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## Crowding Out and Crowding in within Keynesian Framework. Do We Need Any New Empirical Research Concerning Them?

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**No. 2/2014**

***CROWDING OUT AND CROWDING IN* WITHIN KEYNESIAN  
FRAMEWORK. DO WE NEED ANY NEW EMPIRICAL RESEARCH  
CONCERNING THEM?**

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**Toruń, Poland 2014**

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## ***Crowding Out and Crowding in within Keynesian Framework. Do We Need Any New Empirical Research Concerning Them?***

**ABSTRACT:** Last global financial crisis resulted in common among developed countries implementation of expansionary fiscal policy as an anti-recession tool. This led to the renewal of academic discussion on stabilization effectiveness of fiscal policy. In this context, the main research goal of this paper is to give theoretical analysis of the determinants of counter-cyclical effectiveness of fiscal policy with special concentration on *crowding out* and *crowding in* effects. Methodologically the analysis is done within Keynesian IS-LM framework within the assumption of expectations of economic actors. The theoretical analysis is confronted with the review of empirical papers based on the experiences of developed countries.

**Keywords:** fiscal policy, crowding out, crowding in, stabilization policy

**JEL classification:** E62, H31, H32

### **Introduction**

Macroeconomics is the field of modern economy where the scientist and especially the political decision makers “voting” for a given theory are still far away from general consensus on real or just good enough model of economy. However, the end of XX century made a period when the scientific community seemed to agree on fundamental principles of gut applied macroeconomics that could be considered as textbook model and framework for practical policy. This consensus was close to neoclassic synthesis of Samuelson (see. Blanchard, 1997, pp. 244-246; Taylor, 1997, pp. 233-235; Solow, 1997, pp. 230-232, Blinder, 1997, pp. 240-243). From the perspective of day to day policy this general agreement concentrated on application of anti-cyclical monetary policy stabilizing business cycle, which complies with rules that are similar to Taylor’s rule, and fiscal policy was considered to be rather responsible for foundations of long term economic growth. As it was stated by Martin Eichenbaum: “In sharp contrast to the views that prevailed in the early 1960’s, there is now widespread agreement that countercyclical discretionally fiscal policy is neither desirable nor politically feasible. Practical debates around stabilization policy revolve almost exclusively around monetary policy” (Eichenbaum, 1997, p. 236).

Last global financial crisis has completely changed that situation. From the practical point of view one could see massive fiscal stimulation packages that were supposed to counteract the crisis and stabilize the real economy. However, also the theoretical agreement among university researchers is not valid any more. This can be especially seen when one observes the massive discussion around three influential papers, two of Carmen Reinhart and Kenneth Rogoff (2011, 2010) who proof that expansionary fiscal policy leading over time to high level of debts (the breaking level of debt was estimated here as 90% of GDP) can be a significant factor negatively influencing GDP growth, and a critic article of Thomas Herndon, Michael Ash and Robert Pollin (2013) who argue that the estimations of Carmen Reinhart and Kenneth Rogoff are seriously influenced by methodological approach and are not valid.

The practical return to fiscal massive stabilization policy during the last financial crisis and the growing theoretical controversies on factors concerning fiscal policy that used to be considered as explained and once set prove that there is a growing need for renewal of research and theoretical discussion on the determinants of counter-cyclical effectiveness of fiscal policy. The main research goal of this paper is to fulfill that need with concentration on two significant factors influencing effectiveness of fiscal stabilization action, which are

*crowding out* and *crowding in* effects. From the methodological point of view the analysis is done within Keynesian IS-LM framework but within assumption of expectations. The main reason for this approach is the fact that it gives the advantage of analytical simplicity. Currently for the same reason many economists often use textbook AS-AD model. In this paper IS-LM framework was preferred due to some methodological problems and serious contradictions in the AS-AD model that were pointed by Robert Barro (1997, p. 611). Keynesian IS-LM perspective is also used here due to the growing theoretical and practical expansion of Keynesian economists in recent years.

In the first part of the article the transaction *crowding out* is defined in the context of its influence on fiscal stabilization actions. The second part is devoted to the analysis of consequences of portfolio *crowding out* and *crowding in* effects. In the third part the review of empirical research is done and the article ends with conclusions and future research recommendations.

### **Transaction *Crowding out* and Effectiveness of Fiscal Stabilization Policy**

In case of Keynesian model the effectiveness of fiscal stabilization policy that is aimed at stimulating aggregate demand is dependent on the size of fiscal multipliers, which in case of basic models are assumed to be positive and high. In reality there are many economic factors that may impact negatively on their size, starting with the institutional factors, macroeconomic situation of a given economy, foreign trade and ending with the actions of microeconomic market actors (see Hassett, 2009, p. 8).

One of the most important factor, which has been the object of theoretical and empirical analysis for last few decades, is the *crowding out* of private spending by government spending associated with fiscal expansion, which directly leads to a decrease in the value of fiscal multipliers. Thus, limiting the effectiveness of the government's fiscal stabilization policy.

The *crowding out* is a heterogeneous phenomenon, where the subject of scientific discussion is not only the possibility and scope of its existence, but also the transmission mechanisms leading to it. Willem Buiter proposed to introduce two basic distinction of the *crowding out* processes into two main categories: a) direct *crowding out* where the economic activities of the state interact in a direct way on the structure of private consumption and private economic activities, such as the situation when private consumption is directly replaced by the consumption of public goods, b) indirect *crowding out*, much more complex than the first one, where the reactions of economic actors are associated with the changes in the level of interest rates and their structure (Buiter 1976). In that case, one can talk about transactional *crowding out* and portfolio *crowding out*. This subsection is devoted to the effects of the transaction crowding out. The portfolio *crowding out* will be discussed in the next section.

Effect of transactional *crowding out* is defined as the phenomenon of the decrease in private investment and private consumption resulting from an increase in the interest rates, which is the consequence of fiscal stimulus (see Keynes, 2003, p. 84, Wernik, 2011, p. 97). Transactional effect is associated with increased volumes of transactions in the economy resulting from the fiscal stimulus, which leads to an increase in the demand for money. In the conditions of the growth in the demand for money, an equilibrium in the money market is possible only if there is an appropriate interest rate increase, which would bring the demand for money to its original level.

Assuming that the demand for money is a growing function of the product, fiscal expansion that is increasing aggregate demand in the product market must also lead to an increase in the transactional demand for real resources of money. When one assumes that supply of money is exogenous and constant, the increase in the transactional demand for

money leads to an increase in the interest rate, which is necessary to maintain equilibrium in the money market. In the same time, both private investment and private consumption are negative functions of the interest rate. It means that the increase in the interest rate leads to decline in private investment and consumption. Thus, one observes the phenomenon of *crowding out* of private consumption and investment spending as a result of fiscal stimulus. This is shown in chart 1. First of all, assuming that one analyses only the market of products that is unrelated to the market of money, where change in the volume of transactions do not affect the transactional demand for real resources of money, and therefore it does not affect the interest rate, the change in the size of government expenditure  $\Delta G$  increases aggregate demand and shift the curve from  $IS_1$  to  $IS_2$ , it means that it shifts the equilibrium level from  $Y_1$  to  $Y_3$ . However, including into the analysis the money market, after the fiscal stimulus for the size of product  $Y_3$  and the interests rate  $r_1$  money market is in a state of disequilibrium. Returning to the market equilibrium requires a transition to  $Y_2$  product size and a higher interest rate  $r_2$  (Friedman 1978, pp. 599-603, Spencer, Yohe 1970, p. 17). Thus, in this model the size of the effects of transaction crowding out is the difference between  $Y_2$  and  $Y_3$ .

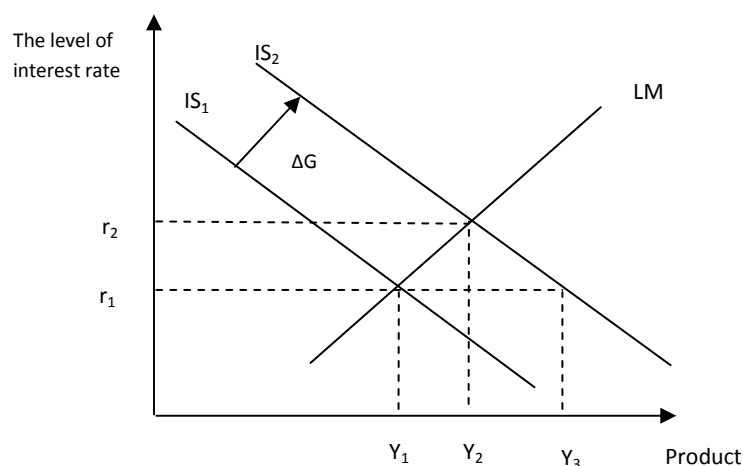


Chart 1. Fiscal expansion with the transaction crowding out effects in IS-LM model

Source: based on Friedman (1978, p. 602, Spencer, Yohe 1970, p. 17).

The phenomenon of transactional *crowding out* leads to reduced effectiveness of positive fiscal stimulus, but in the same time it can also mean smaller negative consequences of fiscal consolidation in the real economy. Along with a reduction in aggregate demand resulting from the reduction of the budget deficit there is a decrease in the transaction demand for real resources of money, which translates into lower interest rates needed to maintain equilibrium in the money market. The lower level of interest rates may be a source of positive impulse on the side of private investment and consumer spending. Thus, this effect may in part, or – in extreme cases – even entirely offset the negative impact of negative fiscal adjustment on economic activity.

From the perspective of the effectiveness of expansionary fiscal policy, which is aimed at stabilization purposes, it is particularly important that the effect of transaction *crowding out* can occur not only in conditions of full capacity utilization, but also in the case of economy in the Keynesian situation of unused production capacity. In addition, a major practical problem associated with the effects of transaction *crowding out* is the potential reaction of investment demand that is highly sensitive to interest rate, which can seriously affect the development of new productive capital equipment. In that case of the short-term effectiveness of fiscal stimulus is limited as a result of the impact of the current transaction *crowding out* effect, but

the fiscal stimulation can also have negative long-term impact on the growth rate of productivity of the economy, and hence the rate of long-term economic growth (Friedman 1978, p. 596).

There are two main factors that determine the scale of the transaction *crowding out*. First it is the elasticity of the LM curve, which determines the response of demand for real resources of money associated with the changes in product size. The second one is the elasticity of the IS curve, which reflects the impact of interest rates on private consumption and investment.

The first extreme case leading to full transactional *crowding out* effect is a situation of zero elasticity of demand for real resources of money, where the demand for money does not respond to changes in nominal interest rates. This is the “classical case” of a vertical LM curve (Figure 2a). In this situation, shifting the IS curve associated with fiscal expansion only results in changes in interest rates. However, it does not lead to changes in the size of aggregate demand, there is only a change in its structure (Carlson, Spencer 1975 , p. 5).

The second extreme case leading to the full effect of the transaction *crowding out* is the situation with perfectly elastic IS curve (Figure 2b). This occurs when there is an assumption of constant returns from investment. It may result from the interaction between a large amount of capital accumulated in the economy, and its relatively small marginal values. Due to the relatively small marginal values of capital they should not affect revenue from all the accumulated capital. Another factor leading to the constant returns to scale from investment is the fact that investment spending is often accompanied by investments in knowledge and research and development. As a result the typical decreasing returns to scale from capital accumulation may be offset by technological progress. Based on this thesis in the middle of eighties the endogenous growth theory was developed. In the case of horizontal IS curve fiscal expansion cannot move the IS curve, for example the increase of government spending absorbs the private savings that is necessary for financing private investment, thereby reducing adequately their feasibility. Thus, in this case, fiscal expansions do not affect the size of aggregate demand, as their effect one can only expect the change in its structure (Carlson, Spencer 1975 , pp. 6-7) .

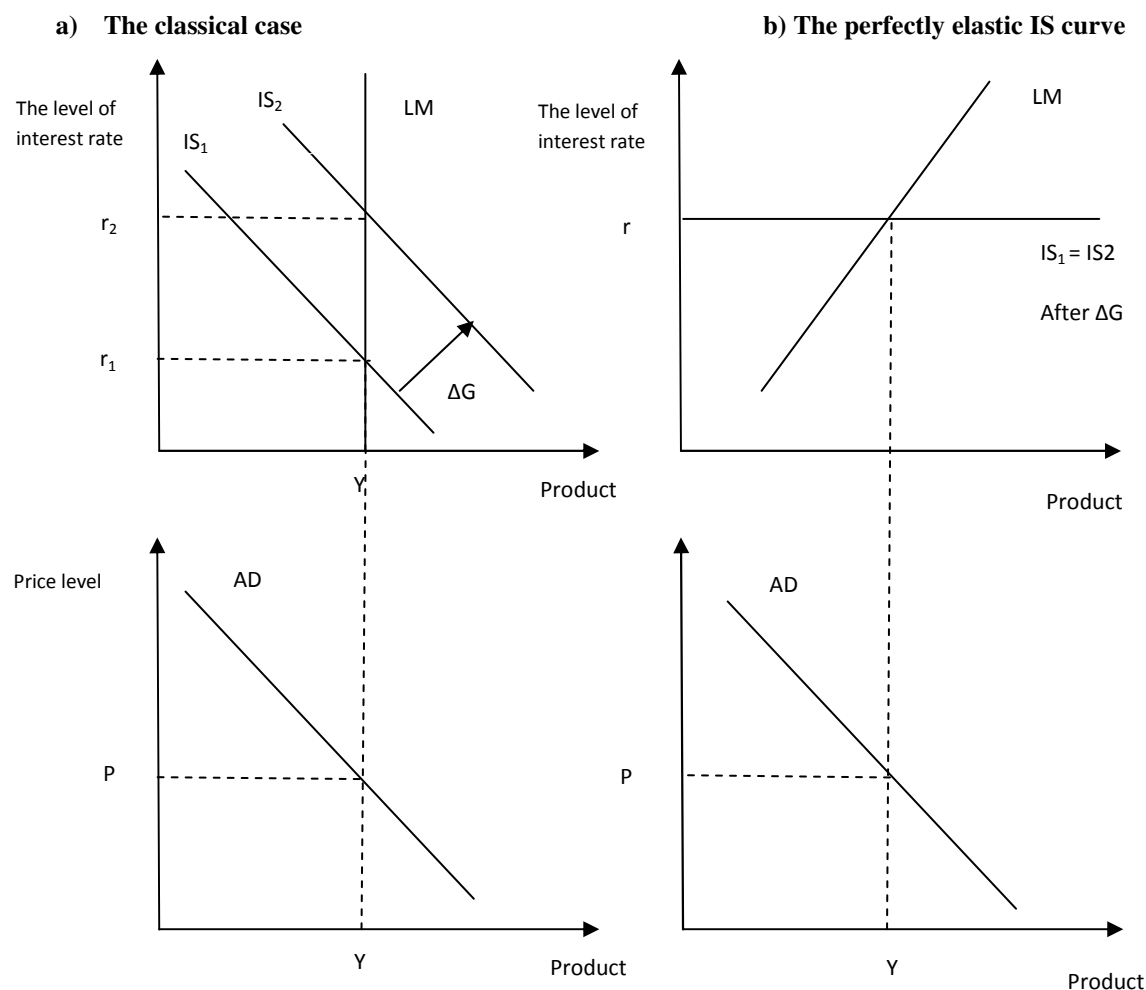


Chart 2. Transaction crowding out full effect in IS-LM model: extreme cases

Source: based on Carlson, Spencer (1975, p. 5, 7).

On the other hand, extreme cases leading to a lack of transactional *crowding out* associated with the positive or negative fiscal adjustment is the cases of vertical IS curve. In this situation planned consumption and investment spending do not respond to changes in interest rates. The second possibility is the liquidity trap case with horizontal LM curve. LM curve has that shape when the demand for real resources of money is insensitive to changes in the product or strongly reacts to changes in nominal interest rates (Rzońca 2007, p. 64).

However, the previously mentioned two “extreme” cases of full transactional *crowding out* are not the only possible conditions leading to full neutralization real effects of stimulation or fiscal consolidation. Keith Carlson and Roger Spencer present two more variants of the model with the so-called. conventional shapes of IS-LM curves, which can lead to the full effect of transactional *crowding out*, hence the neutrality of fiscal adjustment. Such cases are: a) the case of Keynes with expectations of private sector; b) the case of ultrarational households (Carlson, Spencer 1975, pp. 5-8).

In the first case fiscal expansion may adversely affect the confidence of economic actors in the future, which may result in an increase in liquidity preferences or decrease of the marginal efficiency of capital, thereby reducing the level of investment. This mechanism is shown in chart 3a. Fiscal expansion initially leads to a shift of the curve from the position  $IS_1$  to the position  $IS_2$ , which causing the increase in liquidity preferences shifts LM curve from  $LM_1$  to  $LM_2$ , while the decline in the marginal efficiency of investment shifts IS curve from the

position  $IS_2$  to  $IS_3$ . In this model, there is a final solution of the model for which shifts of the IS and LM curves lead to no change in the size of the aggregate demand for a given price level (Carlson, Spencer 1975, pp. 5-6).

In the second case of ultrarational households there is a departure from the assumptions adopted in the traditional Keynesian approach in the IS-LM model, where there is no possibility of substitution between public and private expenditure. When one assumes that private debt and public debt are close substitutes, an additional amount of expenditure increasing budget deficit replaces the analogous value of private investment, because the government deficit is treated by households as public investment constituting a substitute to private investment, where both types of investments are evaluated by households from the prospects for future growth in consumption. As a result, after the initial shift of IS curve from  $IS_1$  to  $IS_2$ , household can limited their private investment or private consumption, pushing the  $IS_2$  curve to the starting position (Figure 3b). Such a solution of the model does not depend on the method of carrying out fiscal stimulus. It does not matter whether fiscal expansion is the result of increased budget spending or tax cuts. As a result, fiscal expansion leads only to the full transaction *crowding out* effect (Carlson, Spencer 1975, pp. 7-8).

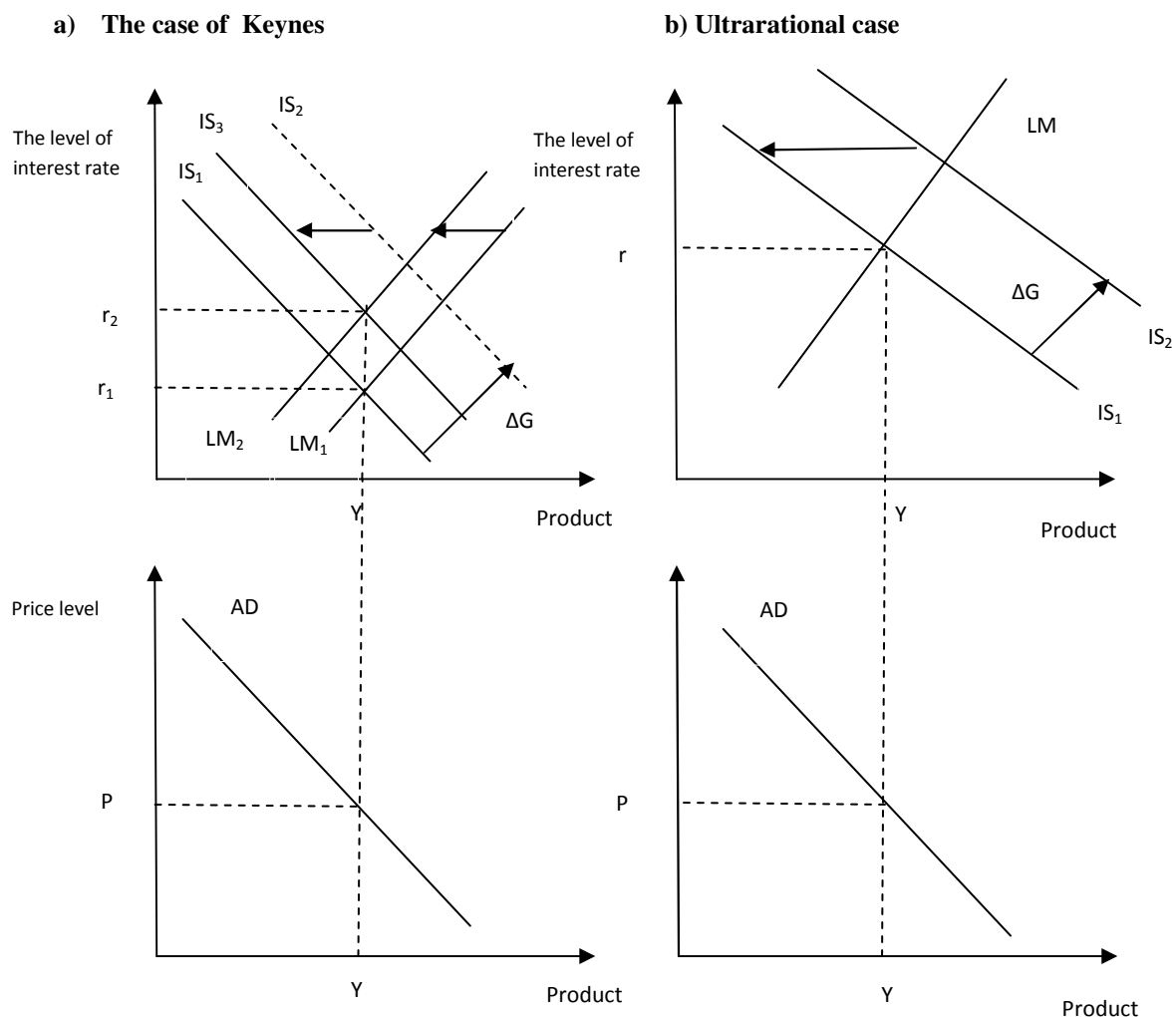


Chart 3. Full effects of transactional crowding out in IS-LM models: the case of Keynes and ultrarational case

Source: based on Carlson, Spencer (1975, pp. 6, 8).

An important issue in the context of the analysis of the consequences of the transaction *crowding out* effects on the effectiveness of fiscal stabilization policy is the time horizon of



the analysis. In the literature, there is no clear agreement on the possible extent of *crowding out* of private spending by government spending depending on whether the analysis concerns the short or medium time horizon. Empirical studies cited by Benjamin Friedman suggests that with prolongation of analysis the effects of transactional *crowding out* may have larger sizes, which negatively influences the effectiveness of fiscal stabilization policy (Friedman 1978, p. 607). Analogous conclusions can be drawn from the analysis of several econometric studies presented by Gary Fromm and Lawrence Klein (1973, p. 393).

### **Portfolio *Crowding out* and *Crowding in***

Transactional *crowding out* effect is not the only consequence of fiscal stimulation, which can affect the behavior of private consumption and investment. By modifying the assumptions of Keynesian IS-LM model with respect to the definition of consumption function, in particular assuming the relationship of private consumption not only with income and interest rate, but also with wealth of economic actors and also taking into account the wealth in the money demand function, one can talk about the possibility of portfolio *crowding out* or portfolio *crowding in* effects. These effects are also sometimes called *wealth effects* and are defined as a situation where the rising public spending leads to decrease in private spending (crowding out) or stimulate private spending (crowding in) through its impact on the value of the wealth of economic actors.

Foundations of analysis of the impact of the wealth on the private consumption and investment can already be found in the classical works of Arthur Pigou, who analyzed the impact of the size of households wealth on their consumption, as well as John Maynard Keynes investigating the impact of wealth on investment activity of enterprises. Reflection of the wealth effect in the goods market is the fact that the growth of wealth held by private entities is accompanied by an increase in aggregate demand, which in the standard IS-LM model moves IS curve to the right. This is equivalent to the occurrence of a positive wealth effect. Assuming that the source of increased wealth of households is positive fiscal impulse, the positive wealth effect in the goods market may strengthen primary multiplier effects of fiscal expansion (Kosterna 1995, p 121 ; Friedman 1978, p 609).

As mentioned earlier occurrence of the wealth effects is not limited only to the goods market. It may have also a very significant influence on the money market, where the consequences of changes in household wealth may be much more complicated.

Extending the model analyzed so far, it is assumed that households and enterprises treat the debt (government bonds) used to finance the state budget deficit as the wealth which positively affects their consumption and investment decisions. In addition, the treasury bonds included in the portfolios of households and enterprises as assets increase the demand for real resources of money (Silber 1970, pp. 465-467). This is due to the willingness of households to diversify risk, prompting them to build a diversified and balanced portfolio (Rzońca 2005, pp. 7-8).

Based on the above assumptions, in the case of a fiscal stimulus leading to the issuance of debt financed by issuing the government bonds, one can predict the occurrence of two opposite effects. One should expect an increase in aggregate demand associated with the growth of household consumption that finance the budget deficit through the purchase of government bonds, and consider it as an increase in wealth held by them. This is the equivalent of shifting IS curve to the right from  $IS_1$  to  $IS_2$  in Figure 4. However, due to increased wealth of households, one should also expect an increase in interest rates, which is necessary to maintain equilibrium in the money market when there is the increase in the demand for money (it makes effect of portfolio *crowding out* and this corresponds to a shift of

the LM curve to the left from  $LM_1$  to  $LM_2$ ), which may translate into a decline in both private consumption spending and private investment (equivalent to a shift of the IS curve to the left). As a result, there is a negative impact of portfolio effect on aggregate demand (Rzońca 2005, pp. 12-13).

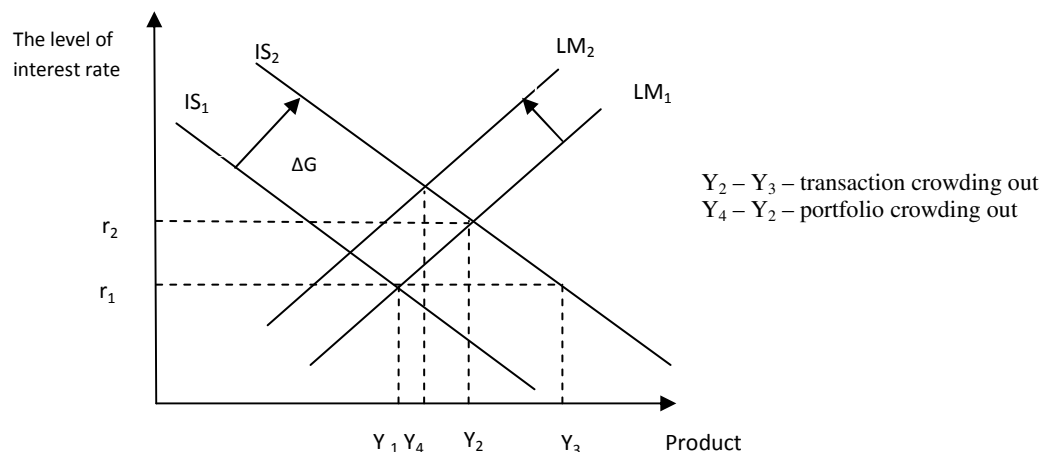


Chart 4. The portfolio crowding out effects as a result of fiscal expansion in IS-LM model.

Source: based on Friedman (1978, p. 619).

The Scale of that crowding out effect in practice depends on a number of factors such as the method of financing the budget deficit, the monetary policy accompanying the fiscal expansion, and in the case of absence of reaction of monetary policy a key factor is the degree of substitutability between money in cash and the government bonds (Wojtyna 1990, pp. 164).

Shift of the LM curve leading to an increase in the interest rate is dependent on the sensitivity of the demand for real money resources to changes in product and wealth. No response of the interest rate would require a horizontal LM curve, which would be identical to the situation in which money and the government bonds are perfect substitutes. In contrast, no shift of the IS curve would require that the curve is vertical, which means the perfect elasticity of consumer spending and investment relative to the interest rate. Both of these extreme cases do not seem very realistic. Thus, these facts may lead to the conclusion that the portfolio *crowding out* effect can significantly reduce the short-term positive impact of fiscal expansion on increasing aggregate demand, which can be treated as a factor limiting the effectiveness of fiscal policy as an anti-cyclical stabilization tools (Rzońca 2005, pp. 11-13). However, as emphasized by Benjamin Friedman final determination of the strength and direction of the impact of portfolio effect requires above all a thorough examination of social preferences for allocating resources, because depending on their characteristics the wealth effect may lead both to the effect of portfolio *crowding out*, and the opposite effect of portfolio *crowding in* that stimulate spending. This author strongly criticizes the widespread wrong belief that the negative impact of wealth portfolio effect on private investment is the only possibility to solve the model, and thus he indicates that the deficit financing through the sale of government bond may be in some cases a source of portfolio *crowding out* and *crowding in* effect (Friedman 1978, p. 608). Assuming that economic actors are characterized by risk aversion, who therefore seek to diversify their investment portfolio, the occurrence of portfolio *crowding out* effect is mainly dependent on whether the bonds financing the deficit can be considered as closer substitute for money or physical capital (Friedman 1978, p. 618).

Assuming that the bonds are mainly substitute of physical capital, not the money, to restore equilibrium in the money market will require a growth rate of return from tangible assets, which after initial positive fiscal impulse results in the increase of the interest rate and thus it shifts the LM curve from  $LM_0$  to  $LM_2$  (chart 5). This means that the transaction *crowding out* effect is amplified by the portfolio *crowding out* effect (Friedman 1978, p. 620). Therefore, in this situation the efficiency of fiscal stimulus policy is minimized.

In turn, if the bonds are a close substitute for money and not for physical capital, the LM curve shifts in the opposite direction from  $LM_0$  to  $LM_1$  (chart 5). Issuance of government bonds linked to the increase in the budget deficit will lead to a reduction in the expected rate of return on physical capital that is necessary to restore market equilibrium. This means that instead of portfolio *crowding out* effect, there is the portfolio *crowding in* effect that is stimulating the private investment, which thereby increases the effectiveness of fiscal stimulus (Friedman 1978, p. 620).

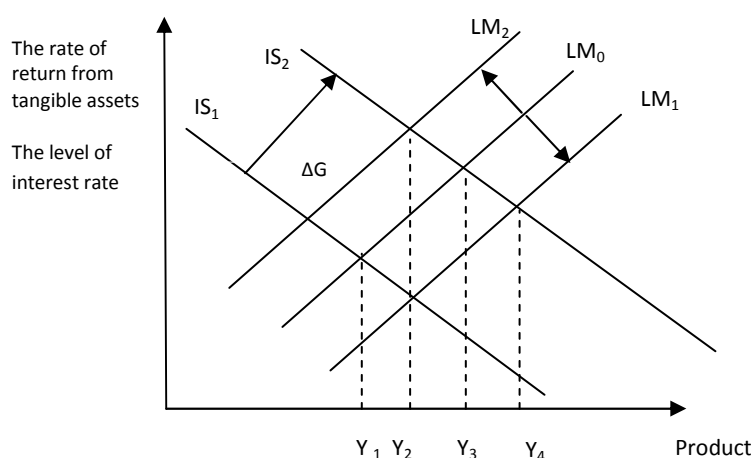


Chart 5. The effects of portfolio crowding out and crowding in as a result of fiscal expansion in IS-LM model

Source: based on Friedman (1978, p. 619).

The above discussed possibilities lead to the conclusion that the occurrence of portfolio *crowding out* effect or the portfolio crowding in effect should be the subject of permanent empirical research. The empirical works quoted by Benjamin Friedman in this matter seem to indicate that government bonds are rather a substitute for physical capital, not money. This allows to conclude that the ex-ante exclusion of the possibility of portfolio *crowding out* effect during fiscal expansions is not supported by empirical studies (Friedman, 1978, pp. 620-627).

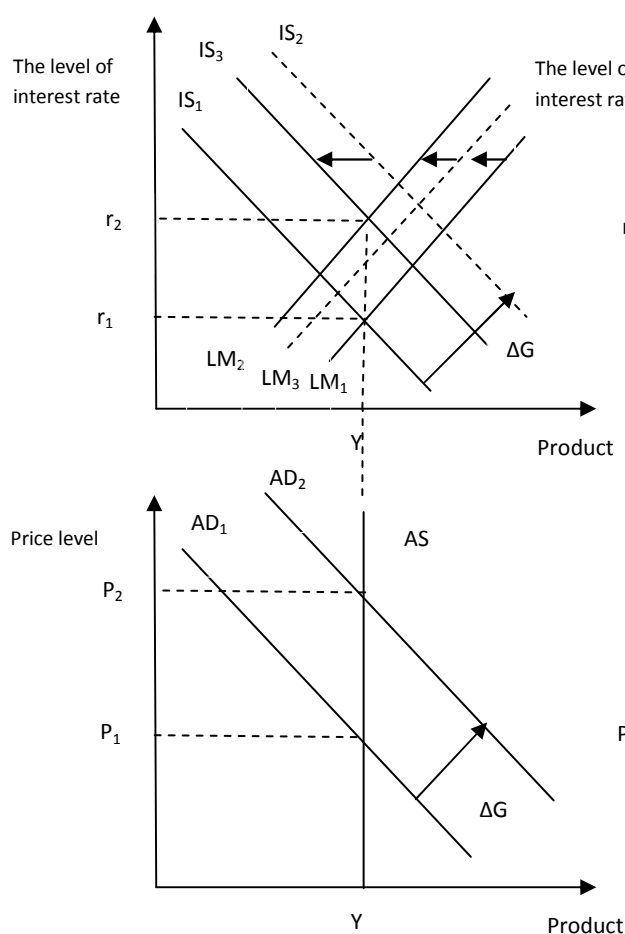
In all the models previously discussed effects of *crowding out* were based on the assumption of price stability in the product market. Portfolio *crowding out* may also occur in case of their growth, which was presented by Keith Carlson and Roger Spencer in the model with flexible prices (Carlson, Spencer 1975, pp. 8-9).

In the model with flexible prices one takes into account the wealth in the consumption function and the function of the demand for money, the constraints of the government budget, the labor sector and the endogenous level of prices. The increase in government purchases financed by both the increasing the taxes or increasing the government deficit, leads to an increase in aggregate demand and can lead to an increase in product prices. In this situation, there may be an increase in consumption associated with a positive impact on wealth of accumulation of government bonds by households. However, there is a compensating increase in the demand for money associated with increased wealth. The increase in prices leads to a fall in private consumption and a fall in real money resources. Together with the decline of

private investment, which is associated with an increase in the interest rate, these factors can lead to *crowding out* of private spending in the amount equivalent to the increased government spending (chart 6a) (Carlson, Spencer 1975 , pp. 8-9).

The previous analysis of the fiscal consequences of portfolio *crowding out* focused mainly on short-term analysis. Meanwhile, its effect may bring significant economic consequences also in the medium term. In this context, as suggested by Keith Carlson and Roger Spencer it is worth using Milton Friedman model. In this approach one assumes a relatively flat IS curve. Its shape may be associated with a broad interpretation of the concept of savings and investments. In the model of Milton Friedman, the wealth effect associated with the accumulation of bonds that finance government debt is minimal. It is offset by the impact of the expected future tax burden and by the effect of substitution of assets accumulated in the form of private bonds and government bonds financing the government debt. In addition, an important factor that was often stressed by Milton Friedman, which may additionally limit the effectiveness of fiscal stimulus, is the possible negative impact of fiscal expansion on the future manufacturing potential of economy, associated with lower private investment than it would be without the fiscal stimulus. Under these conditions, as a result of fiscal stimulus there is relatively small increase in aggregate demand. The substitution of private debt to government debt will lead to a reduction in personal wealth and will be pushing IS curve to the starting point (chart 6b) (Carlson, Spencer 1975, pp. 9-10). What's more there will be medium-and long-term costs of such fiscal stimulus in the form of lower growth potential of the economy.

**a) The case of elastic prices**



**b) The case of Milton Friedman**

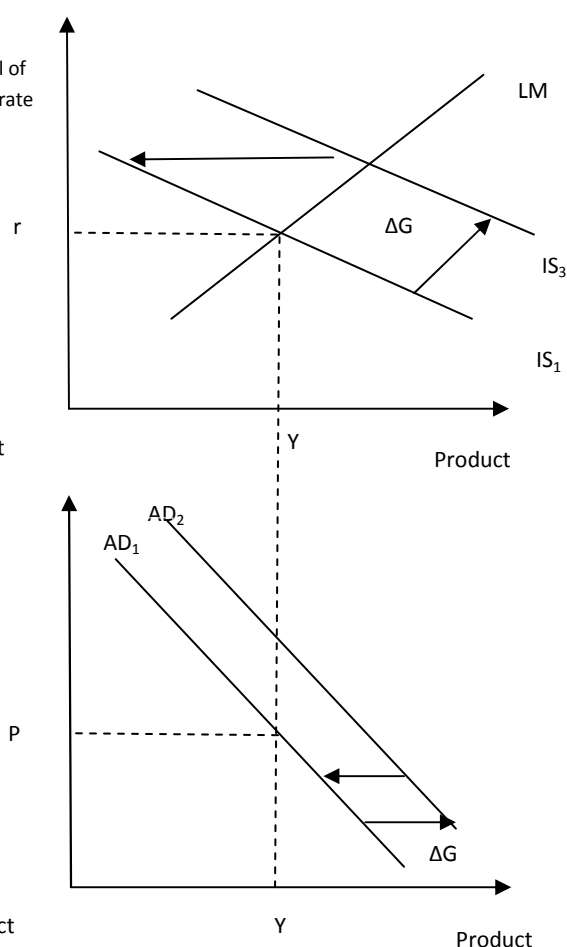


Chart 6: The effect of full crowding out in the IS-LM model

Source: based on Carlson, Spencer (1975, p. 9, 10).

In addition, portfolio *crowding out* can lead to non-Keynesian effects of fiscal policy, that means a situation in which negative for aggregate demand effects associated with shift of LM curve outweigh the positive effects of shift of IS curve. This means adopting by the fiscal multipliers of negative sign and is identical to the situation in which fiscal stimulation leads to a decrease in aggregate demand and fiscal tightening results in the increase of aggregate demand. To eliminate this possibility, the consumption of households must have a high sensitivity to changes in wealth, and the portfolio *crowding out* must touch mainly the investment. This is due to the fact that changes in investment are to a high extent identical with changes in physical capital, thereby they can weaken the impact of fluctuations in debt on the private wealth. Taking into account all of the above consequences of portfolio *crowding out*, one can assume that fiscal expansions can positively impact on aggregate demand, but that impact will be rather minimal, only under the condition of diminishing amount of capital, which is equivalent to a decrease in the supply potential of the economy in the longer term (Rzońca, 2005, p. 13).

## **Review of Empirical Research for United States, OECD and Some Developing Countries**

The analysis presented in previous two sections shows that from the theoretical perspective the *crowding out* and *crowding in* phenomena have quite complicated nature and can depend on many specific factors of a given economy. As a result it will be probably quite difficult to provide universal stylized facts concerning this problem. The main aim of this part of the paper is to review the empirical literature concerning that subject.

The literature devoted to the influence of government debt and consequences of expansionary fiscal policy is quite broad, especially one can find wide range of research on highly developed countries and especially United States.

Martin Feldstein and Otto Eckstein (1970, pp. 363-375) were researching the fundamental determinants of changes in the long-term interest rate in United States based on the quarterly data starting with 1954 and ending at middle of 1969. They developed a model based on Keynesian liquidity preference theory and attitude to the measurement of the real interest rate that was taken by Fisher. Their model was explaining the long-term interest rate with four types of variables: liquidity, inflation, government debt and short-run expectations. Their results suggest that in the analyzed period the long-term interests rates were determined by other factors than the government debt such as liquidity as the primary reason. That could be treated as an argument against significant importance of *crowding out*.

Analogous results can be found in the work of Paul Evans (1985, pp. 68-87) concerning United States economy but made with different methodology and based on much longer analytical period. He analyzed time series starting with 1858 and ending with 1984 with three sub-period during which deficit has exceeded high level of 10% of national income. That were the experience during Civil War in 1861-1865, the experience during World War I and fiscal expansion in the years 1917-1919, and the experience during World War II in the fiscal period 1941-1945. Based on regression analysis with 2SLS he argues that the large deficits during the war periods have never been associated with high interest rates, which means that one can exclude the possibility of *crowding out* effects in US economy. What is more according to him the evidence could even more strongly support the crowding in possibility with the positive association of government deficit and interest rate.

Charles Plosser (1982, pp. 325-352; 1987, pp. 343-367) in his two papers makes an analysis of relation between US government financing decisions and asset returns and

especially he concentrates on the question whether a substitution of debt financing for tax financing of a given level of expenditures is associated with an increase in interest rates. In his both researches he finds little or no association between real or nominal interest rates and deficits, which can be treated as an argument against *crowding out* paradigm.

Gregory Hoelscher (1983, pp. 319-333) investigates empirically the effects of Federal government borrowing on short term interest rates in US. His regression analysis made for quarterly data in the period 1952-1976 showed relatively unimportant and insignificant influence of government debt on short term interest rates, which excludes the hypothesis of *crowding out*. He showed that main and primary factors determining the short term interest rates were expected inflation, monetary factors and economic activity in the economy.

On the other hand, the above mentioned research results of Gregory Hoelscher were reexamined by James Barth et al. who made their analysis for the period of 1955-1983 but adjusted the data for effects of cyclical economic activity. In their research structural deficit variable has significant and highly positive coefficient which is strong argument for the influence of government debt on short term data and it gives an argument for the high possibility of *crowding out* effects in US in the analyzed period.

Richard Cebula (1985, pp. 305-309) investigates quarterly data from 1970 till 1982 in order to find the transmission mechanism of *crowding out* therefore the extent to which the rate of change of the prime rate of interest responds to the rate of change of the rate on Treasury T-bills, which is positively influenced by deficit financing. His regressions provided strong evidence that federal government borrowing has a significant impact upon short term interest rates in the private sector. As the private sector consumption and investment spending is strongly sensitive to the interest rate, he provides a strong empirical argument for high possibility of *crowding out*.

The same author has also recently updated his research for the quarterly data in the period of 1973-2007. As a result he provides new empirical evidence on the impact of the federal government budget deficit on the nominal cost of borrowing for private enterprise in the USA. The analysis is based on an open loanable funds model which includes expected inflation, the ex-ante real short-term interest rate, the M1 money supply, net international capital inflows, and the change in per capita real GDP. It reveals that the federal budget deficit measured as a percent of GDP has a positive and statistically significant impact on the nominal interest rate. As a result it influences positively the cost of borrowing for private enterprises which is an argument for *crowding out* theory (Cebula 2009, pp. 146-151).

The above presented literature review was concerning USA economy, which has long tradition of research in that field. However, the literature provides also a number of empirical studies involving a large group of countries in the long run, which provide empirical arguments for the high possibility of *crowding out*. Stanley Fisher shows the results of a panel analysis for a broad group of countries (OECD countries, Africa, Asia and South America) covering a period of more than thirty years, which confirm the negative impact of budget deficits on capital accumulation and economic growth (Fisher, 1993, pp. 485-512, see as well Fisher, 1991). Similar conclusions can be found in the works of Michael Bleaney and others who carried out the study for the OECD countries in the period 1970-1995 (Bleaney et al., 2001, pp. 37-57).

In turn, the theoretical literature review and an extensive analysis of empirical studies on OECD countries conducted by Richard Hemming and others also points to the relatively low value of fiscal multipliers, which can be the argument for high possibility of crowding out effects, and therefore relatively low short-term stimulation effectiveness of fiscal policy. Short-term fiscal multipliers in the countries amounted to about one-half and short-term multipliers for government spending amounted to about unity, which is consistent with the

conclusions of the presented theoretical analysis (Hemming et al., 2002a, Hemming et al., 2002b).

## Conclusions

Last global financial crisis has changed the political attitude towards the applicability of fiscal policy as an anti-cyclical stabilization tool. It has also influenced the academic discussion concerning the role of fiscal policy and main determinants of its effectiveness.

The presented theoretical analysis shows that even though the phenomena of *crowding out* or *crowding in* are often considered as basic textbook theory, they can have quite complicated nature. It can be seen that many specific factors of a given economy can change the transmission mechanisms and lead to different analytical results, which can be obtained with widely accepted Keynesian IS-LM framework. On the other hand, the empirical literature review have also showed that the research results concerning the subject are often contradictory, they are often sensitive to methodological differences in case of given economies and can lead to different results for different periods. These both factors lead to the conclusion that there is still a great need for theoretical work and wide empirical research concerning these factors. This is important in case of Central and Eastern European economies and especially countries like Poland that in recent years has experienced a serious growth of government debt and is not able to conduct serious fiscal reforms.

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