

The Relation between Money, Interest and Consumption in Developing Countries: The Case of Turkey¹

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Abstract

As the basis of the current economic approach, comes to the fore the intertemporal utility function of decision-making economic units. Decision-making economic units decide their expenditures upon the substitution of their future utility for present utility. They defer present consumption and head for making savings. Yet, the exact opposite may also apply. Changes in the policy decisions of monetary authority have impacts on the intertemporal utility maximization of economic units as well. In this study, the question whether the amount or the price of the money affects the aggregate demand in Turkish economy was examined within the framework of dynamic optimization. The results showed that in Turkish economy where nominal income expectations are high, the resource and loan creation would increase and that when the central bank increase the interest rates to hinder this process, consumption would head up even more.

Jel Codes: E 21, E41, E44

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1. Introduction

As the basis of the current economic approach, comes to the fore the intertemporal utility function of decision-making economic units. Decision-making economic units identify their expenditure by substituting future utilities for current utility. They defer current consumption and head for making savings when they hold a long-term perspective; yet the exact opposite may also apply and they can increase their consumption if they have a short-term perspective. There are a great number of factors that affect the decision-making process. Demographic structure, social security, markets and expectations are a few of them to count. One of the most significant of these factors is the case where economic authority, particularly the monetary authority changes policy decisions. This change in the policy decisions defines the intertemporal utility maximization of the economic units (Phellips, 1968). In developing countries, in particular, where foreign currency is also demanded just like the national currency; decisions(as tight monetary politics) made by the monetary authority generate an adverse effect (increase spending). This effect ends up growth in the aggregate demand. This study will examine, within the framework of dynamic optimization, whether the quantity or the price of money influence the aggregate demand. In the first part of the study, Taylor rule will be reconsidered with the perspective of a small outward-oriented developing country and in the second part; money, interest rates and consumption will be analyzed using cash in advance model for the developing country. In the final part, Turkish economy will be analyzed within the framework of the model constructed.

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2. New Taylor Rule with in the Framework of Cash in Advance Model

Modern monetary policy is called as “New Neoclassical Synthesis” (NNS) or Neo-Wicksellian. This policy derives its basis from both Neoclassical and Neo-Keynesian economy and forms the monetary policy through the basic instrument of interest gap. This theory is based on the dominance of financial markets and lays emphasis on the interest rates elasticity of the loan demand (Sargent and Wallace (1981), Woodford (2003)). Primary objective of NNS is to determine whether the monetary policy can explain the economic fluctuations arising from real shocks. From this standpoint, monetary policy is an active policy. Under this theoretical structure, it is asserted that the inflation targeting policy that was adopted during 1990’s and early 2000’s improved long-term productivity and growth by taking aggregate demand into account and focusing on both price stability and financial stability (Mazzochi 2013). This relation based on interest rates. Interest rates has, in the course of time, turned into a tool that ensures intertemporal coordination as it effects both present and future investment and consumption decisions. In Neo-Keynesian economy, the importance of interest rates in macroeconomic terms can be illustrated through the three equations below:

$$Y - Y^* = \beta_0 - \beta_1(r - r^*) + u_1(1)$$

Y is actual GDP, Y^* is potential GDP, r is market interest rate and r^* is natural interest rate. Equation (1) is the Neo-Wicksellian IS curve or aggregate demand curve.

$$\pi - \pi^* = \alpha_1(Y - Y^*) + v_1 \quad (2)$$

π is inflation, π^* is expected inflation, Y is actual GDP and Y^* is potential GDP. Equation (2) is the Phillips curve. A holist Taylor rule can be written by combining these two curves.

$$r - r^* = \delta_1(Y - Y^*) + \delta_2(\pi - \pi^*)(3)$$

According to equation (2), the most important emphasis in Neo-Keynesian theory is put on the output gap (Cin, 2012). Output is determined in accordance with the decision made in time by economic units under elastic prices and according to the natural rate of interest. So, output and inflation are dynamic structure and they derive from the difference between natural interest rate and market interest rate. In the model above, the relation between income and money stock is neglected within the frame of intertemporal analysis. If we put income as the present reflection of the wealth that we expect to have within a certain period, then the relation between the money stock and income becomes related not only to the present income but also the income that we expect to have in the future. Accordingly, the liquidity effect of the money stock gets ahead of its price effect, the relation between inflation and money supply maintains its long-term effect and the difference between targeted nominal interest rate and inflation arises from the future increase in money supply (Ghiani et. al. 2014).

In the cases of small, outward-oriented developing countries where foreign currency demand is as important as national currency demand; money supply become rapidly endogenous and turn into a key variable for individuals making consumption and investment decisions. When this happens to be the case, money supply should also be added on the Taylor model that is constructed according to the output and inflation gap (Brunhoff and Foley, 2006). With money supply added on the model, Ricardian Equivalence assumption should also be abandoned. In certain cases where they know their nominal income will increase – the most important factor to ensure this for a small outward-oriented country is the uncontrollable capital movements – decision-making economic units decide upon their present and future consumption on the basis of the quantity of money, not the price of it. In this case, the interest policy to be adapted by central banks will lose its effect (Cushing, 1999). Hence, Cushing (1999) found in his study that in order to ensure price stability, it is necessary for price expectations to be external and stable. He also stated that this is only valid for a static economy but, considering the dynamic structure of economy, targeting interest rates would internalize price expectations by disturbing the Ricardian Equivalence; and that this would create multiple equilibriums and price stability would not be able to be determined. Apart from this, as Townsend (1987) stated, with money being involved in the model, promoting the substitution process between money and good, quantities and prices become simultaneously determinable and this determines the resource allocation of monetary shocks. On the condition that the country is a small, outward-oriented economy, fluctuations on the level of foreign currency will become more dominant on resource allocation. As fluctuations on the level of foreign currency, however the central bank uses the interest instrument, will be misallocation; there are going to be multiple equilibriums on the price level (Engels, 2015).

3. Theoretical Model

In the present study, the relation between money and interest is analyzed within the framework of cash in advance model (CIA). The model, in parallel with the study of Lucas and Stokey (1983) urges solely upon the exchange function of money and depends on the substitution process between money and good. In the model, at the beginning of the period, money supply and inflation rate is determined by the central bank externally in accordance with the growth policy (Lucas and Stokey 1983, Ghiani et al., 2014). Households decide upon the cash/expenditure balance beforehand, a shock leads to a revision on this balance; so, money stock includes a unit root and money becomes an internal variable (Svensson, 1985)⁴. Another presumption of the model is that there is an incremental substitution, i.e. positive time preference, between the present consumption and the future consumption. This provides a positive and upwarding interest rate⁵. Endogenous of money supply enhances this substitution process between the present and future consumption and the interest rates variable is determined by the market itself (Giovannini ve Labade 1991; Canzoneri et al. (2008)) the model grounds on the intertemporal budget constraints of households.

$$E_0 \sum \beta^{-t} [\alpha u(c_1) + (1-\alpha)u(c_2) - \lambda n_t] \quad (4)$$

Households live in two terms and utility function is based on the ratio between the present consumption and the future consumption. Accordingly c_1 is the first term consumption and c_2 is the second term consumption. n_t presents the labor supply. In the model, c_1 consumption is only done in cash while c_2 is done with withdrawn money and/or loan. In this case,

$$(1-\alpha)c_2 = \frac{m_{t+1}}{P_{t+1}} + l_t$$

The second term consumption depends on the real value of the money (m/p) in the second term and the amount of loan (l). Accordingly, the utility function of the household becomes:

$$E_0 \sum \beta^{-t} \left[\alpha u(c_1) + (1-\alpha)u\left(\frac{m_{t+1}}{P_{t+1}} + l_t\right) - \lambda n_t \right] \quad (5)$$

Here, α represents the substitution ratio between the present consumption and the future consumption while β^{-t} shows the reduction rate. Household will strive to maximize its utility in accordance with the intertemporal utility function. The utility function of the household depends on consumption, wealth, and labor supply. Moving from Böhm-Bawerk's interest rate theory, the interest rate is equal to the marginal rate of substitution between the consumption of the household in the current period and in the future. Accordingly, the household will substitute its income between the utility of the current consumption and the utility of the future consumption with a rate of " $-\alpha$ ". The factor determining the degree of substitution is the interest rate policy of the monetary authority. In compliance with the Euler equation, the rate of substitution between intertemporal consumption is, at the same time, equal to real interest rate (r_t).

$$\frac{\partial u}{\partial C} = C_t^{-\alpha}$$

$$C_t^{-\alpha} = \frac{C_{t+1}}{C_t}$$

⁴Another version of the model is based on the decision-making of households on cash/expenditure balance after the shocks emerge. In both cases, Money supply becomes an internal variable. For a more detailed account, see Walsh (2010).

⁵A significant study that associates the relation between the present consumption and future consumption to the interest rate is Böhm-Bawerk's interest theory. See, Capital and Interest, <http://mises.org/library/capital-and-interest>.

$$\frac{MU_{c_{t+1}}}{MU_{c_t}} = (1 + \alpha) = (1 + r)$$

$$\frac{1}{r_t} = \beta E_t \left\{ \frac{c_{t+1}^{-\sigma}}{c_t^{-\sigma}} \frac{1}{\pi_{t+1}} \right\} \quad (6)$$

The wealth of the household consists of three elements: national currency, foreign currency and loan. As the country is a developing one, there exists a dual structure in the economy leading to the demand for both national and foreign currency. In the equation, $\left(\frac{M_{3t}}{P_t} \right)$ displays real money supply in a broad sense, while $\frac{T_t}{P_t}$ is the real value of the national currency, $\frac{S_t}{P_t}$ is the foreign currency and l_B is the amount of loan provided by the banks. It depends on the value of the currency how much of $\left(\frac{M_t}{P_t} \right)$ total money stock will be hold as national currency, as foreign currency, or how much loan will be used. The factors determining the foreign currency demand is nominal exchange rate and interest gap value (Clarida, et al. 2001).

$$\frac{y}{p} = \frac{M_{3t}}{p_t} = \frac{T_t}{P_t} + \frac{S_t}{P_t} * \varepsilon + l_B$$

$$\left(\frac{M_{3t}}{P_t} \right) = \tau \left(\frac{T_t}{P_t} \right) + (1 - \tau) \frac{S_t}{P_t} * \varepsilon$$

$$\frac{\partial S_t}{\partial \varepsilon} = S(\varepsilon) > 0, \frac{\partial S_t}{\partial (r - r^*)} > 0$$

$$\left(\frac{M_{3t}}{P_t} \right)^{1-\varphi} = \frac{\left(\frac{M_{3t}}{P_t} \right)}{\left(\frac{M_{3t+1}}{P_{t+1}} \right)}$$

If we include the loans in the model, the result will reflect the intertemporal consumption within the frame of Euler equation.⁶

$$\frac{1}{r_t} = \beta^{-t} E_t \left\{ \frac{c_{t+1}^{-\sigma} r_{t+1}}{c_t^{-\sigma} \pi_{t+1}} \right\} \quad (7)$$

Euler equation (7) reflects the relation between the future consumption preference and the present consumption preference. Starting from this can we reach the standard Taylor rule. Equation (8) is the micro-based version of Taylor rule (3). If we assume that, in economy, all the things produced will be consumed, it can be seen that equation (3) $c_t = Y_t, c_{t+1} = Y_{t+1}$ can be substituted with equation (8).

$$r_{t+1} - r_t = \beta_\pi E_t (\pi_{t+1} - \pi) + \beta_c E_t (c_{t+1} - c_t) \quad (8)$$

⁶ By including interest rate in the cash in advance model, expected circulation velocity of money is also incorporated through finance markets See Ghiani et. al. (2014).

Budget constraint equation (9) of the household is going to take the form of the equation below. Current consumption of the household depends on the intertemporal value of the wealth and real wages.

$$\sum_{t=1}^n \left(\alpha u(c_1) + (1-\alpha)u(c_2) - (1+\beta)^{-1} \left(v_{t+1}/v_t \left(M_{3t+n}/P_{t+n} \right) + w_t N_t \right) \right) \quad (9)$$

In accordance with the cash in advance model,

$$E_t \left(\frac{M_{3t+n}}{M_{3t}} \right) = E_t \left(\frac{P_{t+1}c_{t+1}}{P_t c_t} \right)$$

$$r_{t+1} - r = \beta_\pi E_t (\pi_{t+1} - \pi) + \beta_c E_t (M_{3t+1} - M_{3t}) \quad (10)$$

By revising the model (10) above, we can reach the new Taylor rule. Into this new Taylor rule, we added the increase in money supply. By this way, the central bank determines the interest rate and, consequently, the intertemporal money demand of the household. So, the central bank in the small outward-oriented country is forced to control both inflation and circulation through targeted interest rates. Asset prices in international markets affect interest rates, determining the circulation of money on national level and the consumption rate changes in the course of time. As money supply has turned into an endogenous variable due to the capital movements, the central bank cannot control money supply over Taylor rule and accordingly, it can only influence resource allocation, getting further away from designating an optimal policy (Andolfatto, Williamson 2014).⁷ Central bank aims at constraining current consumption and, thus, controlling prices by means of increasing real interest rates, within the framework of Taylor rule. As shown equation (9), the exchange of the present and future consumption of the household depends on

the intertemporal value of wealth. Thereby, as $\beta^{-1} = v_t/v_{t+1}$ is the rate of substitution between the present and future

value of wealth, it can be inferred that: $\frac{\partial c_t}{\partial \beta^{-1}} > 0$. Expectation of an income growth in the future will lead to an increase in current expenditures. This comes to mean that the household is expending more than its budget. Moving from budget constraints of the household in equation (9), one can reach Ricardian equivalence (Woodford, 1995). According to the Ricardian equivalence theory, the household cannot expend more than its intertemporal budget income.

$$\frac{MU_{c_t}}{MU_{c_{t+1}}} \leq \left(\frac{M_{3t+1}}{P_{t+1}} \right)^{1-\varphi} \quad dir. \quad (11)$$

However, the household will constrain its consumption if it is convinced that there will be decrements in the utility it will gain in the future. Providing that it expects no decrements in the future income, the consumption will follow on. Accordingly, as the sources of saving rates are the output and productivity, and if the saving rate of the

household is, $S_\omega = Y_t - C_t$ (Tamborini, 2010).

⁷ Here the money supply is still internal even when capital movements are not present. In the case when money supply is equal to the utility function of the household $E(M_{3,t+1} - M_{3,t}) = E(U_{t+1} - U_t)$, money supply becomes internalized as central bank cannot directly intervene in the utility functions of economic units.

$$MU_c > MU_{c+1} = -S_\omega$$

$$-S_\omega \geq \alpha \sum_{j=1}^{\infty} S_{t+j} = \quad (12)$$

$$S_{\omega t+j} = \left(\frac{M_{3t+1}}{P_{t+1}} \right)^{1-\varphi}$$

This indicates that the household have negative savings, giving way to a Non-Ricardian equivalence (Buiter, 2002). The price set, then, equals to equation (13).

$$P_{t+1} = \frac{M_{3t+n}}{MU_{c_{t+1}}} \frac{MU_{c_t}}{MU_{c_t}} \quad (13)$$

The interest policy of the central bank in an economy where a dual structure prevails, brings along an increase in the future income of the household, and accordingly, the increase in the future income leads to present expenditure, giving way to a rise in consumption and, thus, borrowing. As shown equation (13), price expectations depend on the intertemporal consumption function, consequently price expectations become internalized and price stability cannot be reached. No matter if the central bank reduces or increases the interest rates, consumption will not decrease unless the future income of the household does so. Therefore, manipulating the consumption can only be possible through the quantity channel rather than the budget cost i.e. the interest channel.

4. Consumption Factor in Turkish Economy

In the developing countries, the asset structure of the financial system will increase regardless of the sources of the central bank and this will lead to an increase in consumption, pushing up the amount of loan because the economy is in a dual structure and the interest gap guarantees real income (Leijonhuvud 2007). As the policies of the central bank disturb the relative price system, it is normal to expect the instability to create fluctuations in itself. As long as the dual structure remains in its place, policies will lead to cheap loans, uneven resource allocation, import dependence, and over-borrowing, creating an upsurge in consumption. In this context, it would be helpful to see figure 1 and figure 2 while examining Turkish economy.

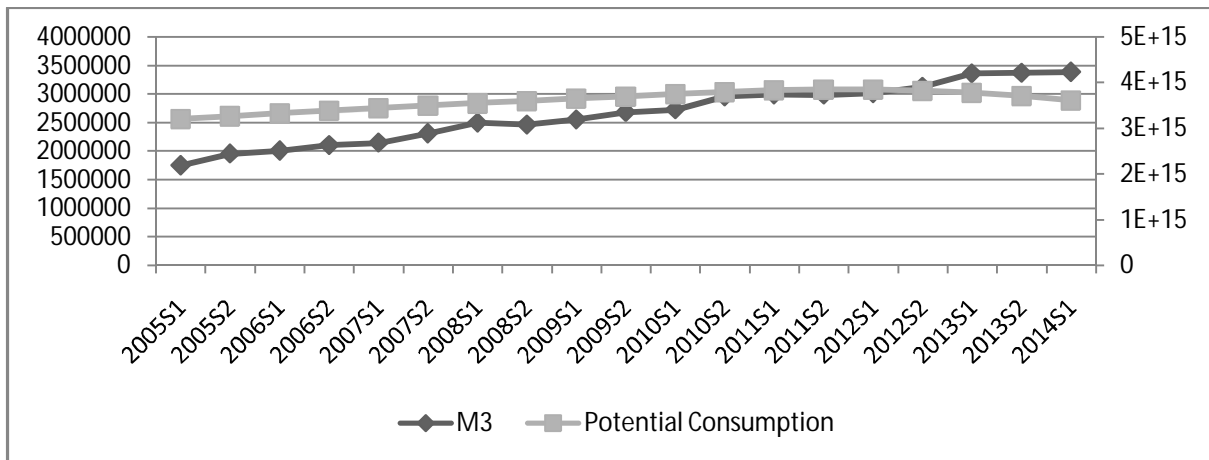


Figure 1: Money Supply – Household Total Expenditure Relation

In figure 1, in compliance with the model explained above, M3 variable which is the widest real supply of money is used and a seasonally adjusted version of consumption expenditure is employed with an H-P analysis of the domestic and foreign expenditures of the household.

As can be seen in the graph above, money supply displays a regularly increasing trend until year 2012. This indicates, as shown in the model, to a dual structure together with the increase in the money income of the household.

Along with the increase in the money income, consumption shows an uptrend until year 2012 as well. With due regard to the budget constraint, households maintain the increase in their future money income as the increase in their present consumption. Starting from 2012, with departure from capital movements (see figure 4), rate of increase in the quantity of money decreases leading to an accompanying decrease in consumption expenditures. This is the reason why the price set is a variable that cannot be controlled by the central bank, as shown in equation (13). This also indicates that the money becomes internalized and the interest rate tool loses its effectiveness, as shown in equation (10) above. Indeed, examining figure 2 together with figure 1 will reveal the fact that the households pay for their present consumption with loan and this suggests, according to the model, that they base their consumption on the income they expect to gain in the future. In other words, households, in compliance with the model, attribute their consumption to the income they will earn in the future. Households make their consumption decisions not upon the interest rate but upon the income they will gain in the future.

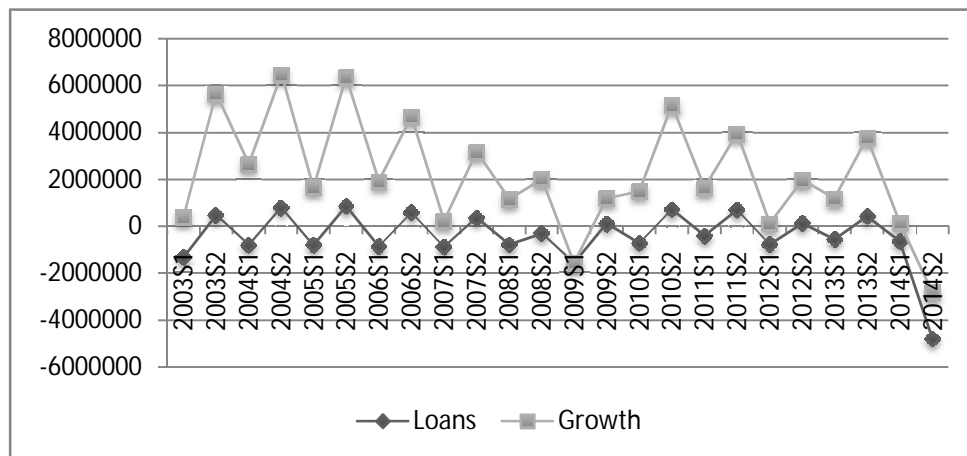


Figure 2: Relation between Total Consumer Loan and Growth Its Share in GNP

It can also be inferred from the figure 3 that there is not a relation between the interest policies followed by the central bank and the household consumption. Central bank determines the policy interest rate according not to the consumption but to the capital movements.

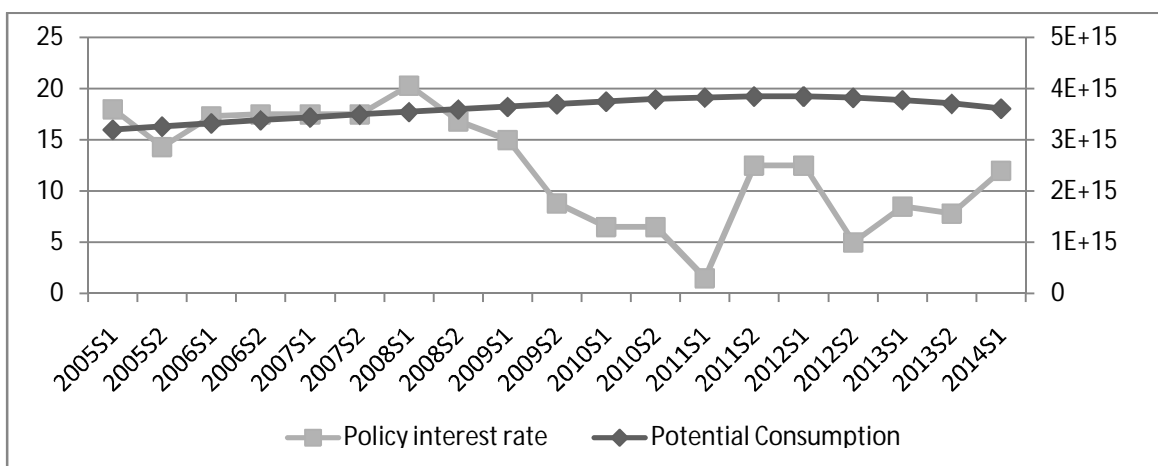


Figure 3: Relation between the Policy Interest of Central Bank of the Turkish Republic and Total Household Consumption

When figure 4 is examined, it is observed that the policy interest is decreased after the terms of capital inflow and that the policy interest is increased after the terms of outflow of capital movements. As can be seen in graph 5, the faster the inflow of capital movements into the country get, the higher the savings gap reach due to the consumption.

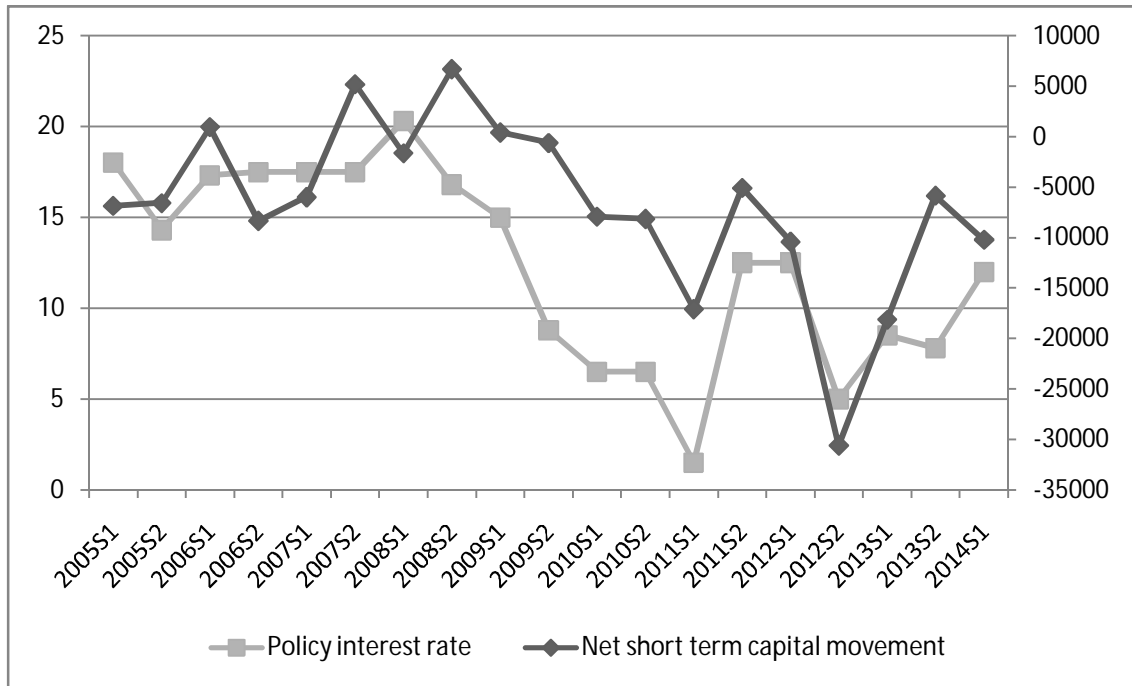


Figure 4: Relation between the Policy Interest of Central Bank of the Turkish Republic and Net Capital Movements

In figure 5 is the relation between the savings gap and annual net capital movements as of the year 2000 given. Savings gap is obtained by subtracting the share of capital facility in GNP from the share of savings rate in GNP while net capital movements are based on the difference between financial assets calculation and liability calculation. It is observed that the households display savings gap from 2001 up to now and that this gap has gained a dynamic structure. The most important factor widening or narrowing the savings gap is the financial movements due to the financial markets that can easily contract external debts.

It can be seen in the graph that, after the terms of capital outflow (as in years 2002 and 2008), savings gap relatively narrowed and, the other way round, savings gap widened after the terms of capital inflow. As of the year 2008 in particular, together with the increase in capital movements and due to the savings gap, the rise in consumption has also accelerated.

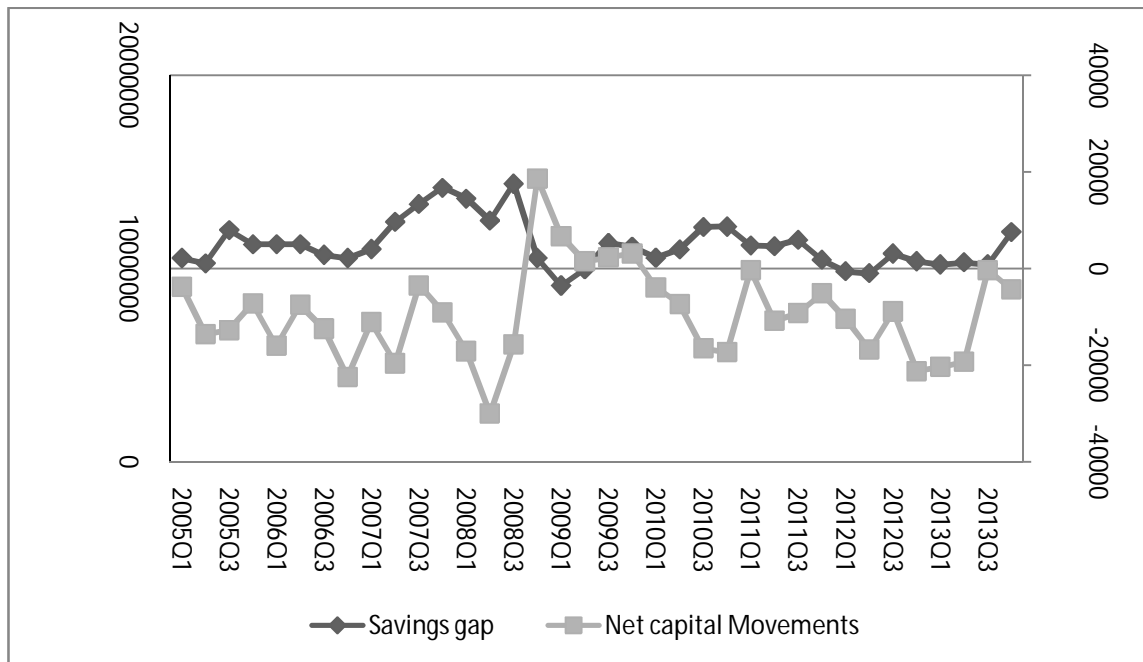


Figure 5: Relation between Savings Gap and Net Capital Movement (Million Dollars)

When figure 1, 2 and 5 are evaluated together, it can be said that the household in Turkey spends more than its income, creating a Non- Ricardian state and this gives way to an economic instability. The root of this Non-Ricardian state lies in the increase in the future income of the household within the framework of capital movements. Interest policy is another factor that further deteriorates this instability. Interest deficit policy implemented by the central bank under nominal rigidities created fiscal imbalances. Fiscal imbalances lead to repeat the optimization of prices in the real sector, price optimization intertemporal utility function causes the influence of the context of consumption and saving decisions(Christiano et al, 2005)

5. Conclusion

Neo-Keynesian macro-economic policy deductions which assert that the efforts to control the quantity and price of money can enable controlling inflation become doubtful when examined by means of micro-based approaches. If we reiterate the results of intertemporal utility analysis by simplifying them, it is possible to say here that money is a liability. The acceptance or generation of this liability by the household should be taken as an income-related process. Incomes of the economic units determine not only their expenditure but also their utilities and budget constraints. If the income expectations are not positive, it is impossible for the money supply to internally expand. In order for the money to be recognized by everyone as a liability tool, it has to have the power to influence income and utility expectations of economic units. Incomes of economic units depend neither on money or the interest of it. The income, indeed, is a function of micro and macro variables such as productivity, accumulation of capital, creativity, investment etc. And taking this into consideration, it would not be wrong to say that we expect too much from the interest with regards to controlling economy. Especially in dual dimensional economies like Turkey, money becomes further endogenous.

Taking a number of various factors such as budget, capital inflow, treasury guaranteed municipality debts, informal and unknown money, contract and elastic labor market etc. into consideration; it would not be correct hypothesis to claim that it is the Central Bank of the Republic of Turkey that controls interest.

In Turkish economy where the nominal income expectations are high, resource and loan creation will accelerate. As stated Walsh (2014), when the central bank increases interest rates to terminate this process, this will not lead to a constraint in consumption but to a disturbance in income distribution. Considering the data from

Turkey, there can be seen no relation between loans and interest. However, when the growth and capital movements are reviewed, a striking relation between loans and capital movements stands out. In today's economies, central banks of developing countries are casted roles that they are not able to handle. The interest rate and the amount of money is affected by countless variables that have impact on the income process of decision-making units. So, the power of monetary policy to control economy is much more limited than it is believed to be. Their primary duty is historically clear: as the final loan authority, to conform to the internal dynamics of the economy and keep the country's economy safe from the destructive impacts brought along by globalization. Asking for more would probably be futile.

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