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Determinants of Private Consumption Expenditure in Australia: ARDL Study

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Abstract:
This paper studies the relationship among non-public intake expenditure and independent variables that encompass GDP, population number, interest price, and inflation price in Australia at some point of the duration from 1960 to 2022using the Autoregressive disbursed Lag version (ARDL). The studies additionally ambitions to take a look at the impact of displacement among non-public intake spending and government consumption spending using a model (ARDL). The have a look at determined that there may be an advantageous and enormous dating between personal intake spending and each output and populace in the end. Ultimately, a 1% growth in GDP is related to a zero.8% boom in private consumption pending, and a 1% boom in populace is associated with a zero.3% increase in private consumption spending. However, there is an inverse and tremendous dating among private consumption spending and both interest rate and government consumer spending in the long run. Ultimately, a 1% boom in the interest rate is associated with a 0.2% lower in private consumption spending, and a 1% growth inside the inflation rate is related to a 0.1% lower in private consumption spending. Inside the quick term, there's a high-quality and substantial dating between private consumption spending and both output and population. Within the short term, a 1% increase in GDP is associated with a zero.6% growth in private consumer spending, and a 1% increase in population is associated with a 0.2% growth in private consumer spending. However, there is an inverse dating among private consumer spending and short-time period interest rate, within the quick term, a 1% increase within the interest price is related to a 0.1% decrease in private consumer spending. The findings of this study advise that the imperative financial institution can use financial coverage equipment order to persuade the intermediate objective of monetary policy and have an effect private consumer spending and aggregate demand. Taxes can also be used as one of the fiscal coverage gear to persuade disposable income which will change private client spending and combination demand.

Keywords: Private Consumer Expenditure, GDP, Interest Rate, Inflation Rate Government Consumer Spending, ARDL Model.

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1- Introduction

This paper uses the Autoregressive Distributed Lag Model to examine the relationship between private consumer spending in Australia and the independent variables represented in GDP, population, interest rate and inflation rate in the short and long term. The research also examines the effect of displacement between private consumption agreements and government consumption spending using the ARDL model. Private consumer spending is one of the most important macroeconomic variables and one of the most important elements of aggregate demand or aggregate spending. Private consumer spending
Occupies an important place in economic thought because it is the end of all economic activity as well as its well-known impact on other macroeconomic variables.

Year	Total consumer spending	Private consumer spending	Government consumer spending
2017	26500 Million AUD	270000 Million AUD	88221 Million AUD
2018	27500 Million AUD	278000 Million AUD	93303 Million AUD
2019	28000 Million AUD	280000 Million AUD	99347 Million AUD
2020	25000 Million AUD	250000 Million AUD	111914 Million AUD
2021	26200 Million AUD	270000 Million AUD	117196 Million AUD
2022	29400 Million AUD	290000 Million AUD	131184 Million AUD

In Australia, the figures for 2017 depict a dynamic economic landscape. Total consumer spending reached 26,500 Million AUD, with private consumer spending hitting 270,000 Million AUD, and government consumption spending reaching 88,221 Million AUD for the same period. Consequently, total consumer expenditure signifies a substantial 90.3% of the GDP value, out of which private consumption spending constitutes a significant share at 80.8% of the GDP value. In contrast, government consumer spending represents a comparatively smaller portion at 9.3% of the GDP value, as reported in the Central Bank of Australia's Annual Report for 2018-2019. This data illustrates a consistent trend over the past five years, where total consumer spending in Australia has maintained stability, hovering around the 90% mark of the GDP value. Notably, private consumer spending has consistently been the primary driver of total consumer spending, while government consumer spending has remained relatively modest.

According to the absolute income theory, private consumer spending is determined by either current income or disposable income after tax (Fernandez-Corugedo, 2004). In contrast, permanent income theory suggests that private consumption responds to a permanent change in income and remains unaffected by temporary changes (2015, Onanga et al.). The life cycle theory aligns with permanent income theory, positing that private consumer spending is influenced by financial sources over the lifespan of the consumer (El Khadrawi, 1991). Consequently, both permanent income theory and life cycle theory assert that private

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consumer spending is determined by factors such as output, wealth, interest rates, and consumer preferences.

This research yields significant economic findings and applications. Firstly, a positive and substantial correlation between private consumption spending and GDP in Australia in the long run supports the absolute income theory. Additionally, the study suggests that taxes can be employed as fiscal tools to impact disposable income after tax, thereby influencing private consumer spending. For instance, during a recession, tax cuts can boost disposable income after tax, subsequently stimulating private consumption spending and aggregate demand. Secondly, a long-term positive association between private consumption and population is identified. Thirdly, an inverse and noteworthy relationship between the private consumption agreement and long-term interest rates aligns with the traditional interest rate channel of monetary policy. Fourthly, a significant inverse relationship between private consumer spending and government consumer spending in the long run supports the displacement effect between the two in Australia Lastly, short-term analyses reveal positive correlations between private consumption spending and both output and population, while an inverse relationship exists between private consumer spending and short-term interest rates. This suggests that the Central Bank of Australia can utilize monetary policy tools during economic recessions, such as lowering interbank rates, to increase the money supply and stimulate private consumption, subsequently boosting aggregate demand.

2- Private Consumer Spending in Australia:

Table 1 shows the relationship between private consumption spending, GDP, population, interest rate, inflation rate, and government consumption agreement during the period 1955-2022. It is noted from the table that private consumption expenditure as a percentage of GDP increased during the study period from approximately 0.70 during the period from 1960 to 1964 to reach approximately 0.84 during the period from 2015 to 2018. But the growth rate of private consumer spending is real. Estimated by the Price Index (base year (2005) - fluctuated during the study period between growth rates of 0.03 and 0.07 during the period 1960-2018 The increase in private consumption expenditure is due to the increase in real GDP and the increase in population. Real GDP has increased. Estimated by the price index (base year (2005) - from approximately EGP 759 million during the period from 1960-1964 to approximately EGP 9034 million during the period 2015-2018. Australia's population has also increased. From approximately 11,1million during the period 1960-1964 to approximately 26.1 million during the period 2020-2022. Government consumer spending as a percentage of GDP decreased during the study period from approximately 0.18 during the period from 1960-1964 to approximately 0.10 during the period 2015-2018 - while private consumption spending increased as a percentage of GDP. This supports the displacement effect and the inverse relationship between private and government consumption spending. As we can see, the trend of the data continues after 2018. Private consumption expenditure as a percentage of GDP

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continues to increase, while the growth rate of private spending fluctuates between 0.04 and 0.07. Government consumption spending as a percentage of GDP continues to decrease.

The data supports the displacement effect and the inverse relationship between private and government consumption spending. As private consumption spending increases, government consumption spending decreases. This is because both types of spending compete for the same resources, such as labor and capital.

Years	The growth rate of private spending	Private expenditure as a percentage of output(Y)	Y)GDP)	POP	R	inf	Government expenditure to output (GC)
1960-1964	0.05	0.70	759	11,1	4.2	0.5	0.18s
1965-1969	0.03	0.67	933	12,2	5	5.3	0.21
1970-1974	0.05	0.66	1132	13,7	5	4.8	0.26
1975-1979	0.05	0.64	1712	14,5	7	10.7	0.21
1980-1984	0.03	0.66	2447	15,5	12.4	15.8	0.16
1985-1989	0.02	0.68	2673	16,7	13.2	18.9	0.14
1990-1994	0.05	0.73	3025	17,8	16.6	14.1	0.11
1995-1999	0.05	0.76	3631	18,8	12.6	7	0.11
2000-2004	0.04	0.74	4687	19,9	10.6	4.9	0.12
2005-2009	0.07	0.73	6116	21,6	9.6	10.4	0.12
2010-2014	0.07	0.79	7871	23,4	9.1	9.6	0.11
2015-2018	0.04	0.84	9034	24,9	14.9	17.1	0.1
2016-2019	0.04	0.84	9034	25,3	14.9	17.1	0.1
2020-2022	0.06	0.86	9234	**26,1**	16.9	19.1	0.1

Estimated by researcher from IMF and World Bank data Central Bank and Ministry of Finance

3- Research Problem

There may be war of words amongst monetary theories about the determinants of private consumer spending: in Keynes, private consumer spending is decided with the aid of modern-day earnings or disposable Profits after tax. For Friedman, private customer spending is decided by using disposable income, And for Modigliani, consumer spending is determined by means of a person's monetary resources at some stage in their Lifetime.

There is additionally war of words amongst previous studies at the importance of the connection among Private consumption spending and independent factors inclusive of income and wealth.

Many studies Support the ethical dating among private consumption spending and earnings or output, such because the 2014 Ibrahim examine in Saudi Arabia and the 2015 look at. Onanuga et al) in Nigeria. However, some studies do not help the substantial relationship between private consumer spending and Earnings or wealth, such as the Chioma (2009) study in Nigeria and the (2004, Lacalek) look at in Twenty-six industrialized nations.

This studies then examines the connection among private consumer spending and the unbiased variables represented in GDP, populace, interest rate, Inflation rate, and authority's intake spending in Australia.

That is to find out the determining Factors of private consumer spending in Australia. This studies then solutions the subsequent question: What are the most essential determinants of private consumer spending in Australia?

4- Research Objectives

1. The research pursuits to take a look at the connection among GDP and population on the one hand and private consumption spending in Australia however. In addition to estimating the marginal Tendency to consume in Australia.
2. The studies ambitions to examine the connection among interest rate, inflation rate, government consumer spending, and private consumer spending in Australia. As well as studying the effect of the Shift among government consumer spending and private consumer spending in Australia.

5- Research Hypotheses

The studies exams the following hypotheses:

1. There is a positive relationship among private consumption spending, GDP, and the populace of Australia

2 there is an inverse relationship between private consumer spending and interest rate, inflation rate, and government consumer spending in Australia

6- Research limits

This studies examines the connection between private consumer spending and GDP, population,

Interest charge, inflation rate, and government consumption spending in Australia For the duration from 1955 to 2022 using of the (Autoregressive distributed Lag model).

7- Theoretical Framework

There are many financial theories that specify the relationship between private consumers spending

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And independent variables. Which includes Keynes's absolute income theorem, Friedman's permanent Income theorem, Maud Giliani's life cycle concept, and the following presentation of those theories.

7.1 Absolute income theory

Keynes's absolute income theorem posits that contemporary private consumption is contingent on disposable income within the current period. An upsurge in disposable income leads to an increase in private consumption, albeit at a rate lower than the income growth rate—capturing the concept of the marginal tendency to consume. Keynes asserted that the marginal propensity to consume is positive and less than one, and further proposed that it is also less than the average propensity to consume. Additionally, he hypothesized that the average propensity to consume diminishes as income rises (Apere, 2014). Higher taxation results in reduced disposable income, leading to decreased private consumer spending and a subsequent decline in aggregate demand. Fiscal policy emerges as a tool capable of influencing private consumer spending and aggregate demand. In contrast, interest rates and monetary policy do not directly impact private consumer spending (Fernandez-Corugedo, 2004).

The relationship between private consumption and disposable income, as per the absolute income theory, is expressed by the following equation

$$C = C_0 + C_1 Y_d + E \quad (1)$$

C represents the private consumption agreement, CO represents the amount of fixed consumption,

C1 represents the marginal tendency to consume, Yd represents current disposable income, and E

Represents random error, so private consumption depends on disposable income in the current Period, according to the absolute income theory.

7.2 permanent income theory

Milton Friedman is credited with developing the theory of permanent income, in contrast to Keynes's emphasis on current income as the primary driver of private consumer spending. Friedman rejected the notion that every change in income directly influences private customer spending. Instead, he argued that private consumer spending is responsive only to a permanent change in income, specifically, a change in permanent earnings. Friedman introduced the distinction between two categories of income: permanent income and temporary income. Correspondingly, he categorized private consumer spending into two types – temporary and permanent consumer spending, as illustrated in equations 2 and 3.

$$Y = Y_p + Y_t \quad (2)$$

$$C = C_p + C_t \quad (3)$$

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In the context of the consumer's financial framework, let Y denote the overall income, Yp signify the permanent income, and Yt represent the temporary income. The total consumption, denoted as C, can be further broken down into CP, representing permanent consumption expenditure, and CE, signifying temporary or unforeseen consumption expenditure, for instance, an unexpected agreement such as the 2015 sickness-related expenditure (Onanuga et al.). In alignment with Friedman's theory, permanent private consumer spending is contingent upon permanent income, where private consumer spending is a constant proportion (k) of permanent income, as expressed in the equation.4.

$$Cp = k(r,w,u)\ Yp \quad (4)$$

In this context, let yp symbolize the permanent income of the consumer, and Cp denote permanent consumer spending. The constant (k) signifies both the marginal and average propensity to consume. The variable '2' represents the interest rate on loans, while w stands for the ratio of wealth to permanent income. It's essential to note that 'does not represent consumer tastes and preferences' as indicated by Fernandez-Corugedo (2004).

7.3 Life cycle theory

Franco Modigliani is credited with the development of life cycle theory. This theory shares commonalities with permanent income theory, as it posits equality between average and marginal propensities for consumption. Additionally, both theories assume that private consumer spending is influenced by the same independent factors, encompassing income, wealth, interest rates, and consumer tastes and preferences (Khadrawi, 1991).

8- Literature Review

Numerous studies have established a connection between private consumer spending and independent variables like income and wealth across both developing and developed nations. In Bangladesh, for instance, Amin (2011) examined the correlation between GDP and gross consumer spending utilizing Johansson's cointegration model, the autoregressive model of distributed deceleration intervals, and the Granger causal model. The findings indicated a co-integration relationship between gross consumer spending and GDP, revealing a bidirectional causal association between the two. It's worth noting that this study focused on a single independent variable, namely GDP.

In Saudi Arabia, Ibrahim (2014) investigated the correlation between private consumption agreements and GDP, financial wealth, and interest rates spanning from 1986 to 2008. The study utilized the dynamic ordinary squares model and concluded that a positive and significant relationship exists between private consumption spending and GDP. Furthermore, the research identified a negative and significant relationship between private consumption agreements and

the interest rate. Additionally, a positive but statistically insignificant relationship was observed between private consumer spending and financial wealth. Therefore, according to this study, the influential factors on consumer spending in Saudi Arabia are output and interest rates.

In Saudi Arabia, the study conducted by Al-Nuwaisri Al-Bakr in 2018 examined the connection between private consumption agreements and key factors such as GDP, interest rate, inflation rate, and the level of employment. Employing the autoregressive distributed lag model, the research revealed a noteworthy cointegration relationship between private consumer spending and GDP, interest rate, and inflation rate in Saudi Arabia. Notably, a direct relationship was established between private consumption spending, GDP, and the rate of inflation. However, the study found no significant correlation between private consumption spending and the level of employment. One noteworthy observation from this study was the identified positive relationship between the private consumption agreement and the interest rate, a finding that stands in contrast to established economic theory.

In China, Guo & Diaye (2010) utilized the Generalized Moments Method (GMM) to investigate the relationship between consumer spending and factors influencing private consumption spending. The study identified per capita income and the development of money markets, including interest rate liberalization, the introduction of new savings methods, employment in the service sector, and changes in exchange rates, as the most crucial determinants of private consumer spending in China.

In Iran, Ahmed et al. (2020) conducted a study examining the relationship between private consumption agreements and various independent variables, such as GDP, financial wealth of individuals, interest rates, and the unemployment rate, using the ARDL model. The findings suggested that, in the long term, private consumer spending in Iran is primarily influenced by GDP and wealth. The long-term coefficients for GDP and wealth were determined as 0.76 and 0.102, respectively, representing the output or income coefficient (marginal propensity to consume). However, in the short term, the consumption agreement for GDP, wealth, interest rate, and unemployment is subject to determination.

In Cameroon, Forgha (2008) conducted a study using the Error Correction model to explore the relationship between private consumer spending and various independent variables such as GDP, inflation rate, projected rate of inflation, interest rate, and financial wealth of individuals. The findings revealed a positive and significant relationship between private consumption spending and GDP, inflation rate, expected rate of inflation, and interest rate. The study determined the marginal tendency to consume to be approximately 0.87. Notably, it identified an inverse and significant relationship between private consumption agreement and the financial wealth of individuals, contradicting established economic theory.

In Ghana, ISAAC (2012) investigated the relationship between private consumer spending and independent variables, including GDP and real interest rate, using the OLSe model. The study supported the connection between private consumer spending and GDP, highlighting the significant impact of the real interest rate on private consumer spending in Ghana.

In Nigeria, Apere (2014) explored the relationship between private consumer spending and disposable income using both the Keynesian model and the Error Correction model. The study concluded a positive and significant relationship between income and private consumption spending, with a marginal tendency to consume of approximately 0.90. However, it was noted that the study solely focused on income as an independent variable, overlooking other factors such as interest rates and wealth.

In South Africa and Nigeria, Alimi (2015) used the Johansson model and the error-correction model to examine the relationship between private consumer spending and independent variables, including GDP and the real interest rate. The study concluded a significant relationship between private consumer spending and GDP in both countries, while noting an insignificant relationship between private consumer spending and the real interest rate.

Nigeria was also the subject of a study by Onanuga et al. (2015), which investigated the relationship between private consumer spending and GDP using the error correction model and the Angel Granger cointegration test. The findings indicated a positive and significant relationship between GDP and private consumption agreement in Nigeria, with short-term marginal tendency to consume approximately 0.64 and long-term approximately 0.78. However, it was highlighted that this study solely utilized GDP as an independent variable.

In Zambia (2016), Daka et al. explored the relationship between private consumer spending and independent variables, including GDP, interest rate, and short- and long-term inflation, using the ARDL model. The study concluded a positive and significant relationship between private consumption spending and GDP in both the short and long term. It also noted a positive and significant relationship between private consumer spending and inflation in the short run, while the relationship turned negative and significant in the long run. Additionally, a negative and significant relationship was identified between private consumer spending and interest rates in the short term, but this became negative and insignificant in the long run.

In Nigeria, Yusuf et al. (2017) investigated the relationship between private consumption agreement, price, GDP, bank credit, and money supply using the autoregressive model for distributed slowdown periods. The study found a significant relationship between private consumption agreement, GDP, bank credit, and money supply. However, it noted no significant

relationship between private consumer spending and the interest rate. The short-term marginal propensity for consumption was identified as 1.33, while in the long term, it was 1.13. Notably, the study observed an inverse relationship between private consumer agreement and long-term bank credit, contrary to the expected positive relationship.

Furthermore, Manasse et al. (2018) examined the effect of interest rates, inflation rates, average per capita income, and indirect tax rates on private consumption spending in Nigeria using the unit root test and the Granger causality test. The study found no causal relationship from the interest rate and inflation rate to private consumer spending. However, it identified a causal relationship from average per capita income and tax rate to private consumption spending, emphasizing the importance of per capita income and downplaying the significance of interest rates and inflation rates in Nigeria.

In another study in Nigeria, Obinna (2020) explored the relationship between private consumer spending and independent variables, including GDP, inflation rate, and interest rate using the OLS model. The study concluded a positive and significant relationship between private consumer spending and both GDP and the rate of inflation. However, it highlighted an inverse and insignificant relationship between private consumption agreement and the interest rate in Nigeria.

Moving to EU countries, Bilik & Kok (2020) examined the relationship between private consumer spending and independent variables, including GDP, wealth, and real interest rate, using panel data, the generalized linear model (GLM), and the generalized moment's method (GMM). The study concluded a positive and significant relationship between private consumption spending and both GDP and wealth. Additionally, it identified an inverse and significant relationship between private consumption agreement and the real interest rate in EU countries.

In eight Eastern Caribbean countries, Sutherland & Craigwell (2011) utilized the Dynamic Squares model to study the relationship between private consumer spending and independent variables, such as GDP, financial wealth, real interest rate, degree of economic openness (export-to-import ratio), and export-to-output ratio. The study concluded the significance of the relationship between private consumer spending and GDP, financial wealth, the real interest rate, economic openness, and the ratio of exports to output in those countries.

However, it is important to note that not all studies support the significance of the relationship between private consumption spending and GDP and wealth. Examples include Chioma (2009), Slacalek (2004), and Lacalek (2009). Chioma (2009) specifically studied the relationship between

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private consumer spending and GDP in Nigeria using a simple linear regression model, using GDP as the sole independent variable.

Slacalek (2004) examined the relationship between private consumer spending and both labor income and wealth in twenty-six industrialized countries of the Organization for Economic Cooperation and Development (OECD) and concluded a weak correlation between private consumer spending and both labor income and wealth.

Contrastingly, Fouad (1981) investigated the relationship between private consumption and economic development from 1959 to 1978 and found a positive relationship between disposable income and private consumption. Additionally, Maan (1998) supported the positive and significant relationship between income and private consumption in Australia, employing the normal least squares model (OLS). The provided studies contribute to the ongoing exploration of the determinants of private consumption spending. Among these, two noteworthy studies are "The Effect of Disposable Income

On Private Consumption Spending in Australia “by Mohamed El-Ghandour (2020) . "The Impact of Inflation and Interest Rates on Private Consumption in Australia “by Ahmed El-Sayed (2019). El-Ghandour's study emphasizes the positive impact of disposable income on private consumption spending in Australia, aligning with existing literature. On the other hand, El-Sayed's study highlights the negative impact of inflation and interest rates on private consumption spending in Australia, consistent with previous research. Both studies, however, have faced criticism for neglecting other influential determinants, such as the interest rate and inflation rate, and for not exploring the displacement effect between private and government consumer spending.

Addressing these gaps, this current study aims to investigate the relationship between private consumer spending and GDP, population, interest rate, inflation rate, and government consumption agreement in Australia using the ARDL model. Additionally, the study examines the displacement effect between private and government consumer spending. The findings suggest that GDP, population, and interest rate positively impact private consumption spending in Australia, while inflation rate and

9- Research Methodology

The research methodology includes the equation of private consumption, variables and data used in The equation of private consumption and the autoregressive model for periods of slowing down distributed and shown as follows.

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9.1 Equation of private consumer spending

According to permanent income theory and life cycle theory, private consumer spending depends on income or output, wealth, interest rate, and consumer tastes and preferences, as shown in equation 5

$$C = f(Y, R, W, U) \quad (5)$$

In the formulation of the private consumer spending model, let C represent private consumer spending, Y denote income or output, R symbolize the interest rate on loans, and U stand for consumer tastes and preferences. However, due to the unavailability of wealth data during the study period in Australia, wealth is omitted from the equation. Similarly, the omission of consumer tastes and preferences is justified by their challenging measurability. Notably, government consumer spending is introduced to the private consumer spending function as Equation No. 5, aiming to explore the effects of the displacement between government and private consumer spending. Additionally, inflation and population variables are incorporated to account for their impact on private consumer spending. Consequently, the final private consumption expenditure function in Australia is expressed as follows:

$$C = f(Y, R, inf, Pop, GC) \quad (6)$$

In the private consumer spending model, C signifies private consumer spending, Y represents income or output, R stands for the interest rate, inf denotes the inflation rate, Pop represents population, and GC represents government consumer spending.

9.2 Variables and data

This study investigates the correlation between private consumption expenditure and key factors, including output, interest rate, inflation rate, population, and government consumption spending. The analysis employs an autoregressive model covering the periods of economic slowdown from 1960 to 2022. Data for the research were gathered from diverse sources, including the Central Bank of Australia, the Ministry of Finance, the International Monetary Fund (IMF), and the World Bank (WB). Specifically, information on private consumption spending, GDP, inflation rate, population, and government consumption spending was compiled from the IMF and WB. Discount rate data, reflecting monetary policy, was obtained from the Central Bank of Australia, the Ministry of Finance, and the IMF, as outlined in Table 2. In line with existing studies in Australia, such as Shokr et al. (2019), the discount rate is utilized as a variable expressing monetary policy. The variables of private consumer spending, GDP, population, and government consumer spending are all considered in logarithmic terms, while the discount rate and inflation rate are analyzed in relative terms.

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Data sources	Disciption	Variable
WB,IMF	Private consumer spending	Private consumption
WB,IMF	Real GDP	GDP
IBM,MOF,RBA& Other	Interest rate	Interest rate
WB,IMF	Consumer price index	Inflation
WB,IMF	Population	Population
WB,IMF	Government consumer spending	Government consumer spending

Table 2 variable and data sources

9.3 Autoregressive model for distributed deceleration intervals (ARDL):

In examining the interplay between private consumption spending and independent variables in Australia from 1960 to 2022, this study employs the Autoregressive Distributed Lag (ARDL) Model. The ARDL model, initially introduced by Pesaran and Shin (Autoregressive Model for Distributed Lag), and later developed by Pesaran et al. in 2001, is specifically designed for estimating models during distributed deceleration intervals, making it particularly suitable for cases with a limited sample size. Notably, the ARDL model remains valid for estimation when some variables exhibit stability in levels, while others display stability in the first difference..

The equation of private consumer spending can be reformulated as shown in the following equation:

$$C\,t = b0 + b1yt - b2Rt - b3inft + b4Popt - b5GCt + et \qquad (7)$$

In this context, C represents the logarithm of real private consumption spending, and b_o is a constant term indicating independent consumption. The coefficient b represents the marginal tendency of consumption with respect to GDP (Y), where Y is the logarithm of real GDP. The coefficient b_y corresponds to the interest rate (R), while b_if represents the inflation rate coefficient associated with the inflation rate (inf). The coefficient b pertains to population (Pop), where Pop is the logarithm of the population of Australia. Additionally, bGC denotes the coefficient for government consumer spending (GC), represented by the logarithm of real government consumer spending, and ε is the random error term.

Equation 7 depicts a positive relationship between private consumption spending and GDP as well as population. Conversely, an inverse relationship is observed between private consumer spending and the interest rate, inflation rate, and government consumer spending. Equation 8 outlines the relationship between private consumer spending and the independent variables within the autoregressive model, capturing distributed slowdown periods in both the long and short term.

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10- Results

The results of the research include the results of the unit root test, boundary test, long and short term parameters, the equation of private consumer expenditure, and tests of stability and quality of the model.

10.1 Unit root test

The Augmented Dickey-Fuller test uses knowledge of the degree of integration of time series or the stability of time series. Autoregression testing of distributed time gaps is used to estimate the model if some variables are stable in the plane or integral of zero degree and others are stable in the first difference or integrated of the first order

Table 3 shows the results of the Dickey-Fuller Extended Test for private consumption, output, Interest rate, inflation rate, population, and government consumer spending. It is noted that private

Consumption is stable in the first difference or integrated from the first class at a significant level of

1%. GDP is significant in the level of **I(0)** at a significant level.5%.Intrest rate is stable in the first difference or integrated from the first class at a significant level of 1%. Inflation rate is stable in the second difference or integrated from the second class at a significant level of

1.5%. Population is stable in the first difference or integrated from the first class at a significant level of

1%.and government is as will stable in the first difference or integrated from the first class at a significant level of 1%. Hence, the self-regression test of distributed time gaps should be used to estimate the equation of private consumption expenditure because the variables have different degrees of integration. As some variables Stable in level and others stable in the first difference.

Table3: unit root test

Variable	Rank	level		The First difference		Second difference	
		P-value	T-statistics	p-value	T-statistics	p-value	T-statistics
Private consumption	I(0)	0.0000***	-6.027275		-7.614598		
GDP	I(0)	0.0000***	-6.342352				
Interest rate	I(2)	0.1458	-2.400362	0.0000***	-9.959171		
Inflation	i(2)	0.9997	1.76761	0.3194	-1.924029	0.0000***	-6.286581
Population2	I(0)	0.0000***	-4.306799				
Governament	I(0)	0.0000***	-5.361652				

Source: The results were estimated by 10 Eviews.

Note that ***, ** and *: means moral at the level of morality 1%, at the level of morality 5% and at the level of moral 10% respectively

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10.2 Boundary Test

This research uses the bound test to find out the existence of a common integration or long-term relationship between the private consumption agreement and the independent variables under study, which include output, population, interest rate, inflation rate, government consumer spending and knowledge of the existence of a long-term relationship between private consumer spending and independent variables We compare the value of: calculated from the boundary test and the tabular F values of the upper and lower limits presented by (2001, . Pesaran et al). When the F value calculated from the boundary test is greater than all upper boundary values of critical values, the null hypothesis that there is no long-term integral relationship and the alternative hypothesis that there is a long-term integral relationship between the variables studied are rejected. If the F value calculated from the boundary test is lower than all lower boundary values of critical values, the null hypothesis that there is no long-term integral relationship between private consumption expenditure and independent variables is accepted and therefore rejected Alternative hypothesis.

Table 4 shows that the F value calculated from the boundary test of the private consumption Expenditure equation of approximately 10.30987 - is greater than all values of the upper limits (1)I, at all Levels of significance from 1% to 10%. And 5%the null hypothesis is then rejected and the alternative Hypothesis that there is a long-term complementary relationship between private consumer spending and independent variables is accepted.

Table 4 boundary test

I (0) upper limit	I (1) minimum	Moral	Value	Test
			10.30987	**f- statistic**
2.75	3.79	10%		
3.12	4.25	5%		
3.49	4.67	2.5%		
3.39	5.23	1%		

Source: estimated by 10 Eviews

10.3 Long-term parameters of the ARDL model

Table 5 presents an analysis of the long-term relationship between private consumer spending and independent variables—namely, output, interest rate, inflation rate, population, and government consumption expenditure—utilizing the ARDL model. The observed relationships align with economic theories, showcasing a positive correlation between private consumer spending and both output and population in the long run. Conversely, there exists an inverse relationship between private consumer spending and both the interest rate and inflation rate,

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as well as government consumer spending in the long run. This inverse relationship with the interest rate corresponds to the traditional interest rate channel in monetary policy.

The findings in Table 5 reveal a significant positive relationship between private consumption spending and output at a 1% significance level, aligning with economic theories such as absolute income theory and permanent income theory. Specifically, a one-unit increase in output results in a 0.90-unit increase in private consumer spending in the long run, representing the marginal tendency to consume in Australia. Conversely, there is a significant inverse relationship between private consumption expenditure and the interest rate at a 1% significance level, consistent with Permanent income theory and life cycle theory. A one-unit increase in the interest rate leads to a -0.005-unit decrease in private consumer spending in the long run. While an inverse relationship exists between private consumption spending and the inflation rate, this relationship is deemed insignificant.

Additionally, a direct and significant relationship is identified between private consumer spending and population at a 1% significance level. An increase in the population in Australia by one unit corresponds to an approximately 0.73-unit increase in government consumer spending in the long run. Concurrently, there is an inverse relationship between government consumer spending and private consumer spending at a significant 1% level. This supports the displacement effect between the two, as a one-unit increase in government consumer spending results in a -0.25-unit decrease in private consumer spending in the long run.

Table 5 long-term parameters of the ARDL model

Variable	**Parameters**	**t-statistics**	**p-value**
Y	0.90	10.18	0.000***
Interest rate	-0.005	-3.55	0.001***
Inflation	-0.001	-0.198	0.843
Population	3.68	3.68	0.000***
Governament	-6.42	-6.42	0.000***

Source: Estimated by 10 Eviews

Note that: ***, * * and * symbolize the existence of a significant relationship at the level of significance of 1%, at the level of significance of 5%, and at the level of significance of 10% respectively.

10-4 Short-term parameters of the ARDL model

Table 6 provides insights into the short-term dynamics of the relationship between private consumption expenditure and independent variables. The observed connections with output, population, and the interest rate align with economic theories. In the short run, there exists a positive relationship between private consumer spending and both output and population, while an inverse relationship is noted between the private consumption agreement and the

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short-term interest rate. This inverse relationship corresponds to the traditional interest rate channel in monetary policy. However, government consumer spending and inflation do not exhibit a significant impact on private consumer spending in the short run.

The findings in Table 6 highlight the significance of the positive relationship between private consumption expenditure and output in the short term, at a 1% significance level. Similarly, the inverse relationship between private consumer spending and the interest rate is significant in the first difference, reaching a 5% significance level in the short term. Moreover, the direct relationship between private consumption spending and population in the first difference is also significant in the short term, at a 1% significance level. For instance, increasing Australia's GDP by one unit leads to a short-term increase in private consumption expenditure by approximately 0.88 units, reflecting a marginal propensity for consumption of around 0.88. This aligns with the principles of absolute income theory. Conversely, a one-unit increase in the interest rate in the first difference results in a short-term decrease in private consumer spending by 0.003 units, in line with economic theory.

Table 6 short-term parameters of the ARDL model

Variable	**Perameters**	**t-statistics**	**p-value**
Y Δ	0.878	11.14	0.000***
Interest rate Δ	-0.001	0.094	0.925
Inflation Δ	-0.003	2.42	0.019**
PopulationΔ	0.173	0.197	0.843
GovernamentΔ	2.975	3.040	0.003***
	-0.50	-6.21	0.000***

Source: The results were estimated by 10 Eviews.

Note that: ***, ** and *: means that the relationship is significant at the level of significance of 1%, at the level of significance of 5%, and at the level of significance of 10%, respectively.

Table 6 also indicates that the Error Correction Term (ECT) is negative, registering at -0.50 and achieving significance at a level of 1%. This implies that 50% of short-term deviations from the long-term equilibrium are corrected annually. Consequently, short-term deviations from their long-term equilibrium path are rectified within a span of two years, representing an average correction speed.

10-5 Model stability test

The model stability test contains the cumulative sum test of residual residues and the cumulative Sum test of the squares of residual residues presented by (1975,. Brown et al).

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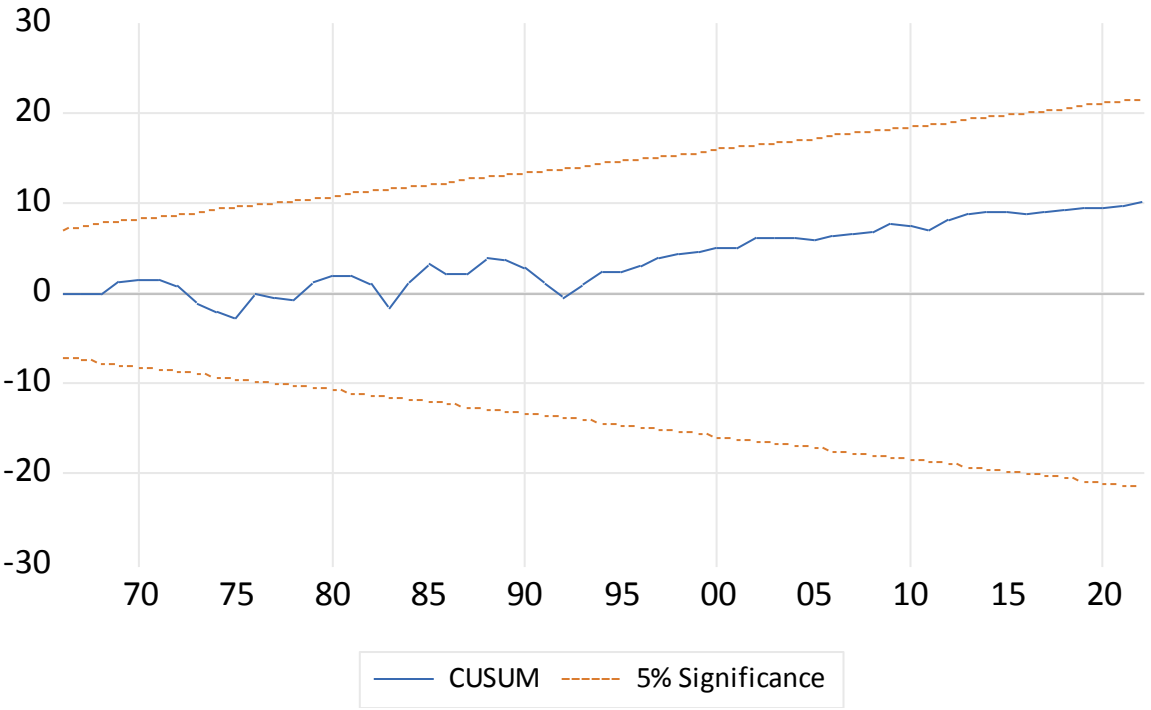
10.5.1 CUSUM cumulative sum test

Figure 1 illustrates the Cumulative Sum of Residuals (CUSUM) test for the private consumer spending equation in Australia throughout the study period. The figure visually represents the stability of the parameters in the estimated private consumer agreement using the ARDL model. Notably, the CUSUM test's estimated line falls within critical values at a significant level of 5%, indicating the stability of the parameters over the specified period.



10.5.2 CUSUMSQ Squares Cumulative Test

Figure 2 presents the Cumulative Sum of Residual Squares (CUSUMSQ) test for the private consumer spending equation in Australia. The figure effectively visualizes the stability of the parameters in the specific consumer agreement estimated using the ARDL model. Significantly, the estimated line of the CUSUMSQ test falls within critical values at a 5% significance level, underscoring the stability of the parameters over the analyzed period.

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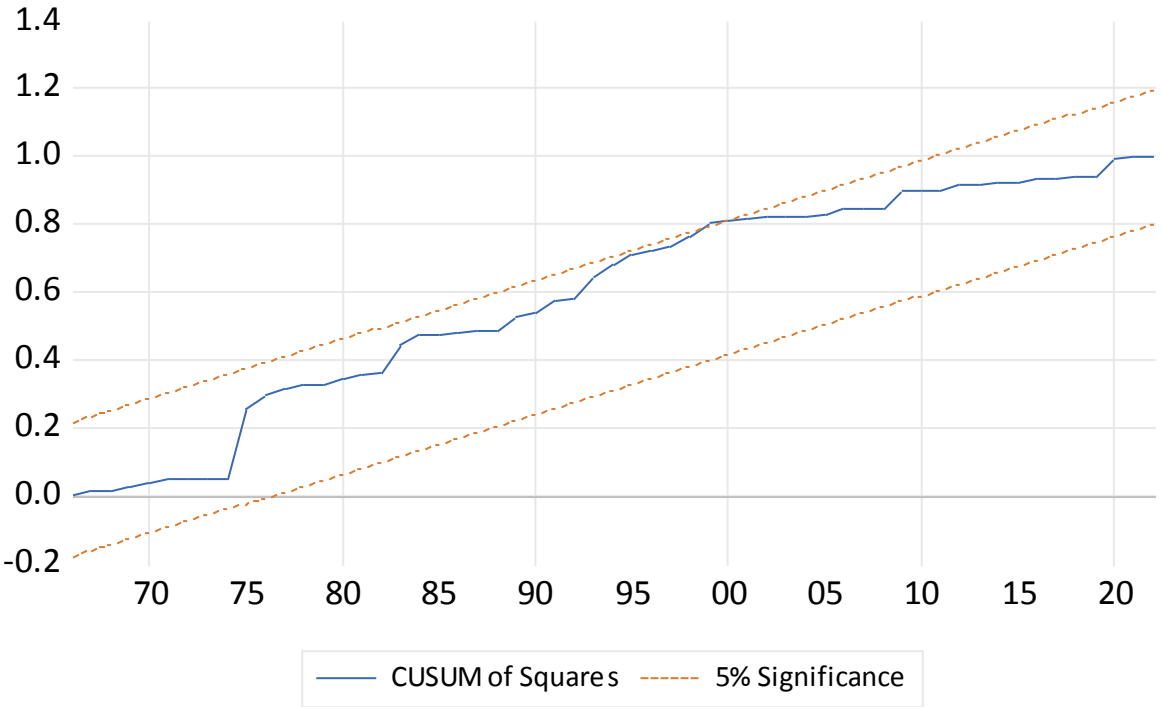

10.6 Test the validity and quality of the model

The assessment of the model's validity and quality comprises four tests: the sequential correlation test between residuals, the variance instability test, the normal distribution test for random errors, and the test of model validity. First, as indicated in Table 7, the absence of a sequential correlation problem among residuals is evident, given that the p-value from the LM Test exceeds 10%. This leads to accepting the null hypothesis, signifying no serial correlation problem, and rejecting the alternative hypothesis suggesting its presence. Second, both the Breusch-Pagan-Godfrey test and the ARCH test indicate the absence of a variance instability problem, as the p-values for each test exceed 10%. Third, the Jarque-Bera test confirms that random errors follow a normal distribution, with a p-value exceeding 10%, leading to accepting the null hypothesis and rejecting the alternative hypothesis. Lastly, the Ramsey test attests to the validity and appropriateness of the model, as its p-value surpasses 10%, prompting the acceptance of the null hypothesis indicating model validity and appropriateness and the rejection of the alternative hypothesis suggesting model invalidity.

Test	**t- statistics**	**P- value**
Breusch -Godfrey Serial Correlation LM Test	0.1480	0.1789
Heteroskedasticity Test: Breusch -Pagan Godfr	0.1421	0.1442
Heteroskedasticity Test: ARCH	0.3592	0.3675
Jarque - Bera	18.83398	0.000081
Ramsey Test	1.092609	0.2792

The Dickey-Fuller extended test conducted on private consumption, output, population, interest rate, inflation rate, and government consumer spending indicates that private consumption, GDP, interest rate, and government consumer spending exhibit stability in the first difference or are integrated at the first order. However, the inflation rate and population remain stable at the level or are integrated at the zero degree. Subsequently, the autoregressive distributed lag (ARDL) test is employed to estimate the private consumption spending equation. The bound test reveals the presence of a shared integration or a long-term relationship between the private consumption agreement and independent variables—namely, output, population, interest rate, inflation rate, and government consumption spending. This is evidenced by the calculated F value surpassing all upper limit values (1) I across various significance levels (from 1% to 10%). Consequently, the null hypothesis is rejected, and the alternative hypothesis affirming the existence of a long-term complementary relationship between private consumer spending and independent variables is accepted.

The ARDL model further establishes that the relationship between private consumer spending and output, population, interest rate, inflation rate, and government consumption spending, in both the long and short term, aligns with economic theories. There is a positive relationship between private consumer spending and both output and population over the long and short term. Conversely, an inverse relationship exists between private consumer spending and both the interest rate and inflation rate, as well as government consumer spending in the long run. Additionally, a negative relationship is observed between private consumer spending and the short-term interest rate, consistent with economic theories.

11- Conclusions and Recommendations

This study seeks to explore the intricate relationship between private consumer spending in Australia and various independent variables, including GDP, population, interest rate, inflation rate, and government consumption spending, over both short and long-term periods, utilizing the Autoregressive Distributed Lag (ARDL) model.

The research findings reveal a consistently positive and significant correlation between private consumer spending and GDP in both the short and long term in Australia. This aligns with economic theory, positing that an increase in income corresponds to an uptick in consumption. The Marginal Propensity to Consume (MPC) is calculated at 0.90 in the long term and 0.88 in the short term, in line with the principles of absolute income theory and corroborated by prior studies such as Apere (2014).

Additionally, the study identifies a positive and significant relationship between private consumer spending and Australia's population over both temporal horizons, supporting economic theory's assertion that population growth correlates with increased consumption.

Furthermore, an inverse and significant relationship emerges between private consumer spending and the interest rate in both the long and short term. This finding aligns with economic theory, suggesting that higher interest rates result in increased borrowing costs, leading to a reduction in consumption.

In the long term, the study reveals an inverse but statistically insignificant relationship between private consumer spending and the inflation rate. This observation is attributed to the relatively low inflation rate in Australia in recent years. Finally, the study unveils an inverse and significant relationship between private consumer spending and government consumption spending over the long run, consistent with the displacement effect. This phenomenon posits that an upsurge in government spending translates to a reduction in private spending.

These research findings contribute meaningfully to the literature on the determinants of private consumption spending in Australia, offering valuable insights into the implications of these factors on the Australian economy.

• Private consumer spending in Australia exhibits a positive correlation with GDP, population, and interest rates in both the long and short terms.

• Private consumer spending displays an inverse relationship with the inflation rate over the long term, and it demonstrates an inverse association with government consumption spending in the long run. • The Marginal Propensity to Consume (MPC) is measured at 0.90 in the long term and 0.88 in the short term.

• The study identifies the presence of a displacement effect in Australia, indicating that an increase in government spending results in a decrease in private spending.

Moreover, this study encompasses a significant array of economic applications:

• Tax cuts emerge as a viable tool for boosting private consumption spending and aggregate demand, as they augment disposable income, enabling individuals to allocate more towards goods and services. This strategy proves particularly effective during economic recessions.

• The Central Bank of Australia holds the capacity to leverage monetary policy tools, specifically by reducing interest rates, thereby fostering an increase in private consumption spending. A lower interest rate reduces the cost of borrowing, motivating individuals to invest in goods and services.

• During economic downturns, the government is advised to prioritize increasing investment spending over consumer spending. This preference stems from the fact that government investment spending contributes to job creation and infrastructure development, fostering long-term economic growth. In contrast, government consumer spending lacks the same simulative impact, potentially crowding out private consumption spending without generating jobs or infrastructure benefits.

These are just a few of the economic applications of the study. The study's findings can help policymakers to make better decisions about fiscal and monetary policy, which can help to promote economic growth and stability.

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Link for the all tests:

https://docs.google.com/document/d/1el23jpF6JdODqoh5uIrSyTjGHTSuTbEV/edit?usp=sharing&ouid=113572032929462007937&rtpof=true&sd=true