MARGINAL PROPENSITY TO CONSUME IN HUNGARY: THE LONG TERM VERSES SHORT TERM
CHALLENGES TO POLICY MAKERS

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ABSTRACT
This study uses Hungarian quarterly data from the International Monetary Fund to estimate a distributed lag model whose coefficients allow derivation of the short-run and long-run marginal propensities to consume (MPC). MPCs are main factors determining the consumption, investment, government spending, and export-import multipliers of the economy. Hungary's economy has stagnated and its policy makers are exploring new ways to manage its economy. Our model reveals that the numerical value of Hungarian short-run MPC is 0.4081 and the long-run MPC is 0.9458. These results are consistent with corresponding figures in emerging and advanced economies. These derived MPCs suggest that Hungarian economic policy makers should use fiscal instruments to bring these macroeconomic variables back to their long-term trend effectively.

Keywords: Distributed lag model, Reduced form, Consumption, Short-run MPC, Long-run MPC. Hungary.

INTRODUCTION

After more than a decade of growth, Hungary's economy has stagnated and its policy makers are exploring new ways to manage its economy. Marginal propensity to consume (MPC) is the most important predictor of the effectiveness of macroeconomic policy actions. We found no previous empirical investigation into the magnitude of the Hungarian short-run and long run MPC. To fill this literature gap, this study uses available Hungarian quarterly data to estimate a distributed lag model whose coefficients allow derivation of the short-run and long run MPC.

Every economy experiences periods of instability in the midst of growth and progress. All economies worldwide have encountered both internal and external shocks. Furthermore, many economies have been destabilized due to improper implementation of public policies. Cyclical fluctuations in economic activities have resulted in both periodic increases in unemployment, inflation and in disequilibria in the external sector (Gbosi, 2001).

Keynes (1936) argued that the task of restoring these macroeconomic variables to their long-term trends cannot be permitted to fall only upon market forces. He went on to say that counter-cyclical fiscal, monetary, and international trade policies are important economic stabilization instruments. These involve measures to control volume, cost, and availability, as well as to direct funds to support specified macroeconomic policy objectives, and to counteract undesirable economic trends. Although monetary and fiscal policies have differing effects, both strive to ensure economic stability. Since Keynes (1936), fiscal policy has

played a critical role in the macroeconomic management of market economies.

Keynes (1936, p.96) said "…men are disposed, as a rule … to increase their consumption as their income increases, but not by as much as the increase in their income". In his interpretation of Keynes, Mammen (1999) proposed current income as the principle objective factor determining consumption. Keynes also argued that the marginal propensity to consume (MPC) is less than the average MPC, both in the short run and long run, and that the long-run MPC might be greater than the short-run MPC (ibid, p. 97). In addition, Keynes posited that changes in the money value of wealth might be a major factor causing the short-run changes in the propensity to consume (ibid, p. 93).

Beginning in the 1960s, changes in international economic conditions resulted in persistently large government budget deficits in economies around the world. The stabilization of output and inflation has been left largely to monetary policy. As articulated by Mishkin (1995), this is partly because of concern over budget shortfalls, and partly because of doubt that the political system can utilize fiscal policy instruments in a timely manner. Then in the 1980s, Hungary gradually liberalized its economy. Calmfors et al. (2015) reported that Hungary's economy was initially the front-runner in terms of market reforms among former socialist central and eastern European countries. At the beginning of the 1990s, it seemed to be in the best position to converge quickly with the European Union, both in terms of income level and institutional quality. However, this convergence stalled beginning in the mid-2000s, with policy measures undermining the security of property rights and private contracts.

Hungary was the first country to apply for an International Monetary Fund (IMF) bailout during the latest financial crisis in the European Union. As argued by European Commission (2015), by the end of 2011, it was one of the most financially vulnerable countries in Europe outside the euro area. Although Hungary's GDP grew annually by about 3 % from 1995–2008, whereas the GDP of the old EU members grew annually by 2.2 % over that period, this difference in growth rates is probably not large enough to soon close the income gap between Hungary and the old EU members. Therefore, the Hungarian economy provides an interesting and important opportunity to investigate its marginal propensity to consume.

The objective of this study is to empirically estimate the Hungarian short-run and long run marginal propensities to consume. The remainder of the study is organized as follows. First is a literature review. Following that is a summary of the Hungarian economy. Then we report our data, methodology, and descriptive statistics. Finally, we report the empirical results and our conclusions.

REVIEW OF LITERATURE

Keynesian macroeconomics has long claimed a causal relationship between consumption and GDP growth. This is the theoretical foundation of the countercyclical macroeconomic policy framework. Macroeconomics consumption theory clearly articulates that the level of aggregate consumption is a primary determinant of GDP. It is said that an economy's marginal propensity to consume (MPC) critically determines the effectiveness of macroeconomic policy measures. This is because the short and long run MPCs are the main influences on investment, government spending, consumption, and export/import multipliers.

Tapsin, and Hepsag (2014) provide an excellent survey of the literature on the relationship between consumption and GDP. Guisan (2001) provides an extensive review of causality and cointegration between private consumption and GDP in twenty-five OECD countries over the period of 1960-1997. The author suggested using a country's individual GDP as the sole explanatory variable in the investigating process. Guisan (2004) evaluated the power of Granger Causality, Modified Granger Causality, Engle-Granger Cointegration, Two Stage Least Squares, and Hausman tests in detecting the causal relationship between real consumption and GDP in Mexico and the United States. He found strong causal dependence of private consumption on GDP, but weaker dependence when the variables are reversed.

Gomez-Zaldivar & Ventosa-Santaularia (2009) further investigated the causality between consumption and GDP in Mexico and the United States. The authors found no evidence of either causality or cointegration between the Mexican series for consumption and GDP; but, in the case of the US series, the authors found the two cointegrated with a unidirectional causality

from consumption to GDP. Mishra (2011) investigated the dynamic relationship between real consumption and GDP in India from 1950 to 2008, and found a long-term unidirectional causality from real consumption to GDP. However, the author reported no short-term Granger causality between these two variables.

Alimi (2013) used the ordinary least squares method to test the relationship between consumption and income in Nigeria from 1970 to 2011. Marginal MPC and average MPC were estimated. It was found that as income increases, the average MPC decreases, and that, although MPC was less than one, it was not stable in the long-run. Nwabueze Joy Chioma (2009) analyzed the casual relationship between GDP and personal consumption using Nigerian data from 1994 to 2007. An increase in GDP had no significant effect on personal consumption, while GDP accounted for about 3.5% of it.

Ofwona (2013) reported that consumption was determined by income in Kenya from 1992 to 2011. Genchev (2012), studied the relationship between income and consumption in Bulgaria and Russia over the period from 1990 to 2010, and found a positive and significant long-run relationship between gross national income and consumption in both Bulgaria and Russia.

Sakib-Bin-Amin (2011), investigated the causal relationship between consumption and GDP in Bangladesh using annual data from 1976-2009. The method used in the study was the Johansen and ARDL cointegration tests. The empirical results revealed a long run unidirectional causal dependence of consumption on GDP.

Finally, Blanchard and Giavazzi (2005) reported that China began the process of rebalancing its economy after pursuing an export-led development strategy for decades. This was the right move for China, because there are increasing signs that its economy has relied too much on manufacturing for export markets, to the detriment of the domestic service industry -- in particular health care services.

THE HUNGARIAN ECONOMY

Hungary's economic growth has generally been weak since the start of the crisis in the early 1990s. Only since 2014 has that growth accelerated significantly (European Commission, 2015.) After the crisis, Hungary experienced a moderate recovery in 2010 and 2011 (0.8% and 1.8% respectively), before the country fell back into recession again in 2012 with a negative 1.5% GDP growth. In 2013, economic activity revived again with a moderate 1.5% GDP increase. After five years of continuous decline, 2013 was the first year when gross fixed capital formation turned positive. GDP has reached only the level of the pre-crisis period, and lags behind regional peers. Hungarian GDP is still below its 2008 level by about 1%, while Poland's and Slovakia's GDP far exceed the pre-crisis levels. By 2015, it was projected to have accelerated to 3.3%. This was attributed to growing domestic demand with a significant contribution of gross fixed capital formation. The surge in growth (3.8% in the first half of 2014), however, was supported by temporary factors, such as the stepped-up absorption of EU funds, and the central bank's "Funding for Growth" program of subsidized loans to small- and medium-sized enterprises. Economic activity slowed slightly in the second half of 2014, and was expected to continue slowing until 2016. According to the Commission's 2015 forecast, economic growth was projected to be 2.4 % in 2015 and 1.9 % in 2016. The flash estimate for 2014 annual growth was 3.5%.

The European Commission (2015) reported that Hungarian domestic demand is expected to remain the main driver of economic growth in the coming years, but with a shift from investment to private consumption. Due to measures easing the burden of mortgage loans on households, real disposable income was expected to increase in 2015, and to stimulate consumption. With the start of the new Multiannual Financial Framework period for EU structural and investment funds, the absorption of EU funds was not expected to be at full speed in 2016. The associated drop would have a visible impact on investment activity, particularly in the public sector, and as a result, investment growth was projected to decrease in 2016. Export growth, which was set to decrease in 2015 due to lower demand from major trade partners, was expected to pick up again in 2016, with imports, fueled by private consumption, remaining stable. Thus, net exports were expected to contribute moderately to growth in 2015, and more significantly in 2016.

Hungarian household final consumption could increase, boosted by expanding real disposable income, for the following three reasons. First is the adopted settlement scheme for household

loans, which requires banks to compensate borrowers for unfairly applied terms. Second, the precautionary savings attitude of households is expected to start gradually decreasing. This is because of the reduced uncertainty concerning mortgage loans. Third is the effect of low inflation.

Inflation averaged 5% until 2011, but has fallen rapidly since 2012. This was driven by utility price cuts, falling oil prices, and by imported disinflation. Inflation expectations have adjusted downwards, but core inflation in 2014 remained positive. With the weaker exchange rate passing through to prices, inflation was expected to increase gradually to reach the central bank's 3% target of by the end of 2016.

European Commission (2015) indicated that the high level of government debt remains an important source of vulnerability for the Hungarian economy. Medium-term sustainability simulations show public debt falling further in the coming decade. However, the projected improvements are subject to important fiscal policy-related risks; and considerable vulnerability to economic shocks remains present. The commission argued that despite the rapid improvements in recent years, external indebtedness levels continue to be unsafe. Rebalancing the economy has been ongoing since the crisis, driven by sustained current and capital account surpluses, which reflect both private sector deleveraging and the increasing positive contribution from EU funds. Investment peaked in 2014, and was forecast to decelerate until 2016. It started to grow in 2013 for the first time since 2008, and in 2014 it showed more than 10% real growth, mainly on the back of EU co-financed public investments. As EU fund absorption was expected to be lower in 2016, this would bring investment growth close to zero.

METHODOLOGY

To specify the model for this investigation, following Green (2008), let L be the lag operator where $Lz_t = z_{t-1}$ and $L(Lz_t) = L^2 z_t = z_{t-2}$; then, the dynamic regression model, expressed in equation (1).

$$y_t = \theta + \sum_{i=0}^{\infty} \varphi_i x_{t-i} + \varsigma_t \tag{1}$$

can be rewritten as:

$$y_t = \theta + \sum_{i=0}^{\infty} \varphi_i L^i x_t + \varsigma_t \tag{2}$$

Also, let $B(L)$ be a polynomial in L, where $B(L) = \omega_0 + \omega_1 L + \omega_2 L^2 + \ldots\ldots$. Considering a common polynomial in the lag operator that is in the form,

$$A(L) = 1 + aL + (aL)^2 + (aL)^3 + \ldots\ldots = \sum_{i=1}^{\infty} (aL)^i$$

if $|a| < 1$, then $A(L) = \dfrac{1}{1 - aL}$.

Also, a distributed lag model in the form

$$y_t = \alpha + \beta \sum_{i=0}^{\infty} \gamma^i L^i x_t + v_t$$

can be rewritten as:

$$y_t = \alpha + \beta (1 - \gamma L)^{-1} x_{t-1} + v_t \tag{3}$$

If $|\gamma| < 1$ then equation (3) is defined by Green (2008, p. 675) as the moving average form or distributed lag form. Multiplying through by $(1 - \gamma L)$ and collecting like terms yield the following autoregressive form,

$$y_t = \alpha (1 - \gamma L) + \gamma y_{t-1} + \beta x_t + (1 - \gamma L) v_t$$

More conventionally, the above expression can be expressed as:

$$y_t = \beta_0 + \beta_1 y_{t-1} + \beta_2 x_t + \varepsilon_t \tag{4}$$

It should be noted here that equation (4) is the reduced form of the indefinite distributed lag model expressed in equation (1); therefore, β_1 is the sum of all the impacts of a change in x_t on y_t in all subsequent periods. This study defines C_t and Y_t as household consumption and GDP, respectively. Following Green (2008), this investigation uses the procedure deriving equation (4) to specify a reduced formed

consumption function with short-run and long run marginal propensities to consume which may be written as:

$$\ln C_t = \beta_0 + \beta_1 \ln Y_t + \beta_2 \ln C_{t-1} + \varepsilon_t \qquad (5)$$

As articulated by Green (2008, p.132), in this specification, β_1 is the short-run marginal propensity to consume (MPC_s) (elasticity since the variable are in logs). The null hypothesis that the short-term marginal propensity to consume MPC_s is equal to 1, $H_0 : \beta_1 = 1$ can be tested using the linear restriction on the estimated coefficient of equation (5) that provides the calculated $t_{(n)}$ and $F_{(1,n)}$, where n is the degrees of freedom.

Additionally, the long-run marginal propensity to consume is MPC_l where

$$MPC_l = \frac{\beta_1}{(1 - \beta_2)} \qquad (6)$$

To test the null hypothesis that MPC_l is greater than or equal to 1, note that, if $MPC_l = 1$, then $\beta_1 = 1 - \beta_2$, or $\beta_1 + \beta_2 = 1$.

Consequently, the null hypothesis that $H_0 : \beta_1 + \beta_2 = 1$, can be tested with a linear restriction on the estimated coefficients of equation (5). The test-statistic for this hypothesis $t_{(n)}$ or $F_{(1,n)}$, where n is the degrees of freedom.

DATA AND EMPIRICAL RESULTS

This study uses IMF quarterly data on Hungarian gross domestic product (GDP) and household consumption over the period from 1995: Q-1 to 2016: Q-3. The quarterly Hungarian logarithmic GDP and household consumption are denoted by $\ln Y_t$ and $\ln C_t$, respectively. Their correlation was .9377. The mean of Y_t during the sample period was 24.86, and ranged from 24.52 to 25.10 with a standard error of 0.16. Over the same period C_t was 24.42, and ranged from 24.10 to 24.62, with a standard error of 0.15. The estimation results for equation (5), using the Hungarian quarterly data over the period 1989-2014, are summarized in Exhibit 1. Standard errors are reported in the parentheses.

Exhibit 1: Estimation Results for Equation (5), Hungary's Short- and long- Run MPCs

$$\ln C_t = 0.3141 + 0.4081 \ln Y_t + 0.5683 \ln C_{t-1} + \varepsilon_t$$

$$(0.5604) \qquad (0.0446) \qquad (0.0473)$$

$$\overline{R}^2 = 0.9558; \text{ Log likelihood =180.3082; DW = 1.9680; } F_{(2,83)} = 920.4986*$$

Note: Data from International Financial Statistics, IMF.

As stated above, given the estimated coefficients for equation (5), MPC_s for the Hungarian economy is 0.4081. Based on the strengths of the calculated $t_{(83)} = 13.2689$ and $F_{(1,83)} = 176.0658$, the null hypothesis, that $H_0 : \beta_1 = 1$, should be rejected at any conventional level of significance.

However, the numerical value of long run

MPC_l is derived by equation (6) to be:

$$MPC_l = \frac{0.4081}{(1 - 0.5683)} = 0.9455$$

which is comparable to corresponding figures for emerging and advanced economies. However, a formal statistical analysis of the estimation results indicates that based on the strengths of the calculated $t_{(83)} = 1.0285$ and

$F_{(1,83)} = 1.0579$, the null hypothesis that $H_0 : \beta_1 + \beta_2 = 1$ could not be rejected at any conventional level of significance. Failure to reject the null hypothesis indicates that the long-run marginal propensity to consume in Hungarian economy is not significantly less than one.

SUMMARY AND CONCLUSIONS

In summary, after more than a decade of reforms and spectacular growth, Hungary's economy has stagnated, and its policy makers are exploring new ways to manage its economy. Marginal propensity to consume (MPC) is the most important variable determining the effectiveness of macroeconomic policy actions. According to Keynes (1936), MPC determines government spending, consumption, investment, and import-export multipliers. The smaller the MPC, the smaller the multipliers, and the larger the countercyclical policy measures must be to achieve policy objectives.

Our study used available Hungarian quarterly data to estimate a distributed lag model whose estimated coefficients allow us to derive the short-run and long-run MPCs. Our empirical results reveal that the Hungarian short term MPC_s is 0.4081 and its long run MPC_l is 0.9455. Our estimation results suggest that the Hungarian fiscal policy makers should use fiscal policy to bring the macroeconomic variables back to their long-term trend effectively.

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