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The Twin Deficit Hypothesis: A Global Empirical Approach

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Abstract

The present paper tries to investigate empirically the global characteristics of the twin deficit hypothesis (TDH). A global definition of the TDH is presented. Different theoretical interpretations of the TDH at national and international levels are discussed. The authors uncover empirical evidence and theoretical interpretation about the interaction between the THD and the Feldstein-Horioka puzzle. Granger causality tests are performed between THD associated variables. The authors develop a new, TDH related interpretation, of the 2007-2008 global financial crisis.

Key Words: Twin Deficit Hypothesis, Feldstein-Horioka puzzle, Global Economy

1. Introduction

The conjecture that having fiscal and external deficits simultaneously may be risky for the economy is usually associated with the IMF and the name of Jacques J. Polak (2001), one of the founders of the monetary approach to the balance of payments. According to Polak (1997), an increase in domestic credit could have a lasting negative impact on the current account. Further, since domestic credit consists of credit to the government and credit to the private sector and given that the economic policy should try to avoid the crowding-out of the private sector, it is essential to prevent fiscal deficits in order to achieve external equilibrium and economic growth.

The TDH can be formulated in absolute and relative form. The absolute form means that there should be an equality between fiscal and current account balances, while the relative form implies

some positive relationship between fiscal and current account balance. The present paper is based on the absolute form of TDH.

The empirical tests of Polak's supposition come to different conclusions, stretching from validation to rejection of the alleged twin deficit hypothesis. A good summary of diverging results can be found in Bandy and Aneja (2019). In some cases the term twin deficit is replaced by the idiom triple deficit as far as the fiscal deficit, the current account and the financial account are interrelated (see for details Okafor et al, 2021).

An interesting research of Aggarwal, Auclert and Straub (2022) explores the effects of the twin deficit on a global level. The authors come to the conclusion that in the long run expansions in government debt raise the world interest rate and increase private

wealth globally. In the short run countries with a larger-than-average fiscal deficits experience both a large increase in private savings and a small but persistent current account deficits.

Probably the world's most important case of twin deficit is that of the USA. According to Guadelupe and Padilla (2012) the budget deficit of the USA is generated mainly by the US defense spending, while the current account one is due to the investment and household consumption. The current account deficit is financed through global savings derived predominantly from countries such as Germany, China and Japan.

A panel research concerning developing countries performed by IMF (Furceri and Zdzienicka, 2018) confirms the TDF hypothesis. It finds in particular that a one percent of GDP unanticipated increase in the government budget balance improves, on average, the current account balance by 0.8 percentage points. The results for Russia are weaker, but in the same direction.

2. Methods

The present research is characterized by several particularities.

First, it explores the absolute form of twin deficit hypothesis, i.e. presumption of equality between fiscal and current account deficits. Second, it explicitly assumes that the global financial system is a closed one, what means that we summarize the fiscal and current account balances of all countries-members of IMF.

We try also to use both qualitative and quantitative methods. The quantitative approach is especially important in the case of international policy coordination and Feldstein-Horioka puzzle.

The research applies extensively of the basic macroeconomic identities. These equations are extended to the global level. The macroeconomic discussion includes theoretical insights from the post-Keynesian school and especially the New Cambridge School, but also the Monetary Approach to the Balance of Payments, the Ricardo Equivalence concept, rational expectations, structural gap hypothesis, theory of games and others.

The approach of the paper, while trying to accept or reject different conceptual approaches, is predominantly inductive in the sense that it tries to derive some regularities from the aggregated information. The theoretical interpretations follow the observations.

We use also qualitative, econometric methods to enhance our conclusions. In particular, we performed a Granger causality tests and correlation analysis on the basis of the EViews 11 platform.

We applied also graphical analysis of the available combined information.

Our date set is based on the IMF statistics. We aggregated the information about 188 countries for the period 1980-2018.

3. Literature review

3.1. The Twin Deficit Hypothesis

The so hosted twin deficit hypothesis is usually analyzed in terms of the compartment of the private and the public sectors in individual countries, without explicitly taking into account the international fiscal policy coordination and the fact, that the global financial system is closed. However, when we analyze the problem from the point of view of the global economy, the situation may change. As Stanley Fisher (1987) explains- "Any one country that expands will create a current account deficit; all countries

expanding together avoid that problem." The same phenomenon certainly emerges in the case of the twin deficit assumption.

Here we begin with a closed world economy consisting of two countries, home and foreign. Based on the main macroeconomic identity with two counterparts, constrained by the twin deficit hypothesis, we can write:

$$(1) \quad (S - I) + (T - G) = -(S^* - I^*) - (T^* - G^*)$$

Were S^*, I^*, T^* and G^* stand for saving, investment, government revenue and spending in the foreign country. All the variables are in home country currency.

This simple identity allows us to draw an important conclusion, namely that the twin deficit hypothesis needs not only internal, but also external conditions. In particular, if we assume that private sector in both domestic and foreign country is characterized by an equality between private saving and investment, the fiscal policies in the two countries must be explicitly or implicitly coordinated. In other words, if the domestic country is running a fiscal deficit, the foreign country must have a surplus.

Further, we can write:

$$(2) \quad (X - M) = -(X^* - M^*)$$

and

$$(3) \quad (T - G) = -(T^* - G^*)$$

If the twin deficit hypothesis is globally binding, i.e. if the private saving equals the private investment in all individual countries and if we have n countries with fiscal surplus and m countries with deficit, expressed in common currency, we can summarize:

$$(4) \quad \sum_{i=1}^n (T_i - G_i) = -\sum_{j=1}^m (T_j^* - G_j^*)$$

Therefore, the global twin deficit hypothesis implies the existence of two group of mutually offsetting countries- with fiscal deficits and fiscal surpluses. It is necessary also, that the global saving equals the global investment, but this may not apply to every individual country. Even in such a case however, the equation (4) must hold.

If the twin deficit conditions are not globally fulfilled, then either the absolute value of the sum of all deficits is higher than the sum of surpluses, or vice versa. If the absolute value of deficits exceeds the sum of surpluses, the financing of the world fiscal deficit requires the saving of the world private sector. In the opposite case, the global fiscal sector funds the global private one.

In the case when the global twin deficit hypothesis is binding, the fiscal surpluses of the excess countries funds the deficit of shortfall states. If the twin deficit hypothesis is not globally constraining or, in other words, if the equation (4) does not hold, we can still confirm the twin deficit locally in individual countries or between groups of countries, where fiscal policies are interrelated and foreign private saving is important for fiscal deficits financing. At any rate, the twin deficit hypothesis should be studied taking into account the fact that the global financial system is closed.

Further, as it is demonstrated in Gandolfo (1987) and Ganchev (2010), if the private sector marginal propensity to spend is constant and close to unity then private disposable income is equal to the private expenditure and consequently $G - T = X - M$. These conclusions follow the logic of the so-called New Cambridge School in macroeconomics.

In the case of global twin deficit in the sense of (4), we presume also that the global propensity to spend equals unity, i.e. that the financial surplus of the global private sector is small and constant with important consequences for the global economy. Further, since the sum of all current account balances is by definition zero, in the case of global twin deficit, the sum of all fiscal balances is also zero. Together with the unity of the global propensity to spend, this implies extremely strong global financial constraint.

Such a situation is highly probable when "...positive income shock leads to overly optimistic future output expectations and overconsumption"- (see Bounader and Elekdag, 2024). Given these circumstances, we will observe higher marginal propensity to consume, compared to the case with purely rational expectations. Consequently, global twin deficit state can be expected as in case of global overoptimistic expectations. Further, the mechanisms of financial accelerator can reverse the situation.

The theory of stock-flow consistent models maybe viewed as further advancement of the New Cambridge School approach. One of the achievements of this theory is the overcoming of the one country approach and the introduction of two countries model for the case of twin deficit situation. In their Monetary Economics Wynne Godley and Marc Lavoie (2007) introduce a two country or two regions economy and demonstrate that in a stationary steady state without growth "it is impossible for both regions of a country, or for both countries of a monetary union, to simultaneously enjoy government budget surpluses or balanced budgets". This conclusion maybe generalized for non-stationary steady states since, as Dos Santos and e Silva (2010) admit that stock-flow consistent models "illuminate the details of what happens when the economy is far from the steady-state (i.e. they go well beyond "steady-state analyses")."

Godley and Lavoie discuss different hypothesis about the causal relationships between fiscal and trade deficits and concluded that fiscal positions of the two countries are interrelated. The conditions of steady state are in fact similar to the conditions of the New Cambridge School defined for an individual country.

The New Cambridge School (NCS) is not the sole theoretical interpretation of the interdependence between the fiscal and current account balances. We can enumerate in addition the neoclassical Ricardian Equivalence (RE), the Monetary Approach to the Balance of Payments (MABP) and the Structural Gap (SG) approaches.

The RE concept is based on the idea that the NCS school interpretation of twin deficit phenomenon implies a passive role of the private sector. For example, if the private sector reacts with cutting saving in case when the government intends to generate fiscal surpluses, then the effect of fiscal tightening will disappear. Barro (1989) demonstrated that rational economic agents would react by increasing private saving in case of fiscal deficit, expecting that government will increase taxes in the future. Consequently, no connection between fiscal and current account deficit is to be expected.

The MABP consideration are close to that of the NCS approach. According to Johnson (1977) the fiscal deficits increase the money supply. When the monetary assets exceed the long-term levels desired by economic agents, the latter will buy foreign financial instruments thus worsening the balance of payments and finally the current account (Harberger, 2008).

The Ricardian equivalence approach is not the only neoclassical substitute to the Post Keynesian twin deficit hypothesis interpretation. Some alternative studies are based on two countries two goods models; see for example Corsetti and Müller (2005). The conclusions of these models however do not contribute to the problem of international fiscal policy coordination.

An alternative line of critique against the NCS is derived from the foreign investors' behavior. The NCS postulates not only that domestic private sector propensity to save is low and stable, but that the foreign sector is characterized too by small and constant inclination to invest in the corresponding country. By contrast, the so-called Structural Gap Hypothesis assumes that the foreign saving can be an active side in financing the current account deficit. The surplus of saving over investment in one country generates current account deficit in its' trading partners (see Feyrer and Scambaugh, 2009). Finally, the external imbalances are determined by the relative competitiveness of the respective economies.

In addition, it must be taken into account, that if countries take into account the interdependence between fiscal and foreign sector and try to affect positively the current account (the so-called current account targeting), statistically the causal relationship my run from the current account to the fiscal balance and not the vice versa (Summers, 1988).

These are the usual considerations not taking into account the international fiscal policies interdependencies.

3.2. Feldstein-Horioka puzzle

The Feldstein-Horioka puzzle is assumed to be among the six major puzzles in international macroeconomics (see Obstfeld and Rogoff, 2000). The phenomenon consists of strong correlation between domestic saving and investment in OECD countries. It was interpreted as a lack of sufficient capital markets integration among developed industrialized countries. Up to now, there is no convincing explanation of this empirical observation. The prevailing interpretation is the existence of frictions in international capital flows (see Giannone and Lenza, 2008).

However, there is a paradox in this puzzle. The problem is, that the correlation between saving and investment among developing countries is much weaker then among OECD members (see Alakbarov and Bayar, 2021 and Vamvakidids and Wacziarg, 1998). This means that the international capital markets impact investment in emerging economies much stronger compared to developed ones. This finding is counterintuitive.

The explanation maybe as follows. The prevailing floating exchange rates regimes and liberalized capital accounts in developed economies after the collapse of the Bretton Woods system, allowed the central banks and the governments to execute autonomous monetary and fiscal policies. This means that they can sustain interest rate levels on domestic markets different from those prevailing of international markets. These polices shift domestic IS and LM curves and increase correlation between saving and investment. The developing countries are much less able to implement sovereign autonomous monetary and fiscal policies, so they depend more directly on international capital markets. Fixed exchange rates regimes in some emerging economies further exacerbate this situation.

The autonomous monetary and fiscal policies in developed countries rise the question of the inevitable interdependence between these policies.

3.3. International Policy Coordination

Since our approach should include international fiscal policies interdependence and coordination, we need some elucidation in this respect. Coordination is understood, following Wallich (1984), as “a significant modification of national policies in recognition of international economic interdependence.” The need for coordination is related to the fact, that “economic policy actions, particularly those of larger countries, create quantitatively significant spillover effects or externalities for other countries, and that a global optimum requires that such externalities be taken into account in the decision-making calculus” (see Frenkel, Goldstein, and Masson, 1990).

The coordination maybe ex ante, or rule-based, and ex-post, which has proved to be very difficult (Alcidi, Määttänen and Thirion, 2015). The coordination takes place via autonomous reactions of the individual countries’ economic policies to the external economic conditions or in a coordinated centralized manner via G7, G20, IMF and other international institutions (Shearing, 2021). Centralized cooperative coordination usually involves small groups of big countries.

In addition, from conceptual point of view, we can distinguish between two types of coordination, one based on Nash type of policies- that is, policies that are the best the country can achieve

unilaterally and the other- on the cooperative package of policies (Ostry and Ghosh, 2013). The Nash type of coordination can be viewed as an implicit one, while the cooperative coordination requires explicit agreements and institutions. The first type of coordination usually ignores the holistic aspects of economic policies and may create conditions for global crisis, as far as “...it is assumed that each participant acts independently, without collaboration or communication with any of the others” (Nash, 1951). In particular, this may create a prisoners’ dilemma. The Nash type of coordination is more probable among developed countries.

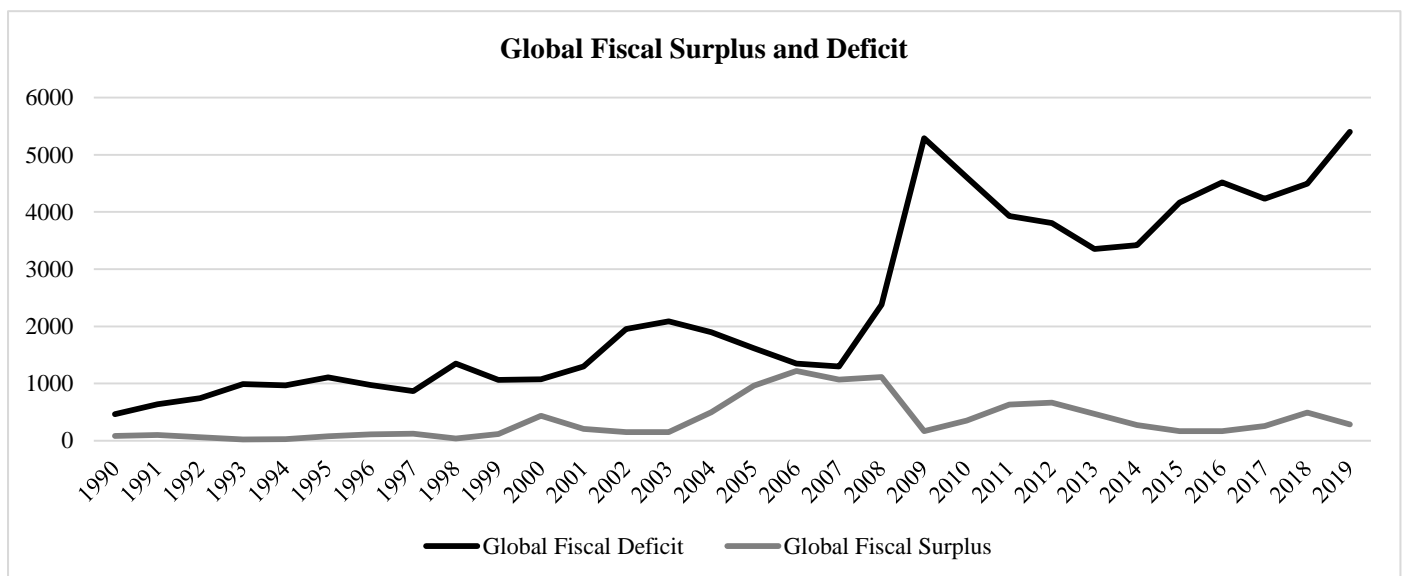
Finally, there must be three levels of investigating the twin deficit hypothesis in global terms. The first level is whether the equation (4) is correct and whether the New Cambridge School type of explanation may be correct in some cases. The latter implies that the global propensity to spent equals unity. This variant is quite unlikely though possible and consequential. It implies high level of perhaps implicit, Nash type of fiscal coordination. This type of coordination prevailed in the period 2003-2007. The global financial crisis marks the transition from Nash type to cooperative coordination.

The second level is to find out to what extent some fiscal deficits are as a rule funded by other countries fiscal surpluses.

Finally, the third level consists of financing fiscal deficits via foreign private saving. This is the usual approach to the problem, especially in the case of small open economies.

4. Results

Graph №1



Source: IMF

As we can see at Graph number 1, combining data from 188 countries for the period 1980-2018, the global aggregated fiscal deficit in absolute terms is as a rule much greater than the global fiscal surplus. Exception is the period 2006-2007, when the conditions of the twin deficit hypothesis are approximately globally fulfilled. Such a situation requires two preconditions.

First, very high degree of international policy coordination and second, strong desynchronization of economic cycles. The second condition follows from the fact, that countries with fiscal surpluses

are typically in a state of overheating, while deficit countries are normally characterized by underemployment. Specifically, in 2006-2007, the oil exporting countries generated huge fiscal surpluses, while the rest of the world unveiled fiscal consolidation, though the former trend did not concern USA, UK, France, Japan and other major economies.

The combination of mutually offsetting fiscal surpluses and deficits spawned global private capital crowding in. This follows from the fact, that according to the New Cambridge School, in case of a

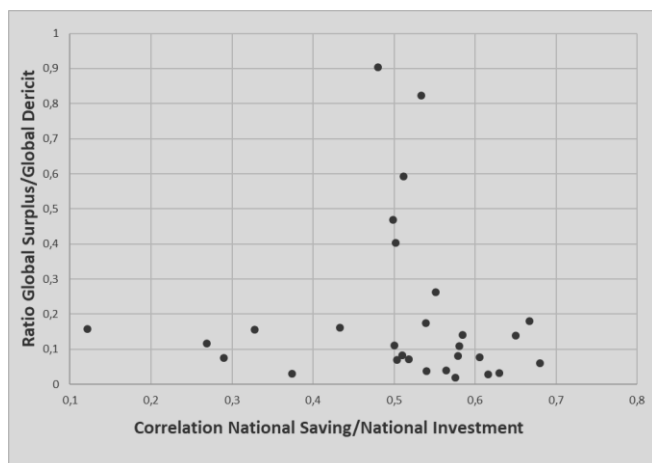
global twin deficit state the global private disposable income needs to be equal to the global private absorption. Therefore, the global twin deficit state allows for redirection of the global financial flows from the global public to the global private sector, predominantly at the expense of the emerging markets.

The policy coordination under the 2006-2007 period was predominantly of the Nash type, via policy related anticipations of the individual countries. This concerned largely the developed and the oil exporting countries. On the contrary, the developing economies were much less able to participate in a Nash type of autonomous economic policy matching given their weaker public financial institutions. In fact, the process of the implicit fiscal policies coordination, ended with the global twin deficit state in 2006-2007, began in 2003 when the course of narrowing the gap between global fiscal surplus and global fiscal deficit was initiated. During period 2003-2006 the over optimism on the world private capital markets prevailed. The global public sector was gradually withdrawing from the global financial markets. However, the global twin deficit situation triggered the opposite process in the spirit of destabilizing fiscal accelerator. Throughout and after the crisis, we observe also a more intensive coordination of cooperative type, via IMF, G7, G20 and among the EU.

In particular, the global twin deficit situation brings about very high insecurity from the point of view of the international capital flows since these flows equalize global saving and global investment under maximum divergence of national business cycles, prevailing deregulation, especially under the period 2006-2007. Since the twin deficit situation implies strong external constraint on growth, especially in developing countries (Blecker, 2021), it is a good case for a global cross-section test of the alleged Thirlwall's law.

In view of the fact that the so-called Feldstein-Horioka puzzle implies high correlation between national saving and investment and the latter presumes some segmentation of the national capital markets, we can expect that the fiscal policy induced desynchronization of cycles will affect the above correlation.

Graph № 2



Source: IMF

As we can see at Graph № 2, the ratio global fiscal surplus/global fiscal deficit actually exhibits interesting interaction with the correlation coefficient between national saving and investment.

The annual cross section global correlation coefficients cover the period 1980-2018 for 188 countries. The correlation spans from

zero (perfect global capital mobility) to unity (total national capital markets segmentation). The value of 0.5 is the middle point of the highest uncertainty (entropy) between the two extreme regimes.

The global fiscal surplus and deficit also contains annual data for the same 188 countries. The ratio global fiscal surplus/global fiscal deficit similarly stretches from zero (no surplus) to unity (global twin deficit).

Interestingly enough, cases close to the global twin deficit emerge only when the global economy is at points near the highest uncertainty in terms of global capital market mobility (value of correlation 0.5).

The possible interpretation is that the twin deficit induced economic cycles desynchronization and generates international capital movement's uncertainty. The converse however is not true-the highest entropy does not always imply global twin deficit.

So worldwide, the twin deficit hypothesis and the Feldstein-Horioka puzzle are interrelated.

The twin deficit state in 2006-2007 maybe viewed therefore as a byproduct of the final stage of the global financial crisis 2007-2008. In this line of reasoning, the overinvestment in the mortgage-backed securities was the initial channel that preceded the excessive fiscal disorder and finally the international capital flows misalignment. The global fiscal consolidation and the unstable international capital flows are the final phases of the global financial disaster. The global financial crisis was exactly global; it concerned the private capital market, fiscal policies of developed, emerging and oil-exporting countries and the international capital flows. The weakest link was the fiscal policy of the most vulnerable emerging economies.

The further empirical analysis is performed via EViews 11 platform.

First, we studied the Granger causality between national saving and national investment in 188 countries for the period 1980-2018. As we can see from the Table № 1, we can refute with high probability the hypothesis of no causal impact from saving to investment and vice-versa. Therefore, both variables are strongly interconnected.

Table № 1

Results of the Granger Causality Test based on Panel Data Covering 188 Countries for the Period 1980-2019

Pairwise Granger Causality Tests

Sample: 1980 2018

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
SAV does not Granger Cause INV	5303	39.2055	1.E-17
INV does not Granger Cause SAV		45.5790	2.E-20

Table № 2

Results of the Granger Causality Tests between the Variables Correlation between National Saving and Investment (*COR*), the Difference between the Global Fiscal Surplus and Deficit (*DEF_SUR*), Global Fiscal Surplus (*GFS*) and Global Fiscal

Deficit (GFD) based on Panel Data, Covering 188 Countries for the Period 1980-2019

Year	Lag	Conclusion about Granger Causality direction of influence
1990-2018	1	DEF_SUR => COR
	1	GFS => DEF_SUR
	1	GFD => COR
	1	GFS => GFD

The second stage of our empirical analysis concerns the causality between variable such as the correlation between National Saving and Investment (COR), the Difference between the Global Fiscal Surplus and Deficit (DEF_SUR), Global Fiscal Surplus (GFS) and Global Fiscal Deficit (GFD).

The causality effect is from DEF_SUR to COR, from GFS to DEF_SUR, from GFD to COR and from GFS to GFD.

These dependences confirm the active role of global fiscal sector over the correlation between national saving and investment, and consequently the importance of fiscal policies for explaining Feldstein-Horioka puzzle. In general terms this conclusion is close to the New Cambridge school theoretical assumptions.

The second important conclusion is about the active role of the global fiscal surplus over the global fiscal deficit. The worst-case scenario is high fiscal surplus of oil exporting countries combined with fiscal consolidation in the rest of the world with strongest negative impact on emerging economies, i.e. global twin deficit situation, activated by surplus countries. This global twin deficit state interacts with the global private capital market and aggravates the negative impact on the world economy.

5. Conclusions

The Graph N1 demonstrates the first level of analysis, namely the check of the validity of the equation (4). Only in years 2006 and 2007, the global cogency of the twin deficit hypothesis is approximately confirmed. This means that the global marginal private propensity to spend is near unity, according to the New Cambridge School assumptions (small and constant proportion of net financial assets to income).

The global twin deficit implies high desynchronization of the directions of the public fiscal impulses- balance between the contraction in the surplus and stimulus in the deficit countries. This have indeterminate impact on the international capital flows and on the correlation between domestic saving and investment. Further, the Nesh type international coordination of the fiscal policies is high under the global twin deficit condition. The balance between contraction and stimulus in the period 2006-2007 is achieved via the increase of surplus in the oil exporting countries and decline of deficits in the oil importing emerging economies, i.e. under prevailing global fiscal consolidation. The trigger of this Nesh type fiscal coordination is the increase of the oil prices in the period 2006-2008. The Nash type coordination took place predominantly between the developed and the oil-exporting countries while the emerging segment of the world economy had to adjust submissively to the negative shifts on the world capital markets. The US in particular sustained their fiscal and current account deficits via autonomous monetary and fiscal policies.

The complementarity of the fiscal policies (surplus countries match deficit ones) involves additional international capital movements. These movements should weaken in principle the correlation between national saving and investment. The opposite interdependencies maybe expected in the prevailing case of global fiscal deficit. Therefore, empirically we observe Granger causality impulses from the global fiscal variables towards annual cross-section coefficients of correlation between domestic saving and investment, associated with Feldstein-Horioka puzzle. This is in favor of the hypothesis, that Feldstein-Horioka puzzle is a consequence of the autonomous macroeconomic policies prevailing in the developed market economies.

In fact, we can reject the null hypothesis of no causality from global fiscal deficit towards global correlation coefficients between domestic saving and investment with a small probability of error. This confirms empirically the interdependence between the global twin deficit hypothesis and the Feldstein-Horioka puzzle.

We can reject also the null that the global fiscal surplus does not Granger cause global fiscal deficit. The latter means that we cannot cast-off the conjecture about the interdependence between the global fiscal surplus and the global fiscal deficit.

As it concerns our third level of empirical analysis, consisting of whether the national fiscal deficits are funded by foreign private saving, the evidence from the Graph 1 is that, except for the period 2006-2007, the global fiscal deficit by far exceeds global fiscal surplus, so deficits are financed predominantly via private capital markets.

In case of a global twin deficit situation, we observe a global private sector capital markets crowding in at the expense of emerging markets fiscal sector crowding out. The latter is due to the amplified risk sensitivity on the capital markets, on the one hand and sustained fiscal deficits in the developed economies, on the other. The latter, during the 2008-2018 period, is entitled to the quantitative easing type of monetary and fiscal policies. The solution in order to avoid the less developed countries crowding out would be a more intensive explicit global fiscal and monetary policies coordination.

6. Discussion

The main discussion topic is to what extent we can consider the global financial crisis 2007-2009 to be exacerbated by the global twin deficit condition, as well as to whether we can expect the situation to repeat itself in 2023-2024.

Maurice Obstfeld (2022), concerning current global coordination of the central banks' monetary policies, admitted "...central banks could avoid excessive monetary tightening without explicit coordination simply by accurate forecasting of each other's policy moves and their global effects. Just stating this computational problem, however, illustrates how difficult it might be compared with proactive direct consultation, which at the very least would provide more transparent guidance."

This reasoning can be applied also to the global fiscal policy coordination. During the global financial crisis, fiscal tightening was observed on a global level, but especially in the emerging market developing economies (Guénette, Kose and Sugawara, 2022). This contraction was disproportionate and combined with the fiscal surpluses of the oil exporting countries led to a global twin deficit situation. The overreaction of the emerging markets

fiscal policies was due to the worsening of the capital market conditions and the lack of explicit global policy coordination.

The situation after the Covid 19 crisis and Ukraine military conflict negative global economic impact, is to high extent similar to the 2007-2009 global economic crisis. The difference between the previous crisis and the present situation is that fiscal tightening is expected not only in emerging, but also in developed economies (Guénette, Kose and Sugawara, 2022).

In particular, it is expected that the low-income countries will need to significantly improve their primary fiscal balances while facing increasing foreign financing needs (IMF, 2022). Given the positive fiscal balance in the oil exporting countries, the emergence of global twin deficit condition is likely. Therefore, if a trigger, similar to mortgage-backed securities panic disturbs capital markets, excessive fiscal tightening in emerging economies can reinstate the global twin deficit situation of 2007-2009. Such an event can be a protracted conflict in Ukraine. On the other hand, the prospect of loosening of the monetary policy of the Federal Reserve System at the end of 2023 may have stabilizing effect via global interest rate decline.

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