years selected for the period of 1980 to 2008 with annual frequency. The Data depending availability has been show with the longest possible period values and avoid smallest period values. The data of all variables has been selected from World Development Indicators. In this study we have been selected five variables one is dependent and remaining have been independent.

Here growth domestic product deflator base year (GDPD) varies by country has been taken as dependent variable to represent the economic growth whereas growth rate annual% of gross domestic product (GGDP), Money and quasi money (m2), Imports of goods and services, Unemployment (total % of total labor force). The dependent and independent variables and their descriptions have been given below:

**Dependent Variable:**

**GDP deflator (base year varies by country)**

Indicator Name GDP deflator (base year varies by country).Short definition The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency. The base year varies by country. Long definition The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency. The base year varies by country.

**Independent Variables:**

**1. GDP growth (annual %)**

The annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2000 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and deficiency of natural resources.

**2. Money and quasi money (M2)**

Money and quasi money comprise the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government. Money supply is frequently called M2; it corresponds to lines 34 and 35 in the International Monetary Fund's (IMF) International Financial Statistics (IFS).

**3. Imports of goods and services**

Imports of goods and services represent the value of all goods and other market services received from the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments.

**4. Unemployment, total (% of total labor force)**

Unemployment refers to the share of the labor force that is without work but available for and seeking employment. Labor force and unemployment differ by country. Unemployment refers to the share of the labor force that is without work but available for and seeking employment.

**Quality of Data:**

The quality of data has been up to the mark no one value has been missing or it can be show accuracy. The data have been collected according to the above definition of variables; the data used in this study is valid for the purpose of analysis. The data of dependent and independent variable show reliability and all independent variables have theoretically explanation that can effect on GDP deflator. It is important to note that the above variable definitions have been taken from the World Development Indicator which is the source of data that has been used in this research study. There is no data of all dependent and independent variables are missing. The data on World Development Indicators are drawn from the sources thought to be most reliable.

**Methodology:**

In this research study we use descriptive statistics and inferential statistics. The scatter-plot has been used to explore the dependent and independent variables. A table of correlation has been used in which we select Pearson correlation sig (2 tailed) and n also a part of this research study and that table provides the signs and values of coefficient of correlation. This table also provides the P-values of the test of the null hypothesis which states that the said variables are not correlated to each other.

 To use regression in this study and their object is to find out the equation which could be find out the predicted vales of GDP of the given values of both dependent and independent variables gross domestic products deflator (GDPDt) we can also say it inflation, money and quasi money (m2 t), import of goods and services (IGS t), Unemployment (β4U t) total (% of total labor force).

GDPDt= β0 + β1GGDPt+β2M 2t+β3IGS t +β4U t +U t ………………………………………. (1)

As specified in the above equation GDPDt is the dependent variable and four other variables are independent. All variables were time series where as time period denotes with t. β0 is a constant term and partial regression coefficients of independent variables are β1,β2,β3 and β4. A partial regression coefficient shows the change in dependent variable and the ceteris paribus, due to change in one unit in independent variable. Ut shows the error term. T-test also applies in this study to check the significant level of individual coefficients. For further necessary statistics table are prepared in this study in which we used Coefficient of Determination (R2), Adjusted Coefficient of Determination (Adj.R2), Durbin Watson Statistic (DW), F-Statistic, Sig. (F-Stat).

**Justification of the Method:**

Keeping in view that the objective of this study, scatter plot diagram has been present to show the relationship between dependent and independent variables. There is a proper justified data we have been taken in this study. Magnitudes and signs of the correlation coefficients are provided in the table of correlations. There is a proper justification done with this research study. Most of the methods have been used to explore this study for that we use spss software that has been clearly define the dependent and independent variables. This table also provides the P-values of the test of the null hypothesis that states that there is no correlation between two variables.

Method of multiple-regression is used to estimate the effect of multiple predictors on the predicted. Considering the objective of this study the multiple-regression analysis is used in this study to estimate the partial regression coefficients of the independent variables and their statistical significance. We have used the method of multiple-regression because there are five independent variables in this study and all of them are scale variables.

Scatter plots are especially useful when there are a large number of data points. It provides the following information about the relationship between two variables:

• Strength

• Shape - linear, curved, etc.

• Direction - positive or negative

• Presence of outliers

1. **Empirical Findings**

In this part of the study empirical findings have been shown and that can be interpreted. The following table presents the descriptive statistics which show the overall picture of the variables.

**Table 1.1**

**Descriptive Statistics**

|  |
| --- |
|  | **N** | **Minimum** | **Maximum** | **Mean** | **Std. Deviation** |
| **GDP deflator (base year varies by country)** | 1869 | 28.77 | 100.00 | 69.8937 | 17.46559 |
| **GDP growth (annual %)** | 1869 | -2.32 | 5.36 | 3.4026 | 1.47290 |
| **Imports of goods and services (% of GDP)** | 1869 | 14.97 | 21.77 | 18.9759 | 2.03308 |
| **Money and quasi money growth (annual %)** | 1869 | 1.18 | 31.02 | 12.1288 | 6.64464 |
| **Unemployment, total (% of total labor force)** | 1869 | 4.20 | 10.90 | 7.1413 | 1.88749 |
| **Valid N (list wise)** | 1869 |  |  |  |  |

In the above mention table we discuss minimum values, maximum values, mean and standard deviation of all five variables. Mean value provides the idea about the central tendency of the values of a variable. Number of observations of each variable is 1869. Standard deviation and the extreme values minimum values compare with maximum values and give the idea about the dispersion of the values of a variable from its mean value. The units of different measures have been used for different variables the dispersion of a variable using standard deviation can’t be compared with other variable unless both variables have the same unit of measure but still these statistics are helpful to have an idea about the central tendency and the dispersion of a variable in absolute terms rather than relative terms. Actually in the above table we conclude that there is a relationship of economic growth of Australia with both of dependent and four independent variables.

**Figure 1.2**

**Scatter-Plot Matrix**



Above mention figure shows the scatter plot matrix. The figure shows the association between economic growth with dependent and independent variables. There is a positive association between GDP deflator and GDP growth (annual %) and also positive relationship between GDP deflator and Imports of goods and services. There is no association shows between GDP deflator with money and quasi money growth (annual %) m2. Whereas there is negative response show the association between GDP deflator and Unemployment total (% of total Labor force). All of the consequences have been inveterate by the table of correlations.

**Table 1.3**

**Correlations**

|  |
| --- |
|  |  | **GDP deflator (base year varies by country)** | **GDP growth (annual %)** | **Imports of goods and services (% of GDP)** | **Money and quasi money growth (annual %)** | **Unemployment, total (% of total labor force)** |
| **GDP deflator** **(base year varies by country)** | Pearson Correlation | 1 | .094(\*\*) | .821(\*\*) | .129(\*\*) | -.586(\*\*) |
| Sig. (2-tailed) |  | .000 | .000 | .000 | .000 |
| N | 1869 | 1869 | 1869 | 1869 | 1869 |
| **GDP growth** **(Annual %)** | Pearson Correlation | .094(\*\*) | 1 | .267(\*\*) | .218(\*\*) | -.280(\*\*) |
| Sig. (2-tailed) | .000 |  | .000 | .000 | .000 |
| N | 1869 | 1869 | 1869 | 1869 | 1869 |
| **Imports of goods and services** **(% of GDP)** | Pearson Correlation | .821 (\*\*) | .267(\*\*) | 1 | .059\* | -.657(\*\*) |
| Sig. (2-tailed) | .000 | .000 |  | .011 | .000 |
| N | 1869 | 1869 | 1869 | 1869 | 1869 |
| **Money and quasi money growth (annual %)** | Pearson Correlation | .129(\*\*) | .218(\*\*) | .059(\*) | 1 | -.460(\*\*) |
| Sig. (2-tailed) | .000 | .000 | .011 |  | .000 |
| N | 1869 | 1869 | 1869 | 1869 | 1869 |
| **Unemployment, total (% of total labor force)** | Pearson Correlation | -.586(\*\*) | -.280(\*\*) | -.657(\*\*) | -.460(\*\*) | 1 |
| Sig. (2-tailed) | .000 | .000 | .000 | .000 |  |
| N | 1869 | 1869 | 1869 | 1869 | 1869 |
|  |  |  |  |  |

The above table shows correlation in which we calculate Pearson correlation significant (2-tailed) and N of both dependent and independent variables. This table shows positive as follows except unemployment GDP growth, import of goods and services and m2 positively correlated with GDP deflator (r=0.94, p =0.000, r=0.821, p=0.000 and r=0.129, p=0.000 respectively). Here except GDP deflator all independent variables show 0.000. GDP growth reflect GDP deflator, Import of goods and services and qusai money (r=0.94, p=0.000, r=0.267, p=0.000 and r=0.218, p=0.000) respectively. This table also gives response negative GDP deflator, growth rate, import of goods and services and m2 negatively correlated with unemployment r=-0.586, p=0.000, r= -0.280, p=0.000, r=-0.657, p=0.000 and r= -0.460, p=0.000) respectively. In this table that also show the significance level either data is moderate, weak or strong but this table shows moderate correlated by import of goods and services with m2 is (r=0.59,p=0.011) and same in case of m2 moderate correlated with import of goods and services. The table does not show the large value of the correlation between any two predictor variables. Here Correlation is significant at the 0.01 level (2-tailed) where as Correlation is significant at the 0.05 level (2-tailed).

**Table 1.4**

**Regression**

**Dependent variable: GDP Deflator**

| **Model** | **Coefficients** | **Std. Error** | **t-test** | **Sig. Level** |
| --- | --- | --- | --- | --- |
|  | Constant |  | 4.234 | -14.177 | .000 |
|  | GDP growth (annual %) | -.163 | .159 | -11.973 | .000 |
|  | Imports of goods and services (% of GDP) | .833 | .156 | 45.783 | .000 |
|  | Money and quasi money growth (annual %) | .097 | .041 | 6.299 | .000 |
|  | Unemployment, total (% of total labor force) | -.038 | .187 | -1.896 | .058 |

The above table represents the regression of dependent variable of GDP deflator. In this table we calculate coefficients, standard error, t-test and significant level. The results show that all of the independent variables except GDP deflator significantly affect the economic growth as shown by the values of the t-statistic and the corresponding P-values. The value of coefficient shows negative in GDP growth (annual %) is -0.163 and Unemployment, total (% of total labor force) is -0.038. The other variables give positive response Imports of goods and services (% of GDP) and Money and quasi money growth (annual %). t-test is used to test the significance of the individual partial regression coefficients. Here dependent data value gives negative response and independent variables give positive response. This test shows that the coefficients of all the predictors except GDP deflator are statistically significant at less than five percent level of significance. The level of significance is less than 0.05 so ho is true and we reject h1. Ho shows thatthere is no relationship between both dependent and independent variables.

**Table 1.5**

**Necessary Statistics**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Coefficient of** **Determination (R2)** | **Adjusted Coefficient of** **Determination (Adj.R2)** | **Durbin Watson Statistic** | **F-Statistic** | **Sig. (F-Stat)** |
| .704 | .703 | .727 | 14.368 | .000 |

Above table shows the necessary statistics in which we focus coefficient determination (R2), adjusted coefficient of determination (Adj.R2), Durbin Watson statistic (DW), F-Statistic and Sig. (F-Stat). The value we calculate on coefficient determination (R2) is 0.704. This value shows the correlation between the observed values and fitted values of GDP deflator is 70 percent. The adjusted coefficient of determination (adj. R2) shows the adjusted degrees of freedom. Adjusted coefficient of determination (Adj.R2) value is 0.703 which shows the 70 percent variation in economic growth. Durbin Watson statistic (DW) is 0.727.The value of F-Statistic is 14.368 which is more than five percent where as Sig. (F-Stat) is 0.000.

**Figure 1.6**

**Plot of Residuals against Fitted Values for the Economic Growth Data**



The above figure shows the plotof residuals against fitted values for the economic growth data of the studentized residual against the unstandardized predicted values. This plot shows that the spread of the studentized residuals is constant. This shows that the evidence of heteroscedasticity does not exist. Only one residual is between -1.00000 and -2.00000. This shows that residuals are normally distributed.

**Summary and Conclusion**

This study investigate the determinants of economic growth of a sample of economic growth of Australia has been taken from World Development Indicators. Sample period of this country data 29 years selected for the period of 1980 to 2008 with annual frequency. In this study we select Country Australia topic we select GDP and one dependent variable and four independent variable has been selected. Dependent variable is GGP deflator (inflation) and Independent variables are GDP growth (annual %), Money and quasi money (M2) as % of GDP, Imports of goods and services (% of GDP), Unemployment, total (% of total labor force).

In this research study we use descriptive statistics and inferential statistics. The scatter-plot has been used to explore the dependent and independent variables. A table of correlation has been used in which we select Pearson correlation sig (2 tailed) and n also a part of this research study and that table provides the signs and values of coefficient of correlation. These results have important implications for policy as economic geography explains more of the differences in GDP per capita. Taking economic geography into account does not change a country's policy reform priorities.

This table also provides the P-values of the test of the null hypothesis which states that the said variables are not correlated to each other. Here growth domestic product deflator base year (GDPD) varies by country has been taken as dependent variable to represent the economic growth whereas growth rate annual% of gross domestic product (GGDP), Money and quasi money (m2), Imports of goods and services, Unemployment (total % of total labor force). Economic policy can do little to change geography itself, but economic policy still has an important influence on economic performance and the wellbeing of Australians. Indeed, good economic policy helps a country exploit and maximise the benefits from its geographic advantages. Good policy also helps a country to adapt to and minimise the costs associated with geographic disadvantages.

**References**

* Bank national accounts data, and OECD National Accounts data files.
* <http://en.wikipedia.org/Economy_of_india>
* Definitions of the variables correspond to the World Bank national accounts data
* <http://www.netmba.com/statistics/plot/scatter/>
* Source OECD National Accounts data files.