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Articles

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8 Valaoritou Str., Kolonaki, 10671 Athens, Greece.
Tel.: 210-36.34.210 Fax: 210-36.34.209
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The current issue of the Athens Journal of Business and Economics (AJBE) is the first issue of the sixth volume (2020).

Gregory T. Papanikos, President
Athens Institute for Education and Research

15th Annual International Symposium on Economic Theory, Policy and Applications 29-30 June & 1-2 July 2020, Athens, Greece

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- **Dr. Chris Sakellariou, Head, Economics Unit & Associate Professor of Economics, Nanyang Technological University, Singapore.**

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- Abstract Submission: **2 March 2020**
- Acceptance of Abstract: 4 Weeks after Submission
- Submission of Paper: **1 June 2020**

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Important Dates

- Abstract Submission: **6 January 2020**
- Acceptance of Abstract: 4 Weeks after Submission
- Submission of Paper: **6 April 2020**

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- **Dr. Gregory T. Papanikos**, President, ATINER.
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The Nation State in the Global Economy

By Attiat F. Ott[*] & Nicole Bissessar[±]

The paper revisits the use of Fiscal Policy as a viable instrument of public policy. Once dominated the landscape as a policy instrument in the nation state economy, it has all but abounded in the 21st century. The paper shows a revival of fiscal policy to address issues in the global economy, in particular global spillover. Using data for two samples; developed and developing economies it highlights the spatial dimension of public functions in the global economy. (*JEL* H3, H7)

Keywords: *State and Local Government; Fiscal Policies, Spillovers.*

Introduction

"Public finances are being shaped by evolutionary dynamics such as Globalization". Vitor Gaspar, 2016, p.166.

At the close of the 20th century, there emerged a new global order where national boundaries of states no longer defined their economic policy. In a provocative paper: "Fiscal Policy for the Twenty-First Century: Testing the Limits of the Tax State", Gaspar (2016) raises the following two questions: In a world full of risk, how can public finances be made safe, and secondly, how can fiscal policy contribute to mitigating those risks?

The state public sector through its instruments of policy; discretionary fiscal actions, and the "automatic" stabilizers, seeks to mitigate the risk to the national economy from fluctuations of aggregate demand nationally, and, from spillovers from the international economy.

To focus on the role of stabilization policy active and passive that is pursued by the nation state, in the milieu of the international economy, the place to begin is with a framework that links globalization to the fiscal policy of the nation state. This paper is organized as follows: In the first section, a brief presentation about the functions of the nation state in a global context is presented. Next, a discussion of the spillovers - from the global economy to the national economy is presented. The response of the nation state to international spillovers is given in the following section. The last section concludes.

[*]Emeritus Professor of Economics, Clark University, Worcester, MA, USA & President of the Institute for Economic Policy Studies, Worcester, MA, USA.
[±]Nicole Bissessar, Faculty of Economics, College of Online and Continuing Education, Southern New Hampshire University, USA & Research Associate, The Institute for Economic Policy Studies, USA.

The Nation State Functions in a Global Context

The fiscal functions of the nation state are commonly enumerated as falling into three categories: provision of public goods, achieving a modicum of equitable distribution of income and the stability of the national economy. In a global context, these functions take on a much broader role in that, risk to the national economy may be associated with "outside" risk arising from natural disasters and/or environmental hazards.

The close of the 20th century ushered in a new global order. National economies are more open and the boundaries of the nation state no longer define its economic policies. In the global economy, governments face the same questions as the ones they face in their nation state - how to better the lives of their citizens. However, in such a milieu the sphere of influence of the nation state extends beyond its national border; it needs to address the question of how to prevent encroachment on its sovereign power by other nations, whether to opt for isolation or for economic integration.

Before addressing the functions of the nation state in the global economy, the place to start is a definition of the term "global economy".

Several articles provide such a definition. Robert Cox (1994) defines it as a "system generated by globalizing production and finance". Given that in the nation state, the functions of the state are enumerated as the provision of public and semi-public goods, redistribution of national resources to affect a modicum of distributive justice, and, the stability of the macroeconomy, the question that may arise then is: had globalization altered the functions of the nation state?

Putting aside for the time-being the distribution function of the public economy, the two functions that are most relevant in the context of the global economy are: the establishment and enforcement of individuals' property rights, and, shouldering the hazards of uninsured risk arising from the interactions of nations in the global economy.

Although the role commonly ascribed to the nation state does not differ much across states, in a global context such a role most likely will encompass broader issues than those pertaining to the national economy. Conflicts between states do arise because of externalities that cut across national boundaries such as pollutions, communicable disease and factor movements. Most contentious issues, which are not of the nation state own making are those associated with risk to life and property associated with wars, pollution and other health hazards. These types of externalities expand the nation-state's fiscal role not only for the purpose of addressing those originating outside of its border, but also spillovers arising from its own activities.

To lend the discussion an empirical focus, an organizational structure of the public sector's functions in the global economy is given in Table 1. The table gives an illustration of what has become known as the spatial dimension of the public economy. This dimension encompasses what is referred to as the "global" public goods. But first, what exactly is the global public good?

Kaul et al. (1999) defined it by reference to the activities ascribed to the public economy. Hence, a global public good, in lieu of the general label public

good, must possess a spatial attribute, in addition to the traditional characteristics of a local or national public good. Accordingly, a global public good in addition to non-divisibility in consumption has to possess a spatial content. This dimension is illustrated in the following table.

Table 1. *Spatial Dimension of the Public Sector*

Dimension	Public Sector Response
Global-Regional Concerns: Defense	Risk Reduction through Cost Sharing
Pollution and other Environmental Hazards	Common Policies such as use of Affluent Charges
Infectious Disease	Provide Tax and Transfer Payments Internally and Externally

As shown in Table 1, the functions of the state in the global economy, take on a dimension which has yet to be recognized as functions of nation states worldwide. For example, the international community, through the World Health Organization (WHO), tackles communicable diseases worldwide, but such a function has not openly been recognized as a nation state function, for which budget allocation would be made and included in the nation-state budgetary allocation.

Intra –States Spillovers and the Public Sector Response

Within the national economy, Intra-states spillovers although most often recognized in national budgets in the form of "grants" and or "transfer payments" to local governments, this recognition and the need for action to address international spillovers have been quite limited. As seen below, (Table 2) such spillovers as well as cost sharing to address them, have been only recognized and implemented in the case of national defense, where the US and its allies share the cost of protecting their constituency from aggression. In the case of the other "spatial" spillovers, such as environmental hazards, compensation for cleanup for damages incurred may not always be recognized or forthcoming on the part of the nation states.

Given that for the provision of a public good to take place, whether the good is characterized as national, local or global, the assignment for its finance must be resolved on the basis of the so called "revealed" preference for the public good. This assignment is "more or less" resolved at the nation state level. That is, whether its finance should fall on the national, state or local government. In the global economy, this preference is often unknown. One needs to go beyond the traditional analyses of "revealed preferences" of the local or the state population to the preferences of the "global public". Since a definition of what constitutes a "global public" may be "good specific", for example the spread of a disease, the assignment of finance may not be easy to resolve, i.e. the free rider problem most likely to arise.

In the global economy, the nation state's functions take on a much broader

role in that, the risks to the national economy may be associated with "out-of-nation" risks. These risks arise from natural disasters and/or environmental hazard which not always are recognized during budget formulation and executions at the nation state level. Given these types of hazards, and their international dimension, how might a nation's fiscal policy should be structured to address them?

One way to address this issue is through the classification of the public economy goods or functions into those goods/functions with global or geographic dimension and those with local or national dimension. Such a classification would be helpful for the structure of finance. This issue has been addressed in Kaul et al. (1999) paper.

According to the authors, certain goods, such as those provided to the alliance by NATO, although would fall in the category of public goods, should be viewed as "club" goods, as their provisions, and hence, their consumption are limited to members. This follows from the definition of a club good (where the good has both a geographic dimension and exclusion applies), hence, both provision and finance of NATO's activities should fall on club members.

On the other hand, if the good provided is viewed as a "global" public good such as the services of the World Health Organization (WHO) where its consumption is not limited to one nation or a group of nations, the burden of finance must be shouldered by all nations.

To resolve the issue of finance in the world economy requires the setting of framework for allocating the cost. Using the criteria discussed above in identifying a good, it could then be stated that: if a good, by meeting the needs of the local population, was also seen to contribute to the welfare of the world population, then the good should be viewed as a global public good. Its finance must be shouldered by all nations jointly. This identification, although may sound simple, its use for allocating the cost may not be so simple. As Kaul et al. (1999) aptly put it: "Who should be the beneficiaries - the *publican*-of the public good" (Kaul et al. 1999: 12).

One may be inclined to state further that both recognition of the beneficiary (or beneficiaries) and the allocation procedure devised in the case of both "public" and "merit" goods may be easier said than done. This is particularly so where a good's benefits spills over outside the country of origin. Even with such recognition it may not be possible to devise an acceptable cost sharing arrangement among the beneficiaries.

The complexities non-withstanding, surrounding not only the definition, but also, the distribution of the cost of provision of the global public good, discussed above, it may nonetheless be possible to link features of the global public good and the cost sharing arrangements.

Starting with the fundamentals that characterize a global public good: non-excludable and, non-rival benefits, not-confined to a space, then the cost sharing arrangement for its provision could be related to one of two criteria (perhaps both): the level of GDP and the "globalization" feature of the economy. An illustration of what such an arrangement may entail is provided in Table 2.

Table 2. *Globalization and Response of The Public Economy*

Feature	Type of response
Intra-generational and intergeneration spillovers of public bads:	
Air and water pollution Nuclear waste Communicable disease	Global, National and Local
Intra-states and local communities of public bads:	
Air and water pollution, Infectious disease	The nation-state and its local governments
Economic and social policies spillovers linked to globalization:	
Erosion of the tax base and skills associated with movements of capital and labor	The nation-state

Note: *For more discussions and analysis of globalization and the state function see Ott (2002), part 1, chapter 4.*

As Table 2, indicates, globalization expands the scope of the nation state public sector's sphere of influence, from addressing local and national needs, to effect a change in its role beyond its border.

Although in many respect, globalization expands the functions of the nation state, it imposes on it the additional task of monitoring spillovers and insuring that resources from home and/or abroad are there to deal with them.

Not all spillovers however, require coordination between nation states to deal with them. As seen from the table, the nation state has to address the majority of spillovers, as such spillovers occur nationally. On the other hand, when spillovers require a coordinating efforts and finance, such as the provision for defense, and, addressing the spillovers associated with the spread of communicable diseases, a mediating structure such as NATO maybe needed for this task.

Clearly, the expanding role of the nation state associated with globalization, in many respect imposes further burden on it, not only to expand its tax capacity, but also engaging other nation states in the process of reaching equitable distribution of the cost incurred in addressing global spillovers.

Spatial Dimension of the Public Sector Functions

As shown above (Table 2), public sector functions were cataloged along with their spatial dimension. The data presented in the Tables 1 and 2 makes it possible to differentiate between public sector's activities that have global, national, or local constituencies, as well as, makes it possible to assign responsibility for provision. Such an undertaking, however, requires detailed information about budgets, and the magnitude of the spatial spillovers. In the next two tables, Table 3 and Table 4, aim at capturing the spatial dimension of public sector spending for both the industrialized countries and the developing countries. The data in the tables, classifies public sector expenditures to correspond as closely as possible to the

spatial dimension of the public sector functions.

The data reported in both tables for the year 2014, updates some of the findings that are reported in an earlier study (Ott 2002), for the purpose of identifying those expenditures that correspond to the classification presented above in Table 2.

Table 3. *Spatial Dimension of Public Sector Functions: Advanced Economies (N=11) (2014, as Percent of Total Expenditures)*

Country	**Global Concern**	**National Concern**	**Local Concern**
Austria	2.00	70.90	27.10
Germany	3.60	67.70	28.70
Italy	4.30	71.00	24.60
Spain	3.80	69.60	26.50
Czech Republic	5.30	64.10	30.40
Iceland	1.40	56.80	41.60
Israel	16.10	51.10	32.80
New Zealand	3.30	56.20	40.40
Singapore	21.80	36.50	41.80
Sweden	3.10	67.00	29.90
United States	9.30	49.30	41.50
Mean	**6.73**	**60.02**	**33.21**
Std. dev.	**6.51**	**11.08**	**6.79**

Categories:
Global concern:
∑; Defense and environmental protection
National concern:
∑; General Public Savings, public order and economic affairs and social protection
Local concern:
∑; Education, Housing and community development, Health and Recreation.

Source: International Monetary Fund: Government Finance Statistics Yearbook, 2015.

As shown in Table 3, the mean expenditures for the advanced economies for the spending category corresponding to the global concern, accounted for merely 6.7% of total budget expenditures in the year 2014. As would be expected, the spending category labeled spending to address national concerns absorbed the bulk of total budget funds with a mean value of 60%. The last category, spending for meeting local concerns, had a mean value of 33% of total outlays.

Table 4. *Spatial Dimension of Public Sector Functions: Emerging and Developing Economies (N=30) (2014, as Percent of Total Expenditures)*

Country	Global Concern	National Concern	Local Concern
Asia (9)			
Bhutan	0.3	59.4	40.4
China, P.R.: Macao SAR	1.9	67.3	30.8
Indonesia	5.6	65.2	29.2
Kiribati	2.1	69.5	28.5
Marshall Islands, Republic of	4.9	48.1	47.1
*Nepal	8.5	61.4	30.1
Philippines	5.8	68.1	26.1
Samoa	3.1	56.7	40.2
Solomon Island	0.6	55.0	44.3
Central and Eastern Europe (8)			
Albania	3.0	67.9	29.2
Turkey	5.3	64.6	30.0
Azerbaijan	7.3	78.1	14.5
Belarus	2.7	60.1	37.2
Georgia	9.3	63.8	26.9
Kazakhstan	5.8	55.1	39.1
Moldova	2.2	60.9	36.9
Russian Federation	4.3	69.2	26.6
Middle East and North Africa (6)			
Egypt	5.3	68.7	26.0
Jordan	12.0	59.6	28.5
Lebanon	8.7	81.1	10.3
Pakistan	11.9	85.1	3.0
United Arab Emirates	4.6	79.0	16.5
West Bank and Gaza	0.1	65.6	35.6
WAEMU (5)			
Angola	12	65.8	22.1
Mauritius	2.1	65	32.9
Seychelles	9.4	57.9	32.6
South Africa	3	67.4	29.5
Uganda	11.6	63.6	24.8
Western Hemisphere	Data for 2014 not available		
Mean	**5.48**	**65.33**	**29.25**
Std. Dev.	**3.71**	**8.23**	**9.83**

*Data for 2015

Categories:

Global concern:

∑; Defense and environmental protection

National concern:

∑; General Public Savings, public order and economic affairs and social protection

Local concern:

∑; Education, Housing and community development, Health and Recreation.

Source: International Monetary Fund: Government Finance Statistics Yearbook, 2015.

Of note is the distribution of public spending, reported in the table, for two countries: Singapore and Israel. In the case of Singapore, the state's spending for meeting global concerns was equal to 22% of total budget spending with the category of spending with the highest percentage 42% went for meeting local and not national concerns. A somewhat similar distributional pattern was found for Israel where 16% of the total went for meeting global concerns; and almost one half of budget spending was allocated to address local concerns. Another interesting finding is the allocation of budget outlays in Sweden. The percentage distribution reported in Table 3, shows that only 3% of the total was devoted to the category of spending labeled meeting "Global Concerns". Since the allocation of budget spending reflects not only needs specific functions, but also, the country's defense posture and its global involvement it is to be noted when comparisons across countries regarding the distribution of public funds are made.

Looking at the corresponding data for the emerging-developing economies reported in Table 4, one discerns a different pattern among the different segment of this population. For the first group, Asia (N=9), whereas spending for meeting global concerns was a bit high for Nepal (8.5%), Philippine (5.8%), and Indonesia (5.6%), Bhutan the Solomon Island devoted less than 1% of their total spending on this category.

The next group of countries comprise countries in Central and Eastern Europe (N=8), exhibits a spending allocative pattern similar to that observed for the developed economies (see Table 3). As to the distribution of spending for the Middle East and African countries (N=11), differ across the spectrum of this group of countries. For example, Jordon, Angola, Uganda and Pakistan have devoted in 2014, over 10% of their state budgets on the category labeled; spending to meet "global concern" most of which undoubtedly went for national defense, perhaps to be expected given the nature of conflicts in these parts of the world.

With respect to the breakdown of spending between national concern and local concern, one observes similar pattern where the category of spending labeled national concern, absorbed 85% in Pakistan, 81% in Lebanon and 79% in the United Arab Emirate. This being said, one does not discern a pattern to the allocation, except that spending for meeting national concern is consistently the dominant feature in the spatial dimension of the State's functions.

It is worth noting that whenever comparisons are made, across samples at different levels of economic development, as well as form of governments; central versus federal, is that the findings are bound to reflect as much the form of government, hence the assignment of responsibilities, as public preferences for one or another type of public spending allocation. For example, a decentralized form of government is likely to have a higher level of spending on local concern than a centralized form of government. Likewise, a nation state that falls in a "war zone", or, faces the prospect of war with its neighbors, is more likely to allocate a higher percentage of its budget to meet "global" concern than other states that do not face the same prospects.

Given the divergence of needs across the samples as well as within each sample, the data reported in the tables, nonetheless paints a clear profile of a nation

state's public sector activities nationally and in the global economy. What it does not convey however, is the implications of these activities for the fiscal policy of the nation state. How then might one infer, from these data the fiscal posture of an advanced nation or a nation in the process of development?

A closer look at the data reported in both tables, suggests that most of budget resources is devoted to address national and local concerns. Of the two categories of spending, spending for meeting national concern is likely to be altered up and down to affect the path of the economy. Spending for meeting local concern, in a decentralized setting may serve the same stabilizing function as spending for meeting national concern.

With respect to the category, spending for meeting global concern, although the bulk of funds in this category are spent on defense, some such funds are likely to have a stabilizing impact on the economy. As seen from Table 2 above, to the extent that a country may satisfy some of its demand through imports, adjustments in the level of spending on this category may have a fiscal impact not only on the importing country but on the economy of exporting countries as well.

For example, in the majority of the advanced economies, the largest component of spending that meets global concern is spending for defense. This category of spending is not designed to influence the path of the national economy. This is because, expenditures on defense, for the most part, meet needs not related to the fiscal posture of a nation. In other words, the determination of the level of spending on defense is in response to concerns not related to the fiscal posture of the nation at any given time. Accordingly, higher or, lower levels of spending on defense, although impacts the growth path of the economy, as well as, the stability of the world economy, its level and spatial dimension do not rise or fall in response to changes in aggregate demand at home or abroad.

The spending category of interest, as it impacts the fiscal stand of the nation state, is that category identified in Tables 3 and 4 as spending meeting "national" and "local" concerns. The level of spending on each one of these two types may be said to be a function, not only of needs, but also of the growth of the national economy. In periods of slack in private sector demand, the state may be able to adjust its level of spending on these categories, thus through the "multiplier" effect achieves a higher growth path for the economy. Similarly, in periods of high employment, the state can adjust its level of spending on these categories to prevent escalation of prices.

Having attributed to this category a stabilization role, one needs to inquire as to the spatial impact of the "up", or, "down" level of spending on this category. From the tables, the stabilization-function induced changes in the level of spending on functions identified in the category, i.e., transportation and communication will have a spatial effect which may impact the level of activities, hence spending globally.

Public sector spending meeting global concern, aside from defense, may play a role as a fiscal stabilizer both at home and abroad. For example, as reported in Table 2, to the extent that a country may satisfy some of its demand through imports, adjustments in the level of the state expenditures on this category may have a fiscal impact not only on the importing country, but on the economy of the

exporting country (countries) as well, finances have to increase to meet the required expenditures to deal with them. On the revenue side of the state budget, it is unlikely that spillovers associated with state taxes occur, except in the case of corporate taxation of foreign direct investment (FDI). Such spillover has been recognized recently.

In an IMF paper, published in 2014 by Keen et al., identified another source of spillovers - the corporate tax effect spillovers where tax policy of one country spillover and impact the economies of other countries. The issue of concern here is the effect of international tax spillovers on the design of taxation and their stabilization effects on the developing economies.

Recognizing that, in the global economy, both spillovers of "public bad", such as pollution and the erosion of tax bases do occur, as well as "public good" does occur one needs to inquire as to the response of the public economy in the nation - state to spatial spillovers. If it is assumed that spatial "public bad" do exceed "public good" spillovers, this would mean that both the nation- state taxes and expenditures would be impacted.

If the nation state, in response to the spatial spillovers, is induced to alter the design of its tax system, from direct to indirect taxation - from the corporation income tax to an excise tax, this shift would likely have a significant effect on the built-in stabilization of its tax system. On the other hand, if, global spillovers were in the nature of "public good", that impact positively the welfare of citizen, the nation state then may be induced to offer the initiators of said spillovers, tax benefits or free services.

Clearly then, documenting the impact of globalization on the public finances of the nation state, especially, spillovers is critical to understanding the kind of response that the nation-state ought to pursue (see Garrett 2000 and Quin 1997).

The public economy in the nation- state, in short, bears the responsibility of carrying out several tasks: the provision of public and semi-public goods, addressing spillovers, especially spillovers associated with the so called "public bad", as well as enacting policies that would enhance society's welfare.

Performing these functions, the state does so, within the constraints it faces locally and globally. With high and rapid degree of integration of the world economies, developments in one country or region do spillover on the rest of the world. Accordingly, to assess the impact of fiscal policy pursued by one country, one cannot but pursue knowledge about developments in the region where it is geographically located as well as developments that are taking place in the rest of the world.

Given that fiscal actions of a country or a group of countries in one region, most often are not independent of events taking place elsewhere, an analysis of the fiscal posture taken by one country, whether developed or developing should be viewed in the context of events and policy undertaken by other states in the world economy. In this regard, the analyses of the fiscal posture and fiscal policies pursued by the 88 countries reported in the IMF (2015) report, is valuable, not only for its empirical content, but in highlighting the need to view fiscal policy pursued by one country not in isolation but within the context of the global economy.

Although the main focus of the IMF report was on providing an empirical test of the significance of the "built-in stabilizers for the stability of the economy, among other lines of inquiry the report pursued, is the discovery of those economic variables that are of significance for determining the effectiveness of fiscal policy. Of interest is the link, the study highlights, between low inflation, low growth and the public debt.

Conclusion

The public economy of the nation state bears the responsibility of carrying out several tasks: the provision of public, semi or club goods and addressing spillovers, national as well as global.

Performing these functions, the nation state does so, within the constraints it faces. With a rapid pace of integration of the world economies, developments in one country or region spill over on the rest of the world. Accordingly, to assess the impact of public sector actions in one nation on the economies of other nations, one cannot but pursues knowledge about developments and policies pursued globally.

Although the focus of the paper was limited to ascertain the effects of globalization on the behavior of one state in such a milieu, it was soon evident that such an assessment can only be pursued in a global context.

Given that fiscal action of a country or a group of countries in one region of the world most often are not independent of events or actions taken place elsewhere, an analyses of fiscal actions pursued by one state can only be assessed within a global framework of analyses.

This what this paper attempted to do by recognizing the fiscal actions of the nation state not in isolation but in the context of events and issues relevant to the functioning of the global economy. In this regard, the data and analyses of the fiscal posture of both developed and developing economies presented above (Tables 3 and 4) are valuable, not only for their empirical content, but also in highlighting the need to view fiscal policy decisions of one country not in isolation but within the context of the global economy.

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The U.S. Dollar and the World Economy: A Critical Review

By Kalim Siddiqui[*]

The relative decline of the U.S. as a global economic power is clear, and can be seen in the statistics. However, the U.S. decline is nevertheless a slow one, and carries all sorts of unprecedented dangers for the world. The U.S. is definitely in a less powerful position than previously with respect to production, but it is still successfully siphoning off much of the economic surplus (or surplus value) created in the developing countries via the operations of its multinational corporations and its hegemony over the global financial architecture. With respect to U.S. financial dominance, the key issue becomes the continuation of the dollar as the hegemonic currency, which is currently threatened by the rise of China. This paper intends to critically analyse the performance of the U.S. economy and also the role played by the U.S .dollar in the international payment and in reserve currency. The study will also examine the expansion of Chinese economy and importance of the gradual development of a multicurrency system with the intention of reducing the growing balance of payments deficit putting pressure on a single reserve currency. This study has followed doctrinaire methodology, which includes analytical, descriptive and comparative methods. This article concludes that the U.S. economy is currently suffering from a serious trade deficit and the position of the U.S. dollar is under genuine threat from the renminbi, the renminbi will not be able to replace the U.S. dollar as the global currency for at least the next decade. (*JEL* E50, 60, F30, G15)

Keywords: *World Economy, U.S. Dollar and the Renminbi.*

Introduction

The relative decline of the U.S. as a global economic power is clear, and can be seen in the statistics. However, the U.S. decline is nevertheless a slow one, and carries all sorts of unprecedented dangers for the world. The U.S. is definitely in a less powerful position than previously with respect to production, but it is still successfully siphoning off much of the economic surplus (or surplus value) created in the developing countries via the operations of its multinational corporations and its hegemony over the global financial architecture. With respect to U.S. financial dominance, the key issue becomes the continuation of the dollar as the hegemonic currency, which is currently threatened by the rise of China. (Wade 2017, Economist 2015) The U.S. share of the global domestic product is estimated at less

[*]Senior Lecturer, Department of Accounting, Finance and Economics, University of Huddersfield, UK.

than 20%, while U.S.-based companies control about half of the world's wealth (World Bank 2017).

Of course, these facts show us a very complex picture of the contemporary world. A recent study by Bullard et al. (2017) points out that the U.S. economy is still the world's largest economy and, according to them, between 2008-15 there was an average annual shortfall of 20% in fixed capital investment due to the 2008 crisis, which adversely impacted on GDP growth by an average of 10% (Bullard et al. 2017). Needless to say, the U.S. has by far the largest military in the world. It controls – largely through the role played by its military sector in technological development – the most advanced technologies in the world (Harvey 2005).

For major G7 economies, the average growth rates experienced were all over 3% between 1960-80; however, in 2016-17, U.S. growth was 1.7%, the Eurozone area saw 1.8% growth, and Japan, 1.1% (World Bank 2017: 4, Table 1.1). Wien (2010) commented about the U.S. economic decline in key areas like, the "return on investment" from an estimated 15% in the post-war period to 10% by the end of the 1980s; by the end of 1990s, it was said that the return was only "5 percent and few would put money at risk for that reward" (Wien 2010).

This paper intends to examine the performance of the U.S. economy and also the role played by the U.S. dollar in the international payment and in reserve currency. The U.S. dollar is, at present, the dominant reserve currency of the country's central banks. The U.S. Treasuries market is the most liquid financial market in the world, which makes Treasures an attractive investment for holding central bank reserves. The U.S. dollar is also the dominant currency for invoicing international trade and is also used in denominating the majority of foreign debt securities (Fine 2013). The study will also examine the expansion of Chinese economy and importance of the gradual development of a multicurrency system with the intention of reducing the growing balance of payments deficit and lessening of pressure on a single reserve currency. A multicurrency reserve would even help developing countries to diversify their foreign exchange currency holdings; hence, should a country accumulate a huge amount of U.S. dollars and find that confidence in the dollar declines, then they can merely switch to other reserve currencies. This reduces the demand for single reserve currency.

This paper also aims to analyse the Chinese currency and its potential to become an international reserve currency. However, China needs to improve the efficiency of its financial sector and financial market (Subacchi 2016). The challenges will be whether increased demand for the renminbi would lead to its appreciation and consequent loss of export competitiveness in the global markets. This study has followed doctrinaire methodology, which includes analytical, descriptive and comparative methods. The research is drawn from the use of past documents to understand the subject area and in the process it becomes evident that the methods utilized depend not only upon the researchers' perspective, but also on the time and available resources.

The relative strength of the U.S. economy supports the value of its currency. In fact, this was an important reason for the US dollar emerging as the most powerful currency after World War II. At the end of the World War II, the US accounted for half of the world's GDP and with Europe and Japan destroyed by

the war, the US was the only country with a developed manufacturing sector to produce goods needed by the consumers. As Western Europe and Japan began to recover from the war, the US relative economic strength started to decline. By the 1980s, West Europe and Japan caught up with the US in the terms of productivity. In the 1990s, the dominance has remained due to the rising amount of US dollar debt owed by domestic and foreign borrowers and creditors in countries in the rest of the world.

Despite the slowdown of the U.S. economy in recent decades, more than one-third of the world's gross domestic product still comes from countries that peg their currencies to the dollar; indeed this includes seven countries that have adopted the U.S. dollar as their own. Furthermore, more than eighty-five countries maintain their currencies in a tight trading range relative to the dollar. In fact, the U.S. GDP makes up only 25% of the global GDP and U.S. trade volume in only 15% of the world's total trade in 2017. But still the U.S. dollar remains the predominant currency used in world trade and financial transactions. For example, the U.S. dollar makes up nearly 63% of central banks' reserve currency holdings, against 17% for the euro and 2% for the yen (Siddiqui 2018a, World Bank 2017). In the foreign exchange market, 90% of forex trading involves the U.S. dollar. The dollar is of course just one of the world's currencies, but most of these currencies are only used inside their own countries. Theoretically, any one of them could replace the dollar as the world's currency, but this is unlikely as they are generally not widely traded. At present, nearly 40% of the world's debt is issued in the U.S. dollars (World Bank 2017, Willett and Chiu 2012).

The history of international reserve currencies shows that there is a tendency in the past for one currency to dominate global trade and finance, and any change to the status quo is often reflected in shifts in its economy and global power politics (Harvey 2005). This means that there has been a strong incentive to choose a currency that other trading countries are able to accept and use for international transactions. However, a dominant currency can lose its hegemony to another due to changing economic and political dynamics. For example, the British Pound Sterling was a leading international currency before World War I – more precisely between 1860 and 1914 – when more than 60% of world trade was invoiced and settled in Pounds Sterling, and a similar trend was seen in the holdings in the global foreign exchange reserve. Once Britain became colonial power, it encouraged colonial administration to use Pound Sterling and thanks to the associated favourable policy of support, Sterling then flourished. (Kaldor 1971) In 1914, Britain stopped using the gold standard but returned to it in 1925 at a pre-war parity under pressure from British financial capital, which wanted such parity; at that time, Britain had colonies to support such moves, but such alternatives were not available after the war, so the Pound Sterling was over-valued and Britain started facing balance of payment problems. To extricate itself from this, Britain imposed wage deflation and reduction in domestic absorption on its workers so that its exports would be cheaper and imports more expensive. The then strong trade unions did not accept this and called for a general strike in 1926, soon after Britain returned to gold standard. The current situation differs from earlier periods

because the advanced economies do not have direct colonial possessions (Siddiqui 2019b).

In the beginnings of World War I, the balance of Sterling accounted for less than half of total official foreign exchange holdings, while the French Franc accounted for about a third and the German Mark about one-sixth. Between the 1920s and 1930s, these two currencies (Pound and Franc), along with the U.S. dollar, dominated the demand for international reserve currencies. Historically, very large UK's current account deficits have been sustained for long periods of time, as seen during the late 19th century. The UK was also exporting huge amounts of capital to countries such as Australia, Canada and Argentina. Some critics were worried that UK investors were lending and exporting capital at the neglect of the domestic markets. This was primarily due to the lack of higher returns in the domestic economy (Siddiqui 2019a, Kaldor 1971).

During World War I, the UK economy understandably experienced a deep crisis and its current account and fiscal deficits and external debts rose sharply. These developments affected the British Pound adversely. Soon after World War I, the U.S. dollar took over as the leading international currency, but it was not until end of the World War II (i.e., 26 years later) that the dollar became the dominant international currency, replacing the Pound Sterling as the principal international currency (Kaldor 1971). At present, similar situation can be seen in the U.S. economy, where the U.S. trade share in the global economy has declined significantly; nevertheless, other countries are still using the U.S. dollar as an invoicing currency, which keeps the ex-post prices of goods similar to those of its competitors, and further provides hedging benefits. Safe heaven depositors have not been influenced by recent developments in the US economy, even after the Standard and Poor downgraded the US credit ratings in August 2011.

Currently, the U.S. economy is experiencing deep structural difficulties. The question facing other countries' governments now is whether they will go on buying and holding U.S. securities in large amounts. For more than six decades the U.S. has maintained its financial hegemony (Fine 2013), where no other asset was seen as attractive as U.S. dollar by the overseas investors; however, things are now changing, with the Eurozone, for instance, providing as large a liquid market as the U.S. The Euro economy is the same size as that of the U.S., but at present accounts for a larger share of world trade.

Since the euro emerged as the single currency of the Eurozone countries, a single euro has consolidated, rather than fragmented, national currencies (prior to 1999). It seems the euro has emerged as a second important useful currency to be used as a reserve by the country's central banks. In 2010, the euro's share as a reserve currency was 26%, as compared to 61.8% for the U.S. dollar for the same year (Siddiqui 2019b). In 2010, East Asian currency traders conducted 93% of their transactions in foreign exchange markets, as these markets also happened to have seen the largest shares in global growth. All these factors have boosted the demand for U.S. dollars (Wolf 2008, Harvey 2005).

Further, in reference to debt, the U.S. official indicates that as a share of GDP, U.S. debt has greatly increased in recent years. The proportion of debt to GDP may drop due to government surplus, inflation or growth in GDP. As of October

2018, the US public debt stood at $15.8 trillion; at the same time, intragovernmental holdings stood at $5.8 trillion. Further, in 2017, U.S. debt was about 77% of its GDP which was the 43rd highest in the world. By 2028, the ratio would be 100%, or even higher if present policies will be extended past the scheduled expiration date. Further, by December 2017 45% ($9.3 trillion) was held by foreign investors, with China having the largest share of $1.18 trillion, followed by Japan at $1.06 trillion. (OECD 2019, Willett and Chiu 2012)

The use of the U.S. dollar as an international reserve currency heightens the so-called Triffin dilemma. With increasing trade there are also demands for international reserve increases. Hence, the reserve-issuing country needs to continue to run a balance of payments deficit in order to meet the increasing demand for its currency; as a consequence, the reserve-issuing country's external debts rise sharply. According to the researchers, an international currency must satisfy three key criteria, which are: medium of exchange, unit of account, and store of value (Patnaik 2009). In the short term, it appears that the U.S. Dollar and euro are likely to remain the dominant international reserve currencies. The greatest challenge is currently seen to be a lack of dynamism within the eurozone economy, and it is unlikely the euro will ever represent an alternative to U.S. Treasury, also in part due to the eurozone's current economic crisis, especially in the southern EU countries. The Japanese yen, which had high levels of foreign exchange reserve of 8% in 1990, soon declined due to the long-term stagnation of the Japanese economy; in 2010, the reserve in the yen was merely 3.7%.

The Chinese renminbi could emerge as the new international currency with the country's growing economy and trade. The Chinese economy has increased its share in the global economy. In the coming decades, it is hoped that China's economy will take over that of the United States. China has increased reliance on international trade, with both its exports and imports consistently rising; it is expected that its trade will grow further in the future. China's export baskets include manufacture products and its currency could be used for global exchange.

Flexible exchange rates and free capital movement have been unable to keep the world economy stable. The emerging economies have built up massive foreign exchange reserves principally in order to protect themselves from panic capital withdrawals (Siddiqui 2018b), as seen during the 1997 East Asian crisis and again after the 2008 financial crisis. Such sudden withdrawal of capital proved to be costly in terms of their investment, economic growth and overall development. This uncertainty also adds to global imbalances. Lee (2014: 43) noted: "The fast growing economies of developing Asia are providing an important source of global production and demand. Asia's emerging and developing economies maintained an average annual growth rate of 6.8% over 2000-10. In 2010, Asia (including Japan) accounted for about 27% of global GDP, up from mere 12% in 1960. By comparison, in 2010, the United States contributed 23.1% and the European Union (EU) 25.8% to the world GDP".

The emerging economies have kept reserves in dollar denominated assets. The continuous rise in foreign reserves in foreign countries has led to an increase in demand for U.S. financial assets, which is tied to the ever-rising inflow of funds into the U.S. financial system from abroad, which encourages asset prices bubbles;

also, excessive reserve accumulation overseas is due to developing economies trying to self-ensure against possible speculative currency attacks. This caution is due to the East Asian crisis of 1997, and the desire to guard against sudden investment collapse or to keep currency from appreciating as this could adversely affect export competitiveness (Wade 2017). A large number of emerging market economies borrowed heavily in dollars when American interest rates were at rock-bottom levels (Huang and Kishor 2019, Siddiqui 2017). The result was credit-driven growth, which starts to look fragile when – as now – the Federal Reserve is raising interest rates and the U.S. dollar is strengthening (Siddiqui 2018c).

Despite some of these countries' efforts to build-up foreign exchange reserves over the past decades, the shortages of US dollars as capital inflows into these economies resulted in a reversal of capital flows into developed economies. All these developments led to an increased cost of borrowing in the dollar. The Stiglitz Commission (United Nations 2009) argued for the creation of a new global reserve system based on Special Drawing Rights (SDRs). The Commission report recommended that during recession the role of the SDR should be increased through IMF lending to those countries in need of short-term finance (Stiglitz and Greenwald 2010).

Since the 2008 crisis, the interest rates in the advanced economies have been maintained at almost zero levels in order to revive their economies, which meant that the flow of capital from their economies to the emerging economies became more profitable. Such capital flows have taken the form of equities and loans. Therefore, if the currencies in emerging economies depreciate, then asset holders from the advanced economies will be affected (Siddiqui 2016a,b). Any depreciation of the local currency will thus start panic and result in capital flight from the emerging economies. This means international capital is not interested to see depreciation take place (Patnaik 2009).

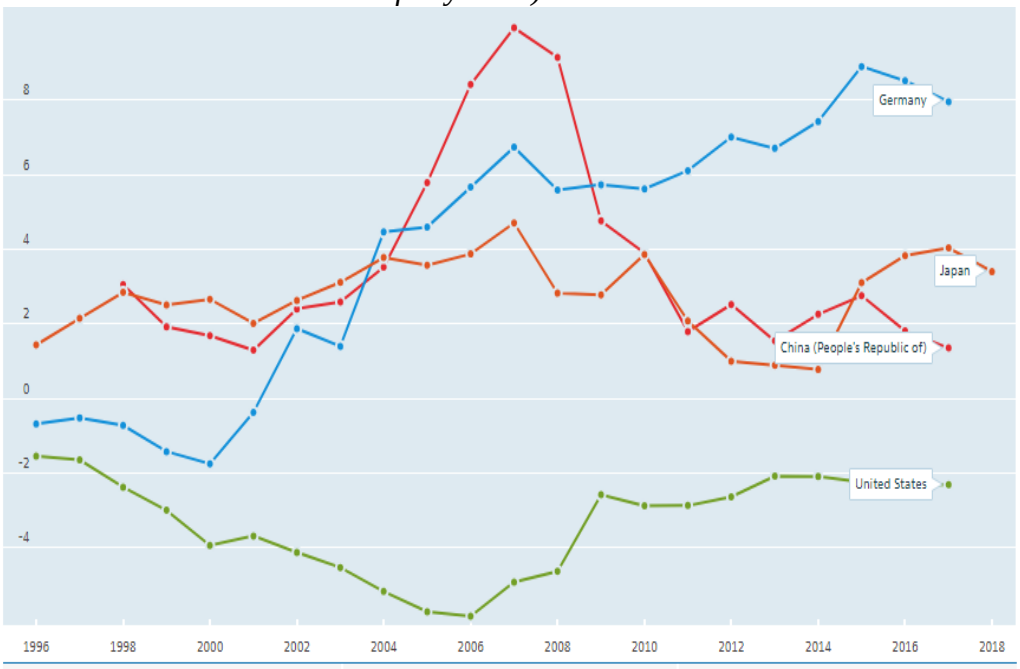
Performance of the U.S. Economy

The current account provides an overview of transactions between a country and its foreign trading partners resulting from the purchase and sale of goods and services produced in the current period. If the United States has a current account surplus, this means that America is selling more goods and services to foreign markets than they import goods purchased from foreign markets. Typically, since 1996, the U.S. has a negative current account balance, or current account deficit (See Figure 1), while, Germany, Japan and China have current account surplus. When there is a current account deficit, the United States must borrow the liabilities to pay for goods and services purchased from abroad. The external debt rises as a result of current account deficits. However, exchange rate changes may not be adjusted according to the direction of balance of payments. If the current account is in deficit but there is also a large amount of capital inflow in capital account surplus, the currency will not devalue but will rather appreciate, thereby exacerbating the balance of payments deficit. If the balance of payments deficit is caused by a current account deficit, it will inevitably lead to fewer jobs in export-

related sectors and a downturn in the economy. If the balance of payments deficit is caused by capital account and financial account deficit, however, this would mean a lot of capital outflows and a tight supply of domestic capital, which would result in a rise in interest rates and a decline in the economy.

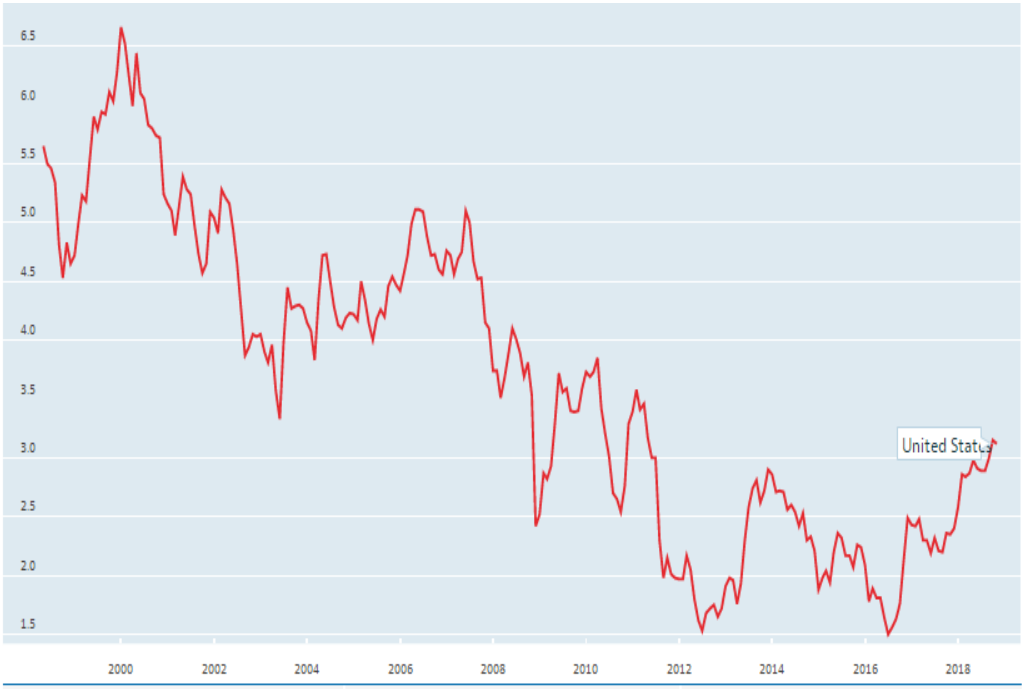
According to Amadeo (2018), the main contributors to the deficit are consumer products where, in 2017, the U.S. imported consumer products worth $602 billion, while exports totalled $198 billion. This could be explained by the decline in competitiveness of U.S. products which was largely the result of the devaluation of the Chinese yuan, making Chinese products cheaper than U.S. products. In an effort to bridge this gap, President Trump enacted his policy of protectionism measures (Siddiqui 2018a), in particular imposing tariffs against the imports from China and Mexico (Amadeo 2018).

Figure 1. *Current Account Balance, Total, % of GDP, 1996 – 2018 (Source: Main Economic Indicators: Balance of Payments)*



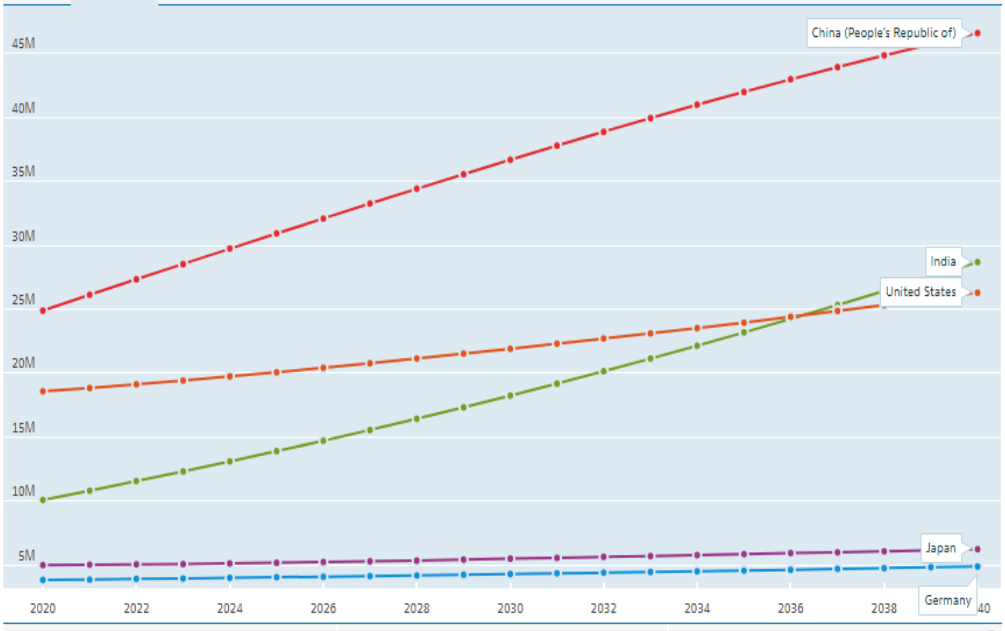
Source: OECD Retrieved from https://data.oecd.org/trade/current-account-balance.htm [Accessed 10 February 2019].

Figure 2. *United States Long Term Interest Rates, Total, % per Annum, May 1998-November 2018*



Source: OECD Data. Retrieved from https://data.oecd.org/interest/long-term-interest-rates.htm [Accessed 10 February 2019].

Figure 3. *Real GDP Long-term Forecast, Total, Million US Dollars, 2020 – 2040*



Source: OECD Economic Outlook: Statistics and Projections: Long-term Baseline Projections. Retrieved from https://data.oecd.org/gdp/real-gdp-long-term-forecast.htm. [Accessed 2 March 2019].

China, Japan and Germany are willing to go on buying enough U.S. Treasuries and other dollar assets to finance U.S. deficits and sustain the U.S. dollar. In response to the bursting of the financial bubble around 2000, the Federal Reserve cut U.S. interest rates 13 times in two years, from 6.5% to 3.5% (see Figure 2). Low interest rates have prompted Americans to invest their savings in assets and banks to lend too much, contributing directly to the continued expansion of the U.S. housing bubble.

Once the dollar loses its status as an international currency, there is no doubt that it would depreciate substantially. The United States will be unable to repay its external debt. China, as the largest of American creditors, will lose a lot of money. Transparency in U.S. financial markets and predictability and credibility in monetary policy have strengthened the dollar's position. Unlike many other economies, the current structure of the U.S. economy also allows it to reasonably tolerate a persistent trade deficit, so the dollar will remain the main foreign exchange reserve for a long time.

As the crisis deepened in the 1980s and 1990s, neoliberal capitalism was adopted in the major capitalist countries. This led to undo the gains of the previous decades, especially in terms of income distribution. For instance, in the U.S. the income share of the top income group (1%) declined from 29% in 1929 to 8% in 1970 and remained about same until 1979, while the lower and middle income group experienced a greater rise in their incomes. In contrast, the neoliberal regime pursued since the 1980s reversed the redistributive policy. For instance, the income share of the top 1% in the US then rose very sharply to 23% by 2008 (Wade 2009).

Ten years ago, the financial crisis in the United States led to a global economic crisis in 2008. This financial crisis was caused by the exposure of risks in the U.S. house market, which led to a nearly vertical downward shift in the U.S. dollar index. Emerging economies have been affected by the severity of the global economic financial shocks because the current global reserve system fails to ensure adequate international liquidity (Lee 2014). The global financial crisis of 2008 showed weaknesses in the current monetary system and it has contributed to global financial instability and ultimately adversely affected the global economy. For developing countries, which heavily rely on trade and capital inflows for their economic growth, the failure of the global reserve system with insufficient international liquidity led them to witness difficulties in the aftermath of the global financial crisis (Costigan et al. 2017).

In fact, the rate of accumulation responds to the rate of profits in the economy when profit rate increases, meaning higher expected returns from expanding capital stocks. The profit rate fell during the 2008 crisis, but after 2013 profit rates rose again, but have fallen slightly again since 2014. The recovery of 2012-14 was associated with debt-financed consumer spending, which is not sustainable in the long run. The 2014 recovery took place when consumer spending accelerated while investment in the economy slowed, government spending also declined in real terms over the period, exerting adverse pressure on output growth. During this period, U.S. imports grew faster than exports, therefore the biggest factor to have contributed to the recent growth in U.S. GDP is household consumer spending,

i.e., contributing 81% to its increase in the period 2014-17 (Kotz 2018), while investment slowed to 2.1%, contributing only 16% to growth in GDP growth over the same period. As Kotz argues that "The current structural crisis has taken the form of stubborn stagnation despite unprecedented monetary stimulus, with slow economic growth, a low rate of capital accumulation, stagnating real wages and worsening economic insecurity for working people- conditions that have helped to produce new political polarization" (Kotz 2018: 30).

The high dollar, and indeed other factors, had led to an extraordinary decrease in the manufacturing competitiveness of the U.S. (Glyn 2005). The 'strong dollar' policy seen in the 1990s had proved to be more important in terms of attracting capital for the 'new economy'. It was observed that the overseas purchase of U.S. assets, including assets and bonds, rose sharply (i.e., four-fold) between 1989 and 2000. The massive capital inflow was due to foreign investors seeing this as an excellent opportunity to make higher profits that the latest US technology was expected to bring. More than a decade ago, Krugman (2007: 437) noted, "The United States has a remarkably large current amount deficit, both in absolute terms and as a share of GDP. At the moment the country is not having any difficulty attracting capital inflows sufficient to finance this deficit, but many observers nonetheless find that deficit worrisome. This worriers see an ominous resemblance between the current U.S. situation and that of developing countries that also went through periods during which capital flows easily financed large current deficits, then experienced 'sudden stops' in which capital inflows abruptly ceased, the currency plunged, and the economy experienced a major setback".

The widening gap between U.S. economic and financial power is creating difficulties for the rest of the world. This is because the costs of dollar dominance are beginning to outweigh the so-called benefits. The U.S. share of global merchandise imports declined from 16% in 2005 to 13% in 2016. The US was the biggest export market for only 32 countries in 2016, which declined from 44% in 1995, while for China this has risen from 2 to 43% for the same period (Economist 2015). Bernanke's 'saving-glut' thesis, where he argued that U.S. overspending caused the U.S. trade deficit, was due to this the money flowing into the U.S. market from other countries through its capital account. This would lead to credit expansion and lower interest rates, making it attractive for U.S. consumers to overspend, and as a result U.S. household consumption increased global demands. Here it is being emphasised that the U.S. trade deficit gave rise to excessive global savings. Until this issue is addressed, reducing global imbalances by raising U.S. savings would lead to a global slump and, ultimately, recession. Bernanke also argued that high saving rates in surplus countries, especially in East Asian countries, are due to historical, cultural and demographic factors, while others pointed out that the East Asian crisis has been an important reason for such behaviour. Others emphasise the fact that excessive global savings are due to structural causes and cannot be corrected simply by these measures (Wade 2017).

In recent years, we find there has been an upward shift among the foreign investors who would like to invest in U.S. assets. As long their demands to invest in U.S. dollars of their accumulated wealth exist, this will lead to the generation of large capital inflows into the U.S. economy. The official statistics show a

substantial role of overseas capital in financing the US current account deficit, but private bond purchases also play a large role as well. The sharp rise in the U.S.. Treasury Bond yields the fact that the interest rates set by the U.S. Treasury have risen from 1.86% in 2017 to 2.84% in 2018, after Trump became US President. In 2016, U.S. economic growth was 1.5%, while the EU's growth was 2% and China's was 6.7% for the same period. In 2017, U.S. economic growth was 2.3%, while the EU's average growth was 2.5%, and China's, 6.9%.There seems to be a strong correlation between the growth in U.S. output and the percentage of net fixed investment in the U.S., meaning that in the long term it would not be possible for the U.S. economy to accelerate without an increase in net fixed investment. For example, in 1966, during the long-term boom, the U.S. net fixed investment was 11.3% of U.S. GDP, but in 1978 U.S. net fixed investment was 10.5% of U.S. GDP. In 1984, this same figure was 9.2%, then 8.3% in 1999, 7.9% in 2006 and, in 2017, 4.2% (Kotz 2018).

The U.S. power reached unprecedented levels at the end of World War II. From the 1960s, however, this dominance started to decline in what was then known as the "loss of China" and as Europe and Japan began to recover from the war and the post-war decolonisation in Africa and Asia moved towards national sovereignty within former European colonies. By the 1970s, the global economy was becoming tripolar: North America, Europe, and Japan. In the last decade, there has been further erosion due to rise of China. However, despite the dramatic transformation in China and the rise of its share in the global economy, and indeed its economy emerging as the second largest worldwide, China remains a poor country whose average income is quite low compared to the developed economies (Siddiqui 2015).

Securitisation is an issue related to collateralised debt obligations (CDOs) by banks which began to take off in the late 1980s and became increasingly prevalent in the run-up to this 2008 crisis. CDOs are created from portfolios of debt pooled together by banks, the ownership of which is transferred to a "special purpose vehicle" (SPV), a temporary company formed for that purpose. This SPV then issues bonds which are sold on to investors. The process is dubbed securitisation because bonds are an example of a security (a tradable financial asset). Essentially, the loan repayments act as a stream of income to the ultimate investors, while, for the bank, the debt is sold on, recouping the cash and allowing it to issue more loans. There are, in addition, lucrative fees available to those overseeing the process. Prior to 2007, the riskiest "tranches" of the bonds issued by SPVs, and hence the most attractive to speculators, often included large numbers of subprime mortgages. The amount of CDOs issued globally rose from $68 billion in 2000 to $521 billion in 2006 (Norfield 2016: 140). As a recent European parliament report put it: "Securitisation amplified the crisis by contributing to lengthening the intermediation chain, by creating conditions for incentives and interests between participants in the securitisation chain to be misaligned, by increasing the reliance on mathematical models and on external risk assessments and, finally, by increasing both individual and systemic bank risks" (Delivorias 2016: 14).

Moreover, through securitisation there has been an explosive growth in derivatives. These consist of assets that change in value depending on what

happens to some underlying asset. For instance, a "credit default swap" compensates the holder in the event of a specific debt defaulting, in return for which they pay a small regular fee to the counterparty. This can be a useful form of insurance, "hedging" against a risk. However, derivatives can be bought and sold for purely speculative reasons by people who are not exposed to the underlying risk and simply wish to gamble on whether or not something will happen. In the run-up to the crisis, the derivatives market was dominated by interest rate contracts (which pay out as rates move), followed by CDSs. Again, the market in derivatives has not recovered to the peak levels seen immediately prior to the collapse of Lehman Brothers in 2008, but nor has the growth been entirely reversed. In the first half of 2016, the gross market value of "over-the-counter" derivatives (the money required to replace them at market prices) still stood at $12,690 billion, roughly where it was in early 2007 (Delivorias 2016: 14).

The expansion of credit generally helped both to conceal and to defer capitalism's problems in the period from the early 1980s, as part of a system sometimes dubbed "privatised Keynesianism", but only at the expense of creating a grotesquely oversized financial system that would ultimately explode into crisis. The fact that the long depression began in the field of finance led many commentators to identify it as simply a financial crisis. (Fine 2013, Keynes 1980) After the 2008 financial and economic crisis, the U.S. Federal Reserve, the Bank of England and the European Central Bank launched quantitative easing programmes or, in the case of the Bank of Japan, expanded an existing programme. Quantitative easing involves central banks electronically creating money and using it to purchase assets from banks and other financial institutions, in particular acquiring government bonds. Doing so has two effects. First, it floods the banking system with liquidity, supposedly encouraging lending. Second, it drives up the price of bonds. Bonds pay a fixed income at regular intervals, so, if they increase in price, their "yield", the return on the investment relative to the price, tends to fall. Lower yields mean lower borrowing costs. Rapid accumulation takes place in conditions in which investors believe that production will be profitable. Instead, money was either squirrelled away by the banks or streamed into financial investments, though often high-yielding, risky investments.

Despite the persistence of high levels of sovereign debt in the U.S., no country is willing to challenge the dollar as the representative international currency. As Patnaik notes, any alternative to the dollar as an international currency in the current set-up will need a country to challenge the status quo. He argues that the fall in the value of the dollar in terms of oil could lead to the decline, and finally replacement, of the dollar. At present, there is no attempt nor, it seems, any interest among major dollar holders or among top major economies to seek an alternative. Currently, the major creditors to the U.S., namely China, Japan, Germany and oil exporter Middle Eastern countries, rely heavily on the U.S. markets to prop up their own domestic demand and economy. In the U.S., real wages have fallen since 2008 but domestic demand has continued to grow thanks to household borrowing and domestic and international sources (Patnaik 2009).

The U.S. government has the privilege of paying its debts in its own currency rather than in some other currency. This means that this eases pressure on the U.S.

to reduce deficits and regulate its banks. As Wade (2009: 545) notes: "The U.S. government's privilege of paying its debts in its own currency rather than in someone else's softens the pressure on it to cut its deficits and get its banks working. The U.S. central bank can just print even more than it has been doing, reducing the pressures for adjustment and raising the potential for a later inflationary surge. The outcome could be stagflation in the USA and damage to countries that hold dollar assets in their foreign exchange reserves."

The U.S. dollar reserve constitutes up to 70% of the world's foreign exchange reserve. The rapid expansion of the dollar by the U.S. did not lead to hyperinflation in the country. This large additional amount of dollars is being used to boost foreign exchange reserves in emerging economies. Furthermore, huge amounts of U.S. dollars are used in the trade of mineral, oil, gas, and agricultural commodities. The prices of these commodities fluctuate. The countries who import these commodities in large quantities will thus be affected by the rise in price of the U.S. dollar due to imported oil prices. As D'Arista (2009: 634) argues "the key currency status of the dollar appeared to offer significant advantages for the USA, questions about its sustainability have been raised almost since its inception. Any country that issues the global medium of exchange will experience capital inflows and the resulting investments in its credit instruments will increase the availability of credit and allow its residence to spend more and save less. But the steady stream of capital inflows can only continue if the key currency country is able or willing to run the trade deficits that allow other countries to earn the currency they hold as international reserves. Over time, growing imbalances between the external debt of the key currency country and the surpluses of other countries tend to push the system to breaking point. The ballooning internal debt of the reserve currency country – particularly of its household sector – strains its capacity to import and undermines the value of its currency both literally and in terms of its role in the global economy".

According to D'Arista, (2009) the functions for the dollar required that dollar/gold exchange rate be fixed and unchangeable, but in the absence of rival currencies convertible into gold ensured that the dollar would also emerge as an international medium of exchange used in transactions between third countries and an international store of value. Further D'Arista (2009: 641) argues: "Dollar reserves had to be invested in U.S. financial assets to earn interest and earnings on reserves augmented the supply, the amount of investments in the U.S. financial assets also grows. Private dollar holdings were also returned to the U.S. and held as working balances with US banks to pay for trade with the U.S. and the third country. Surplus private funds were invested in time deposits or money market assets or Treasury bills. In time the return flow of dollars to the U.S. provided more credits than its economy could use. The outcome was lower U.S. interest rates, economic expansion and a rising rate of inflation. Excessive inflows also encouraged an even larger volume of capital outflows by the U.S. residence that put pressure on dollar exchange rate".

Keynes' proposed in 1944 that international clearing was the key problem in the international system due to lack of liquidity. He viewed the need to make a system that would favour expansion rather than contraction and ultimately would

not restrain domestic policy. He opposed the idea of building a system which relies on one dominant currency as reserve assets to minimise the governmental influence and prevent the collapse of foreign national reserves as occurred in 1928. His suggestion was that the accounts of both debtors and creditors would be interest-bearing so that the burden of adjustment would be shared by both countries. (Keynes 1980) For instance, creditor countries would make deposits of the current account surpluses they did not wish to spend and thus create an additional supply of funds for debtor countries to borrow. However, his plan was rejected then by the US. (D'Arista 2009)

Any other country pursuing such a strategy of huge fiscal deficit would witness an outflow of finance as the "investors' confidence" in that country would be undermined. However, the U.S. dollar is still considered "as good as gold". This is due to a number of reasons, including the home base of global finance itself and its global military domination.

World currency can be divided into three distinct categories: 1) advanced economy currencies, e.g., the U.S. dollar was considered as good as gold by other investors and asset holders; 2) other advanced economies' currencies such as the euro, pound sterling; and 3) developing countries' currencies, which were expected to depreciate over time. When India wants to buy a commodity from South Africa, then India first exchanges Indian rupees for U.S. dollar and uses these dollars for payment. However, when a U.S. firm buys something from India, then it can use own national currency (i.e. dollar) for the payment.

Since the 2008 crisis, the interest rates in the advanced economies have been maintained at almost zero levels in order to revive their economies, which meant that the flow of capital from their economies to the emerging economies became more profitable. Such capital flows have taken the form of equities and loans. Therefore, if the currencies in emerging economies depreciate, then asset holders from the advanced economies will be affected. Any depreciation of the local currency will thus start panic and result in capital flight from the emerging economies. This means international capital is not interested to see depreciation take place.

The Performance of the Chinese Economy

The Chinese economy is now the world's second-largest economy. It is also the second-largest global trader and currently holds the largest amount of foreign exchange reserves. In recent years, the Chinese economy has accounted for more than one-fifth of incremental demand worldwide. The question also arises as to whether the greater use of the renminbi as an international currency is directly associated with the future of the US dollar.

China has, over the last three decades, enjoyed massive growth to become the leading economy in the world by nominal GDP (See Figure 3). As noted by the World Bank (2017), since the introduction of economic reforms in 1978, China has experienced increased industrialisation which made construction and industry the main contributors to GDP. However, in later years, the tertiary sector has

become the main GDP contributor, accounting for about 46.1%, while the secondary sector represented 45.0% of total output. Up to 2015, China had remained the fastest growing economy worldwide, reporting growth rates of about 10% per annum. In 2017, China had a GDP of $23.12 trillion, representing an increase of 6.8% from the previous year (Amedeo 2018). According to the World Bank (2017), China's GDP accounts for about 33% of global growth.

Since 1980s, the rapid growth of China's share in the global economy has risen sharply and the whole East Asian region has witnessed its highest growth rates. If the region is integrated into a free trade zone and these countries use their own currencies, this will have an adverse impact on U.S. interest, including the use of dollar as a foreign exchange. To safeguard dollar hegemony, the U.S. has, accordingly, been active in the region. (Siddiqui 2015) The last four decades of rapid growth in China has tremendously increased both its productivity and trade. Moreover, the country has accumulated large amounts of liquidity in the capital market. China's rising trade and investment abroad led to the increased financialization and internationalisation of the renminbi. With Asia seeing high growth and being an economically fast-growing region, this could open the possibility of a regional free trade zone and also the possibility of forming an Asian currency that could be used in trade and as a foreign exchange reserve. Such a development would ultimately undermine U.S. dollar hegemony in the region.

It is estimated that should the current scenario continue, China will overtake the U.S. by 2030 to become the biggest economy in the world. The World Economic Forum (2018) also noted the country's per capita GDP has continued to converge in relation to that of the U.S., although at a moderate rate. However, the country's growth rate has decelerated since 2013 when it grew by 7.7%, declining in subsequent years to 7.3%, 6.9% and 6.7% in 2014, 2015 and 2016, respectively. In recent years, China has emerged as the biggest foreign buyer of U.S. Treasury bills and U.S. dollars, and will perhaps go on buying to prevent a dollar crash. In order to escape the 'dollar trap', the Chinese government should be worried about the sharp fall in the value of dollar. It is suggested that China has sold around between U.S. $50 bn and $100 bn U.S. dominated assets each month since 2009 and bought assets such as agricultural land, mines and corporate stocks in Asia, Africa and Europe (Wade, 2009). China is also advancing credits to oil companies in Brazil, Dubai, and Russia, which they will repay in oil.

China was one of the poorest countries in the world before 1980 in a closed economy. However, since the Chinese economic reform of the 1980s, the Chinese economy has been growing rapidly. China's current GDP is nearly 70 times what it was in 1980. The current world is an open economy, wherein the trend towards economic globalization is developing rapidly. Economic globalization not only promotes economic cooperation among countries, but also affects close economic development between countries. Due to different national conditions in China, the direct impact of the international financial crisis on Chinese economic development is relatively small. Chinese GDP seems to keep rising, even when most other countries saw a decline during the global financial crisis. In 2013, President Xi Jinping of China proposed that the "Belt and Road" is becoming an important link for Chinese international trade with the world. China's One Belt

One Road (OBOR) initiative and the Asian Infrastructure Investment Bank (AIIB) are intended to increase regional trade but also increase the use of the renminbi, as any currency needs to first gain foothold as a regional currency before becoming a global currency (Siddiqui 2019c).

The Chinese currency has become the fifth-largest international currency since 2016, when the International Monetary Fund formally included the renminbi in the SDR basket. The circulation and use of RMB is mainly accompanied by the rise of tourism. China sees a large number of its tourists visiting various countries every year, so there are more and more shops in these countries where the RMB can be used to buy goods. Judging from the current world situation, no country's currency can hope to match the dollar in the near future with the possible exception of the yuan. The euro was the most likely to replace the dollar, but after the 2008 economic crisis, it was somewhat weakened. The financial crisis in the European countries lead to a weaker euro and left them unable to compete with the dollar in terms of international market share. In addition, although the Japanese yen and UK pound are important internationally, the productivities of these two countries are low, making it difficult for either to assume the role of the world's major currency. (Siddiqui 2019b, Subacchi 2016)

China's export clears in renminbi reached 26% in 2018. Furthermore, with the increasing renminbi deposits around the world, the demands on renminbi financial products have also been increasing in recent years. It is estimated that by 2030, the Asia-Pacific region will account for 40% of global GDP and two-thirds of the global middle class. China's number of middle class is expected to rise to six hundred million by 2020. (Subacchi 2016) This would mean China and the Asia-Pacific will be the largest consumer market for goods. It is also expected that within next few years, due to these changes, the renminbi will become the major trading and clearing currency in the Asia-Pacific region.

China's financial system, fiscal policy and the management of its foreign exchange is in government control and thus the government still maintains macroeconomic autonomy despite the fact that the country is an active participant in the WTO and global financial capitalism (Siddiqui 2015).

Internationalisation of the Renminbi

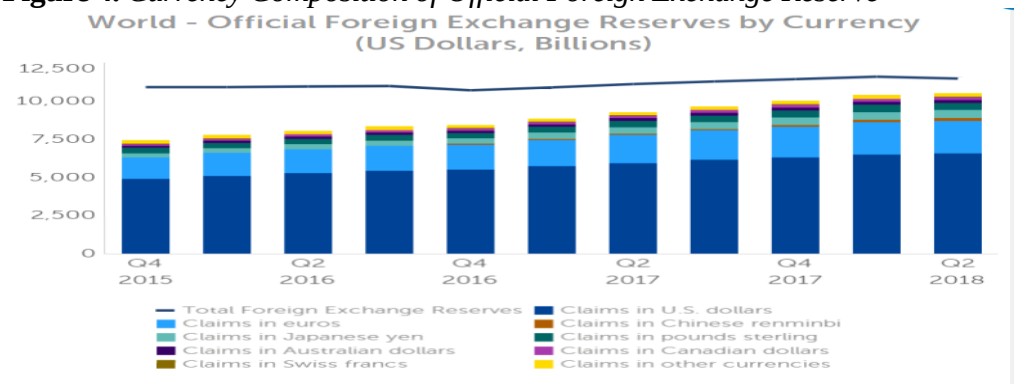
Over the last four decades, the renminbi went from being virtually inconvertible to becoming one of the few major recognised global currencies. Although exchange rates have been controlled by the Chinese central bank since 1981, they have gone through different forms of managed convertibility. For example, from 1981 to 1994, a number of devaluations were enacted to boost exports. Between 1994 and 2005, the renminbi was virtually pegged to the U.S. dollar at a fixed rate. Between 2005 and 2010, this peg shifted to a basket of currencies, and in 2014 the band of fluctuation around the exchange rate target set by central bank was widened. (Subacchi 2016) The internationalisation of the renminbi is being gradually pursued through a number of polices. For instance, control of capital account has been aimed at easing monetary inflows and

outflows, establishing offshore exchange centres, where foreign institutions can exchange the currency with Chinese banks, whereby China has made a series of currency swaps with trading partners, establishing a mechanism for payment of exports and imports without using the U.S. dollar.

Russia radically decreased its U.S. dollar holdings to very low levels last year, and this is seen as a move to boost renminbi and yen reserves. Russia's central bank more than halved its dollar reserves in 2018 and moved $44 bn each into the renminbi and the euro and $21 bn into yen (See Figure 4). This move came soon after the U.S. passed sanctions in April, where Seddon notes: "after the passed sanctions in April that knocked 20 per cent off the rouble's value against the dollar and saw investors scramble to cover against future measures that could affect sovereign debt and popular stocks." (Seddon 2019) There seems to be a clear change in Russia's foreign exchange holdings, with a large shift towards the renminbi. Russia had only 0.1% total reserves in the renminbi in June 2014, which only one year later had risen to 15%. The renminbi holdings yield is 3.20% compared to 0.35% for the U.S. dollar.

The Economist (2015: 15) noted about the U.S. dollar that "For 70 years the dollar has been the superpower of the financial and monetary system … As a means of payment, a store of value and a reserve asset, nothing can touch it. Yet dollar's rule has brittle foundations, and the system it underpins is unstable." The U.S. accounts for 23% of global GDP and 12% of merchandise trade. Yet around 60% of the world's output and a similar share of world's population lie within the dollar zone, i.e., in which currency is pegged to the dollar. The US firm's share of the stock of international corporate investment has fallen from 39% in 1999 to 24% in 2015 (Economist 2015).

Figure 4. *Currency Composition of Official Foreign Exchange Reserve*



Source: IMF Data. Available at https://data.imf.org/?sk=E6A5F467-C14B-4AA8-9F6D-5A09EC4E62A4.

In the 1970s, the French government termed the dollar "America's exorbitant privilege". In the light of the 2008 financial crisis, Eichengreen (2011) noted that other countries question whether the U.S. should have been allowed to run current account deficits approaching 6% of GDP prior to the crisis. Emerging economies are critical in the sense that as their economies expands; they are under pressure to raise dollar reserves for any unexpected eventualities. They are compelled to

provide cheap finance for U.S. external deficit. The cheap foreign money keeps U.S. interest rates low and thus subsidies the U.S. Eichengreen argued that the inter-war experience was that a reserve currency status can change if a new dominant power emerges. Earlier it was thought that Europe might challenge the dollar's hegemonic role. At present, this looks less likely and the sharp rise of the Chinese economy and the fact that it is now a larger exporter than the U.S., holds massive foreign reserves (in dollars), and its GDP, when converted at the current exchange rate, could match the U.S. by 2025.

Since the U.S. dollar is the accepted international currency, other countries would naturally like to hold reserves in it. The demand for U.S. assets, primarily Treasury Bonds, is thus higher than it otherwise would have been, thereby lowering interest rates for U.S. borrowing, which Eichengreen estimated to be up to 1 percentage point in the last decade, which is equivalent to an annual benefit of 0.1% of its GDP. Eichengreen (2011) suggested that there is a strong possibility of a convertible renminbi as early as 2020. The U.S. is troubled by its continuing balance of payments and budget deficit, and also by mounting foreign and domestic debts. All these would adversely affect the future importance of the U.S. dollar, as happened nearly one hundred ago, when the British Pound Sterling lost its global role due to the weakening of British economy. It is not beyond possibility that the US dollar could experience a similar future. According to Boltho (2011: 147), "There is no doubt, threats to America (not quite) hegemonic position and the U.S. dollar could crash should foreign investors, and primarily China, suddenly lose faith in the currency. But this would not be in no ones' interest. China is the first to realize that a dollar collapse would leave it doubly poorer; its massive U.S. Treasury Bond holding would be worth a good deal less in domestic currency, and its export competitiveness would suffer a huge blow". Eichengreen (2011) predicts a world of multiple international currencies, with the euro and renminbi playing more significant roles at the regional level.

In 2009, China's central bank (the People's Bank of China) began a programme in a few Chinese cities to allow trade to be settled with Hong Kong, Macao and 10 other East Asian countries in renminbi. By 2011, this programme was expanded to an increasing number of Chinese cities and, indeed, to additional countries. As a result, there was a sharp rise in trade from 3 bn renminbi to 535 bn renminbi in 2010 and to total of 2.1 trillion renminbi by 2012. China also has signed currency swap agreements with 20 countries, and it is hoped that such agreements will further increase the use of the renminbi. Jenkins and Zelenbaba (2012: 523) note: "Over 3-5 years, overseas lending in RMB would be further accelerated, with restrictions on investment in Chinese property, stock and bond markets gradually being eased as financial sector development strengthened over 5-10 year period… The process would eventually culminate in a fully convertible RMB, suggestive of the fact that Chinese officials remain steadfast, however, cautious, along the course of internationalizing their currency".

Despite the use of the renminbi rising in recent years, it still does not have the particular advantage of the US dollar which is its ability to profit from the global markets. However, as China's financial assets are more internationalised, the more Chinese economy is financialised. In fact, whilst the OBOR initiative will help

China to find markets for its excessive production capacity, it will also help to achieve economies of scale and to build the comparative advantage of globally competitive markets (Siddiqui 2019c). The government facilitates OBOR and outflows of Chinese capital to invest in new markets overseas. The country must build regional institutional arrangements in finance and currency exchange, as the U.S. did soon after the Second World War, which is known as the Bretton Woods system. Such a move facilitated U.S. exports of goods into international markets. China attempts to build AIIB and also other institutional arrangements relating to exchange agreements between the renminbi and other regional currencies. Such measures would build a non-U.S. trading clearing system. Furthermore, such a large infrastructural project would require credit creation, financing and clearing tasks, but the risk is that such huge profits may drive the financial sector to over-expand and over-stretch itself in an attempt to create quality renminbi-based financial assets (Hung 2013). Over-expansion of the financial sector may have an adverse impact on the real economy, leaving it vulnerable to financial crisis as happened in the 2008 subprime bubble in the U.S. and Europe.

Conclusion

Ten years ago, the financial crisis in the United States led to a global economic crisis in 2008. This financial crisis was caused by the exposure of risks in the U.S. house market, which led to a nearly vertical downward in the U.S. dollar index. Emerging economies have been affected by the severity of the global economic financial shocks because the current global reserve system fails to ensure adequate international liquidity (Lee 2014). The recent years, a growing disappointment with the functioning of the international financial system and with the U.S. dollar remaining dominant in facilitating the build-up of global current account imbalances has been seen (Mason 2018); this was the case even before the 2008 crisis. At the same time, the Chinese accumulation of dollar assets and its rapidly growing trade and participation in the global economy, and also the increase in the use of the renminbi in trade, indicates significant impending change in the world economy. With the rapid slowdown of the performance of the U.S. economy and trade, there are concerns being raised about the dollar as the single dominant reserve currency and the asymmetry in adjustments to shocks. There is no mechanism for adjustment, especially real exchange rate adjustment in surplus countries (Jenkins and Zelenbaba 2012).

It seems that Kaldor is describing the current state of US economy rather than nearly 50 years ago. As Nicholas Kaldor noted: “The persistent large deficits in the United States balance of payments-given the universal role of the dollar as the medium for settling inter-country debts-acted in the same way as a corresponding annual addition to gold output… So long as countries preferred the benefits of fast growth and increasing competitiveness to the cost of part-financing the United States deficit and so long as a reasonable level of prosperity in the United States could be made consistent with the increasing uncompetitiveness of United States goods in relation to European and Japanese goods, there was no reason why any

major participants should wish to disturb these arrangements" (as cited in D'Arista 2009: 645). According to him but as the US products were displaced by other countries both in US and overseas market and to maintain prosperity would require budget and balance of payment deficits. Few years later he notes, "If continued long enough it would involve transforming a nation of creative producers into a community of *rentiers* increasingly living on others, seeking gratification in ever more useless consumption, with all the debilitating effects of the bread and circuses of Imperial Rome…" (as cited in D'Arista 2009: 645).

The Study has found that the U.S. dollar still accounting for two-thirds of all foreign exchange reserves and the United States' ability to run large current account deficits has turned out to be a calamity. Once the dollar loses its status as an international currency, there is no doubt that the dollar will depreciate substantially. The United States will be unable to repay its external debt. China as the largest American creditors will lose a lot of money.

This article concludes that the U.S. economy is currently suffering from a serious trade deficit and the position of the U.S. dollar is under genuine threat from the renminbi, the renminbi will not be able to replace the U.S. dollar as the global currency for at least the next decade. However, the next 10-15 years may well see the coexistence of Chinese currencies with the U.S. dollar, especially in the Asian region. It may take at least 20-30 years before there is a real possibility of replacing the U.S. dollar.

The study suggests that the policy should be set to seek profit in the real economy rather than 'finance financing finance'. Finance should be made less globalised. In fact, the pressing issue in dealing with global imbalances is to find ways to recycle the saving of surplus economies back into their own economies to be invested in developmental projects which would increase demand and income and create employment and will also make them less dependence of export-led growth. In the U.S., there is a need to increase public spending rather than rely on debt-fuelled private consumption to resolve inadequate aggregate demands. Greater investment in skills and education will increase labour productivity which will positively impact profit rates, as occurred during the post-war period under regulated capitalism, while rising wages, consumer and government spending would result in higher investment and capacity utilisation.

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Foreign Direct Investment and Tax: OECD Gravity Modelling in a World with International Financial Institutions

By Fabian J. Baier[*]

In this paper, bilateral OECD FDI flow data from 1985 to 2017 is evaluated and compiled to create a new dataset in order to clarify the controversial role (in the literature) of corporate tax levels on the decisions of firms regarding whether or not, and where, to undertake investments. In the course of our research we find the need to control for interaction with international financial institutions: Membership in BIS, EBRD, ADB and MIGA. Quantitative analyses via gravity models firstly provide findings which are consistent with previous studies and, secondly, expand the knowledge about FDI and tax by providing new results relevant for policymakers in the context of globalization and international institutions. It is shown that falling corporate tax rate levels lead to increasing FDI inflows, the effect is, however, smaller than expected; if deviation from international cooperation is chosen as a national strategy (i.e. unilateralism), the tax rate, however, gains in importance. On the other hand, unilateralism triggers various effects decreasing FDI inflows, as trade openness is likely to decrease, the opportunity costs for other nations to deviate decrease, and therefore bilateral tax differences are likely to decrease as well; which will further reduce the effect of low tax levels. Evidence for the phenomenon of implementing low corporate tax levels in order to keep domestic firms within the country and reduce their incentives to invest abroad is not found. (*JEL* C32, E65, F21, F23, G20)

Keywords: *Foreign Direct Investment, Corporate Taxation, International Financial Institutions, Gravity Equation, OECD Countries.*

- Introduction and Literature Review

"Big TAX REFORM AND TAX REDUCTION will be announced".

This tweet from US President Donald Trump on April 22nd, 2017, signaled the intention of his administration to reduce firms' incentives to invest abroad and to attract more foreign firms to invest in the US. The tax reform he referred to came into force on January 1st, 2018. However, has the promise of such reform been fulfilled? Will the US attract more investment, creating jobs and wealth?

"Theresa May pledges to slash taxes to lowest rate in G20 to make Britain a post-Brexit economic powerhouse".

[*]Research Associate, European Institute for International Economic Relations (EIIW), Schumpeter School of Business and Economics, University of Wuppertal, Germany.

This title headline on the British "Telegraph" newspaper on September 26th, 2018, concerned the Prime Minister's plan to mitigate losses due to less foreign direct investment (FDI) inflows to the post-Brexit UK economy. Today, the UK is still a full member of the European Union and even though professionals' opinions are divided about how big the effect of Brexit on FDI flows will be, the broad consensus is that there will indeed be a negative impact. To what extent, and under which circumstances, tax rate reductions could oppose a negative impact will be discussed in the present paper.

The effect of corporate tax on FDI has been discussed extensively over the past 30 years (see for example Baccini et al. 2014; Bénassy-Quéré et al. 2000; Bloningen 2005; Bretschger & Hettich 2005; Chisik & Davies 2003; Ghinamo et al. 2007; Nielsen et al. 2017). Although most researchers find a significant impact, the results are, however, mixed; the estimated impacts on FDI related to a 1 percentage point corporate tax rate decrease (see Feld & Heckemeyer 2011) range between -1.26% and +9.80%, strongly varying between the data (source, time period, flow/stock) and modelling approach employed. In order to provide a clear cut picture, frame conditions for both the data and models used have to be set. Moreover, FDI effectively means international economic cooperation at a firm but also at a country level and therefore requires a global framework and rule-setting in order to develop to its full potential. Looking at recent disintegration processes within the EU and increasing instances of unilateralism rather than cooperation grounded in multilateralism globally[2], one can consider whether these developments will rather promote or restrict FDI activities in the future. National interactions with international institutions are necessary in order to reach fair agreements, including seeking to prevent individual nations from deviating strongly in their tax policy in order to reap short term and one-sided benefits. If such a deviation strategy and disintegration is indeed seen to be beneficial, this would stimulate an international downward tax reduction game (similar to a "prisoner's dilemma") reaching a new steady state where all parties are strictly worse off than if they cooperate. In the present study, FDI inflows are analyzed between a set of countries roughly homogenous in terms of national fiscal policy, especially corporate taxation, as well as participation in and interaction with selected international financial institutions.

Using bilateral FDI flow data from 1985–2017 in a gravity model framework[3], the role of corporate tax and financial institutions in firms' investment decisions is analyzed. The findings show significant negative interaction between FDI inflows and the corporate tax rate, however tax evasion strategies rather depend on FDI flow destinations and not on origin countries' fiscal policy, as the home corporate tax rate has no significant effect on the level of outflow. International financial data exchanges via the Bank for International Settlements (BIS) and participation in programs of the European Bank for Reconstruction and

[2]Here, we abstain from listing specific examples, as several such events can be found detailed in daily media reports (April-July 2019).

[3]Models which use the economic size and distance between interacting countries as major explanatory variables are referred to as gravity models; see Shepherd (2017) for a general introduction and literature review.

Development (EBRD) negatively impact FDI inflows, while memberships of other financial control institutions have no significant impact. The total effect of corporate tax on FDI inflows decreases over time between OECD members.

The remainder of this paper is structured as follows: Section 2 gives a short overview on the theoretical FDI aspects and gravity modelling for FDI, corporate taxation and international financial institutions; Section 3 discusses the data and modelling specification; Section 4 presents and interprets the empirical results; Section 5 discusses relevant policy implications of the findings and concludes.

Theory

General FDI Theory and Main Determinants for FDI Inflows

The 21st century has seen an unprecedented rise in the level of economic globalization, most visually in terms of trade and migration, but most persistent in terms of production networks, supply chains and international financial and institutional integration. This process of globalization, which has increasingly been monitored since end of World War II, was originally intended not only to increase global wealth, but also to maintain peace and establish strong free-market economies to counter the spread of socialist ideas in the Cold War era. This increasing industrial and financial globalization can be witnessed particularly when looking at (multinational) firms engaged in foreign countries via direct investments for a) ownership, b) location and c) internalization (OLI) advantages (Dunning 1979). However, the incentives for FDI are much more complex than that. While a broad range of empirical literature exists on the determinants of FDI, including in gravity settings (see, for example, Bloningen 2005, Pandya 2016 or Nielsen et al. 2017, just name but a few), Faeth (2009) gives a review of theoretical models explaining FDI:

- Neoclassical trade theory á la Heckscher-Ohlin factor endowment and specialization models as well as more recent knowledge-capital models in the context of horizontal and vertical FDI; while studies analyzing factor endowments as driving factors for FDI show mixed results, the rationale should nevertheless be considered in the field of horizontal FDI with special importance on (risk) diversification[4].
- A major part of theoretical models centers around the classical OLI-approach, naming "…a combination of ownership advantages, market size and characteristics, factor costs, transport costs, protection and other factors including regime type, infrastructure, property rights and industrial disputes" (Faeth 2009, p. 174). The relative size and growth

[4]Multinational firms engage in several countries with similar amount and size of business. This sort of FDI is mostly driven by production-to-market and incentives are expected to rise with distance and increasing transportation cost and as well target country market size (GDP).

of foreign markets are especially highlighted, as well as ownership advantages in monopolistic terms.[5]

Policy variables as determinants of FDI are specifically discussed, especially political and investment stability as well as fiscal incentives like corporate tax. While the latter almost always have significant effects on FDI, the magnitude is fairly low and the author advises that those variables shall be used rather as control variables for researchers not including the much stronger policy variables.

Discussing the latter is necessary, as a distinction between countries and economic zones is strongly recommended: While there are close to 200 nations on our planet, only a relatively small number of them are economically large enough to have a significant impact on the global trade and investment networks, also being broadly similar in their individual political endowment (see for example the CPIA database of the World Bank Group, data and indices provided by Transparency International, the Heritage Foundation or V-Dem). So while policy variables are crucial for general FDI theory and theoretical frameworks (see Nielsen et al. 2017 p.65), their utilization is quite restricted in panel gravity FDI studies, especially as policy variables are responsible for little to no variance in major datasets. On the other hand, fiscal incentives, such as the corporate tax rate, can differ significantly between a set of countries with otherwise homogenous political endowments.[6] We choose bilateral FDI flows between all OECD countries as our sample, as those 36 countries account for roughly 70% of global FDI flows and stocks – tackling the homogeneity issue by introducing country as well as dyadic fixed effects in order to control for all time non-varying characteristics.[7]

Other theoretical aspects refer to the role of the size of the source and target economy to promote FDI as well as the (physical and cultural) distance between them to constrain FDI, legitimating analyzing FDI in gravity frameworks. The classical country specific theoretical roots from trade theory are also applicable here, utilizing the CEPII country level data targeting FDI destination and parent firm location, which is discussed in the next sub-section.

Gravity Modelling in FDI

Gravity modelling (as originally applied) for trade is derived directly from Newton's Law of Gravitation, as it uses the economic sizes of and the distance

[5]Contrary to horizontal FDI, vertical FDI does depend on transportation costs and therefore distance, and not necessarily on market size but rather production factors as for example wages/GDP per capita. See also Bergstrand/Egger (2013).

[6]See Table A1 in the Appendix; missing observations are not significant as only immaterial FDI flows relating to respective targets and years are observed.

[7]In many cases, this already includes common policy variables like corruption, safety and investment security, political stability etc.; the "Doing Business Index" developed by the World Bank is also unsuitable for similar reasons, see Anderson/Gonzales (2013).

between trading partners as major control variables (see Tinbergen, 1962).[8] The lack of a sound micro-foundation is successfully tackled by Anderson/van Wincoop (2003) who provide researchers with a theoretical model combining international supply (production) with demand, anticipating iceberg transportation costs. Additionally, the model accounts for multilateral (inward and outward) resistance, taking into account that demand and supply does not only depend on the two interacting partners, but on the whole set of market participants.

Since then, the application of the model has been consistently improved, as illustrated by Shepherd (2017) who compiles and regularly updates a "user guide" for UN-ESCAP (Economic and Social Commission for Asia and the Pacific) researchers. Major developments are the inclusion of sets of country and dyadic fixed effects (Anderson 2011; Head & Mayer 2014) and the adaption of Poisson Pseudo Maximum Likelihood (PPML) estimators in log linearized form for panel data[9] (Baldwin & Taglioni 2007; Martínez-Zarzoso 2011; Silva & Tenreyro 2006). PPML is the first choice for such models with up to 50,000 observations in combination with lower thousands control variables including fixed effects (Head & Mayer 2014; Kareem et al. 2016), even though many researchers use Ordinary Least Squared (OLS) estimators for reasons of robustness.[10] Using more data and/or implementing larger numbers of control variables requires different econometric approaches due to practical issues (see Stammann 2017).

Even though a majority of gravity studies analyzes trade relationships, the approach has proven itself useful for FDI researchers as well, and even finds application in migration and labor economics. A brief literature overview on gravity models which are applied to FDI is given below. One of the more recent reviews by Nielsen et al. (2017), evaluating 153 empirical studies between 1976 and 2015, also examines the role of corporate tax with regard to FDI destination choice, being used as a control variable in 29 studies, functioning along with target country's GDP as a proxy for demand. Both variables are found to be significant in most studies, even though evaluating results for corporate tax does not give a clear-cut picture. The positive effects of target GDP on FDI flows and/or stock in most studies are perfectly in line with FDI market seeking theory. FDI source country GDP, subsequently origin country GDP, is found not to be as straight forward: Gravity theory for trade would predict a positive interaction, as large and strong economies have the potential to serve a larger share of total global demand. FDI gravity might be more complex here, on one hand large origin economies potentially have more economic power and prospects to interact globally, and multinational companies might be more likely to grow from a national to an international competitor from the base of a large domestic market. On the other

[8]This was a rather practically driven approach, as estimation results for distance and GDPs held very high explanatory power in those models.

[9]For Stata implementation, annual fixed effects are a practical solution for non-available panel commands when using PPML estimators such as the xtreg.

[10]Following Kareem et al. (2016) and Silva (discussion forum), OLS results degrade quality-wise with increasing numbers of observations; also note that the OLS estimator does not count "zero" flows between countries and therefore is only suitable if few or no zeroes occur; solutions to this issue can involve re-scaling or assigning small numbers, see Welfens/Baier (2018) for a discussion.

hand, multinational firms in today's world do not necessarily 'belong' to their physical home country, or the country in which they were founded, but place their head office for strategic, financial, legal or political reasons to other countries (examples might be Switzerland, Ireland, Luxembourg etc.). Distance is found to be negatively significant in most studies, supporting vertical FDI theory.

As none of those studies considers dyadic fixed effects, which prove to have very high explanatory power, and as PPML estimators are also barely utilized,[11] it is the goal of the present paper to close this research gap. Leading studies using such models have been published by Bruno et al. (2016), Barrell et al. (2017) and Welfens & Baier (2018) where all analyze the effect of European Union membership and FDI attractiveness (mainly in the context of Brexit), using OECD stock and flow data from 1985-2012. Welfens & Baier (2018) also control for corporate tax, and find similar results as Folfas (2011) and Wojciechovski (2013) for their gravity tax research, who use Hausman-Taylor estimators without dyadic fixed effects, but instead the full set of time non-varying CEPII country and country pair variables such as distance, contiguity, common language or colonial relationship and so on. The fact that all three studies yield similar results despite using different econometrical approaches is picked up subsequently in following sections. The role of tax and international financial institutions for FDI decisions shall be discussed in the following sub-section.

The Role of Tax on FDI

While gravity FDI tax research is limited, there is a broad range of literature on corporate tax rates and FDI; in general, low foreign tax is analyzed in combination with FDI incentive factors rather than discussing a high domestic tax rate as a reason for tax avoidance and therefore increasing investment outflows. As an overview on FDI tax reviews is already given in the introduction of this paper, this aspect will not be stressed further and rather relevant arguments by selected authors on which the hypotheses of the present paper are built are discussed.

Feld & Heckemeyer (2011) point out that the effects of tax or tax differentials between countries on multinational companies' decisions are insufficiently analyzed, and the findings which have been made –especially on degrees of effects– are very heterogeneous. In their meta-study they collect a range of arguments as to why and to what extents findings can be biased.

- *Double taxation treaties:* For most OECD countries, double taxation treaties came in force since the 1980s[12] or earlier (IBFD Tax Treaties Database), implementing either the credit or exemption system. While the latter does not tax foreign income, because such is already taxed by the country where the income was derived and therefore tax avoidance incentives are present, the credit system taxes all income in a double count

[11]This should be no surprise, as the PPML estimator for gravity is still quite new and is currently being developed.

[12]Actually prior to the 1980s as well, but that decade saw continuing (re-)negotiations of older treaties which were previously in place.

(total domestic plus foreign income will be taxed by the home country, foreign income may also be taxed additionally on top, abroad). The firm can offset the foreign-paid tax against the total home country tax bill, and therefore has no incentive for tax avoidance. Thus, the effect of corporate tax on FDI decisions should be rather limited for countries which follow the double taxation credit system (Slemrod 1990). Countries following the exemption system usually counter tax avoidance via national laws.[13] In both cases, thus corporate tax should not significantly affect FDI decisions, even though empirical studies by Jun (1994) and Wijeweera et al. (2007) who explicitly control for double taxation treaties contradict this and find significant effects. In our OECD sample, dyadic fixed effects will control for potential outliers, such as Brazil, which have never signed (or resigned) any tax treaties with several OECD partners. Another solution to double taxation treaties can be the usage of effective average tax rates, which reflect national or bilateral tax incentives, an approach which yields similar results in gravity model settings (Bellak et al. 2009 and Egger et al. 2009) than when using pure corporate tax rates in OECD or EU samples only (Folfas 2011; Welfens & Baier 2018; Wojciechovski 2013).

- *Regional difference in international taxation:* In a global perspective, developing economies face much greater competition pressures concerning FDI attractiveness, and generating corporate tax incentives usually has a higher effect, especially in the absence of (bilateral) tax treaties, where they can use discriminatory tax policy in an "…more targeted and cost efficient manner" (Andersen et al. 2018).
- *Data availability and access:* Studies need to be distinguished on the basis of whether firm level panel data (micro data) or aggregated FDI data (macro data) is used; using micro data limits a global approach in a sense that data is not (sufficiently) available for many countries and/or years, while macro data generally struggles with problems of precision: In theory, macro data is aggregated micro data by institutions as the World Bank (UNCTAD), OECD or the BIS, to name the most popular. Different national and international (institutional) reporting standards, firm sizes etc. also yield different incentives for foreign investment and therefore impact the importance of corporate tax.[14] The tax effects found in studies using micro data are generally lower than in macro studies (Feld & Heckemeyer 2011), indicating that smaller firms do not care as much for tax incentives as bigger firms do. This is a potential bias we will discuss in our results, as those therefore tend to overestimate the degree of the corporate tax effect.

[13]In Germany for example, an actually agreed exemption method in the double taxation treaty with another country will be switched to the credit system according to national law if the company earns certain passive income and if there is a low tax rate applicable in the foreign country (§ 20 para. 2 AStG).

[14]For example, micro data in certain countries covers very small firms which otherwise get dropped in a macro aggregation process as reporting standards differ. Small firms value foreign tax aspects differently to large firms, resulting in heterogeneous estimation results; for reference, see for example the Doing Business Report by Anderson/Gonzales (2013).

- *Discrete and continuous investment choices:* Micro data can distinguish between discrete and continuous investment choices which yields different outcomes in respect to corporate tax as well, where rather continuous arguments are of importance as they proxy real economic activity in terms of property, plant and equipment (Buettner & Wamser 2009; Overesch & Wamser 2010). Reviewing the literature concerning that issue, Feld & Heckemeyer (2011) conclude that studies using micro or macro data can control for firm specific location preferences due to already existing tangible fixed assets via country and time fixed effects, "[which]… can indeed alter the size and particularly the significance of tax effects estimates," (Feld & Heckemeyer 2011).
- *Publication bias:* In their meta-study, the authors find robust results for publication selection, i.e. studies which find higher degrees of tax effect on FDI are more likely to get published; taking this into account drops the overall tax effect coefficient from 2.55 to 2.28; when using only micro data the effect drops even lower, naming to 1.19.

Summing up, a broad range of potential reasons explain why the empirical results of corporate tax on FDI attractiveness deviate. The aforementioned points should be discussed within tax and FDI research in order to receive meaningful information and draw adequate conclusions regarding policy implications, which has, to the author's best knowledge, not been the case for previous research.

When discussing the role of taxation treaties (such as the credit system vis-à-vis double taxation or national tax laws to counter tax avoidance), one should consider why they only prevent firm-level tax optimization to some degree, but not fully; or to put it differently –do such taxation treaties really work and to what extent, what are the restraints and shortcomings? As previously mentioned, taxation treaties are in place between almost all OECD members, so it is important to note the degree of impact on the corporate tax variable in the present study when interpreting the results for global policy implications.[15] The OECD Base Erosion and Profit Shifting (BEPS) project tackles this exact issue, trying to implement an international standard of uniform cross-border taxation, which is a shortcoming of many bilateral taxation treaties. OECD BEPS implementation however also faces the challenge of overcoming significant practical issues, as described in a qualitative study by Taubenheim & Mrkvicka (2018) who rank, for example, the US in place 6 of 43 in "most negative records when taxing affiliated companies", which is quite meaningful regarding the total levels of US FDI. Analyzing BEPS in the framework of tax and FDI, Bolwijn et al. (2018) show that profit shifting FDI results in about 200 billion USD of global revenue losses. Further qualitative issues with the implementation of BEPS, such as the lack of

[15]Quantitatively, this question could be answered by utilizing a diff-in-diff approach in a broader, global dataset such as provided by UNCTAD; unfortunately the quality level of the bilateral data they offer for most countries is quite low (see: Blanchard/Acalin 2016; Wacker 2016; and Welfens/Baier 2018 for a discussion) and, therefore, this analysis will be recommended for future research.

data, information on companies and exhaustive tax variables, were described by Acciari et al. (2015).

The Role of Institutions in FDI

The lack of (qualitatively good) data and information on a) FDI and b) the tax level is a well-known issue, as identified above. This is tackled by using data in a limited country setting (OECD; covering 70% of global FDI) and discussing results in the context of the aforementioned theory and findings. A lack of information and data impacts not only researchers, but in the first instance the strategic decisions of firms, governments and institutions. Investors prefer information which helps them in monitoring and evaluating prospects (locational advantages for production, profit and market potential) as well as risks (political, fiscal, environmental etc.), while they are sometimes not eager that the potential target country shares information with the parent country.[16] Governments and Institutions have incentives for cooperation and information exchange in order to enforce international law and taxation.

International data exchange and international institutions thus are supposed to have an impact on FDI flows; there is a broad range of literature which analyzes the role of international institutions on trade, but also on FDI (see Berger et al. 2012; Buethe & Milner 2008; Dreher et al. 2015; Milner 2014 and many more), where a large share of said studies analyze the role of trade agreements, trade-related institutions and international agreements bolstering stable political systems - as those also target many behind-the-border regulatory issues relevant to multinationals. Controlling for political unobservables and trade via fixed effects and openness, the necessity to additionally control for international financial institutions – who are rather involved in micro-data exchange and project monitoring and planning – when analyzing tax and FDI becomes clear.[17] When evaluating literature reviews on international organizations and FDI, we find that the number of studies which estimate the pure effect of international financial agreements is rather limited. However, Jensen (2004) finds that participation in International Monetary Fund (IMF) agreements actually leads to lower FDI, struggling to offer a convincing explanation and leaving a lot open for further research.[18] Jensen picks up an argument by Vreeland (2003) that international banking programs might entail sovereignty costs for domestic governments in the

[16]The so-called "Panama Papers" leak is a famous example illustrating the lack of international (tax) data exchange.

[17]International financial institutions which collect and evaluate firm level data, like the Bank for International Settlements (BIS), the Asian Development Bank (ADB), the European Bank for Reconstruction and Development (EBRD) or the Multilateral Investment Guarantee Agency (MIGA) of the World Bank; in order not to counteract fixed effects, national interaction and membership need to be time variant over the period bilateral FDI data is available, 1985-2017.

[18]Although Jensen (2004) has been cited quite often, his ideas have been primarily picked up for studies in the context of FDI and political or trade agreements, but not for fiscal policy or taxation; however, Jensen (2013) follows up with a tax-FDI study finding that multinationals pay more tax in democracies than in autocracies, who use subsidies and tax as incentives to attract FDI.

form of fiscal self-restriction and restraints which have to be fulfilled in order to avoid international penalization.

While this is not discussed further in the literature, the present study offers a more detailed explanation when linking the cost in terms of sovereignty to tax policy, where international financial organizations serve as fora for data exchange and control institutions for multinational companies. This serves as a basis for the enforcement of international law, fair taxation and rule-setting in order to establish a high level of common welfare and prevent single nations from deviating (thus fostering an international tax reduction game). Leaving this international structure – represented by participation and cooperation with said institutions – thus will result in an inward FDI increase for the individual country concerned and FDI decrease for all other countries. Linking our argumentation to an increasing level of globalization over the last 30 years, this also means that deviation incentives regarding national taxation in order to attract a relatively bigger share of the "global FDI cake" are expected to shrink over time.

We can therefore structure seven hypotheses:

1. An increasing economic size of FDI target country increases the FDI inflow into that country.
2. An increasing GDP per capita of FDI target country decreases the FDI inflow into that country, representing location advantages in vertical FDI theory.
3. An increasing distance between two interacting countries decreases the FDI inflow into that country, following theoretical vertical FDI approaches.
4. Increasing the level of corporate tax for the FDI target country results in decreasing FDI inflows, as location advantages for firms to invest rise.
5. Increasing the level of corporate tax for FDI origin country results in increasing FDI outflows, as this triggers capital flight from the domestic country to foreign countries.
6. The negative corporate tax – FDI flow relationship vanishes over time.
7. Interaction and cooperation with international financial institutions reduces FDI target countries location advantages and thus decreases FDI inflows.

The data and the model are presented in the following section with which it is possible to empirically analyze the present research questions and provide answer to the hypotheses presented below.

Model Specification and Data

Theoretical Foundation

Following Kareem et al. (2016), the PPML estimator developed by Silva & Tenreyro (2006) is used in order to reach consistent results in the presence of heteroscedasticity and values of zero in our dataset (up to 40%), which stands for a significant share. Heteroscedasticity is identified as a common problem for fixed

effects gravity estimations, being needed in order to take into account multilateral resistance and thus satisfy the theoretic micro-foundation by Anderson/van Wincoop (2003), which was originally developed for trade, but recently updated for FDI as well (Anderson et al. 2016, 2017); in this perspective, FDI is viewed in a knowledge-capital framework and can therefore be interpreted similar to trade in technology service. Technological capital (viewed as a "mobile good") can be used in several countries on a non-rival basis, whereas its value (in combination with capital, and therefore investment) differs across countries. Due to the insubstantial nature of knowledge capital, FDI flow or stock is used as measurement.[19]

As is usual amongst FDI gravity researchers, structural gravity with country fixed effects is chosen as a practical approach to FDI estimation where multilateral resistance is controlled for as unobservable, following Shepherd (2017). FDI inflows from origin *o* to destination country *d* in time period *t* depends on economic sizes *Y* of countries and trade cost. Time varying country and dyadic fixed effects (i.e. one dummy for each possible combination of two partner countries; direction matters) control for all kinds of time invariant variables as well as unobservables, which includes many policy variables in the OECD sample, as discussed above. Time fixed effects, i.e. one dummy for each year, are included in order to satisfy norms for panel estimations, since when estimating PPML in Stata, the program does not operate with common panel commands which are usually performed using OLS only. Distance as a time non-varying bilateral variable has to be excluded when introducing dyadic fixed effects. The dependent variable FDI inflow from origin to target country is therefore defined as follows:

$$lnFDI_{odt}^{inflow} = \alpha_0 + \alpha_1 lnX_{ot} + \alpha_2 lnX_{dt} + \alpha_3 Z_{od} + \delta_o + \delta_d + \delta_{od} + \tau_t + e_{odt}$$

with the following notation:

α_0 = regression constant (α_{1-x} are regression estimators respectively),
X_{ot} = origin country time variant characteristics (GDP, GDP per capita, corporate tax etc.),
X_{dt} = destiny country time variant characteristics (GDP, GDP per capita, corporate tax etc.),
Z_{od} = characteristic of the relationship between country-pairs, time invariant (distance between countries, contiguity, common language, cultural and colonial ties etc.),
$\delta_o, \delta_d, \delta_{od}$ = time invariant country and country-pair fixed effects (δ_{od} zeroize Z_{od}),

[19]An adaption of transportation costs might, however, make sense for future research, as we see in our literature review that direction and degree are fundamentally different when looking at horizontal or vertical FDI; as neither micro nor macro FDI data distinguishes here, application in empirical research is however questionable up to this point; Multilateral Resistance in terms of considering all possible locational factors (for horizontal and vertical FDI) should however be applied.

τ_t = time fixed effects,

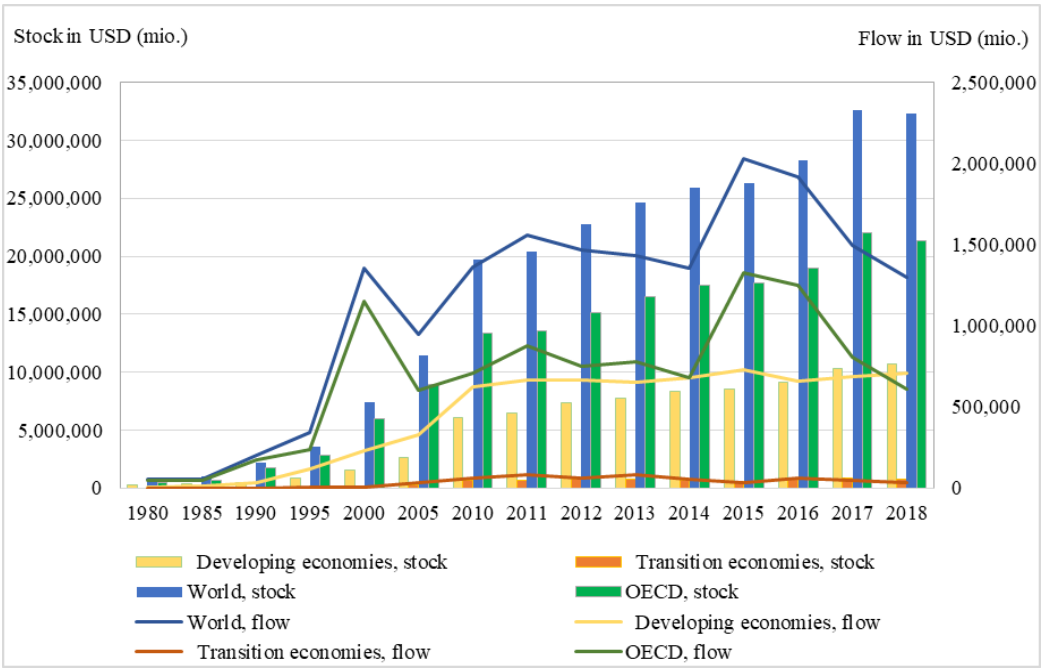
e_{odt} = error term.

It shall be noted that δ_{od} is not included in a pure country fixed setting, where we control for bilateral time invariant relationship via a different set of Z_{od} control variables provided by CEPII.

Data

Figure 1 shows the proportion of flows and stocks into OECD countries respective to global, transition and developing economies. With our OECD dataset, we cover a decreasing fraction of global FDI flows, which is mainly due to an overall decrease of FDI flows in 2017 and 2018, but also due to an increase to developing economies over the past years. It has to be noted, however, that numbers are constantly updated and corrected upward for the past one to three years due to delays in national data collection, which blurs data quality to some extent.

Figre 1. *FDI Flow and Stock for World, OECD, Developing- and Transition Economies*



Source: UNCTAD

Bilateral FDI flow data provided by the OECD is used as our dependent variable, even though UNCTAD aggregated data is used for descriptive (global) reasons. Flow rather than stock data is chosen in order to picture annual FDI decisions and relate them to same-year determining economic and political occurrences. Authors such as Dellis et al. (2017) and Wei (2019) argue that flows should be analyzed for FDI-entering decisions primarily, and also due to a book-value bias where FDI stock suffers from discrepancies between the original book

value and current market value. Stocks also face higher distortions due to exchange rate volatilities, which cannot be statistically proven for FDI flow analyses (Welfens & Baier 2018).

Following previous gravity FDI studies, annual lagging is not adequate as we suppose the processes towards national changes in corporate tax levels or engagement with international organizations are initiated with a period of a number of months or even years prior to enactment and ratification, respectively, and thus do not come as a surprise to decision makers in multinational companies. FDI data quality can in general be challenged a lot: whereas trade data is reliable up to a high degree as it is gathered and aggregated via global customs supervision, FDI data gathering is still somewhat in its infancy. National banks collect domestic firms' data on financial activities abroad, an international uniform approach is however not enforced.[20] National micro-databanks are usually of a better quality, but are also not gathered in a uniform manner when we examine micro databanks by the BIS or EUROSTAT and compare them with raw data they gather from national institutions as the Bundesbank for Germany, to name but one example.[21] In addition, raw data material gathered by national institutions are usually confidential and inaccessible to external researchers. We conclude that no general trend has emerged amongst researchers on what data type is the most appropriate, but the work of Baltagi et al. (2007), for example, points out that results are sensitive to the use of different types of data.

Evaluating the two common sources of bilateral FDI data, UNCTAD data is not used for several reasons; firstly, the time-frame only covers 2001-2012 which is perceived as being insufficient for general gravity panel studies, origin-destination reports differ too much for a large share of developing- and tiger states but also for industrialized countries, and a large number of no-observations is found for implausible country-pairs.[22] In opposition to that, OECD macro-data is compiled in a more uniform matter and available from 1985-2017, however the dataset is gathered with two different benchmark definitions (1985-2012 BMD3 and 2013-2017 BMD4) and therefore the two datasets have to be merged. The difference for the BMD4 is the introduction of splitting FDI on the basis of Special Purpose Entities (SPE) and non-SPE FDIs, where an SPE is defined as an entity with little or no physical presence in the respective country and which serves primarily for holding assets and liabilities or raising capital for the multinational firm (OECD 2015). Discussing the SPE FDI split in general makes sense for FDI gravity research, especially in the field of tax (avoidance), however this has to be left open for future research as most countries do not report splits as recommended by the OECD but instead report total FDI equal to non-SPE, indicating that the BMD4 guideline has not yet been successfully implemented. This however

[20]Even within the OECD, national banks vary in their requirements for reporting firms concerning business volume, amount of foreign investment activities, or treatment of multinationals with international shareholders.

[21]We gratefully acknowledge the opportunity to work with the Bundesbank MiDi-databank in 2018 and 2019.

[22]US-outflows to Japan are, for example, reported as being multiples of what Japan reports to receive from the US as inflows, while Belgium or the Netherlands barely receive any inflows, etc.

simplifies merging both datasets; in addition, a trend-break variable is introduced to control for a potential bias. We convert negative flow values to zero and exclude missing values, as explained in Welfens/Baier (2019).

Our independent variables are defined as described in table 1:

Table 1. *List of Variables*

Variables	Definition	Source
inflow	FDI inflow, from origin to target in current USD; Negative values to zero, excluding missing values	OECD FDI database; BMD3 data 1985-2012, BMD4 data 2013-2017
dist	Bilateral distance between two countries	CEPII GeoDist dyadic dataset; Mayer/Zignago (2011)
target_gdp	GDP of FDI target country, in current USD	World Bank
origin_gdp	GDP of FDI origin country, in current USD	World Bank
target_gdp_per_capita	GDP per capita of FDI target country, in current USD	World Bank
origin_gdp_per_capita	GDP per capita of FDI origin country, in current USD	World Bank
target_tax	General FDI target country corporate tax rates, including average/typical local taxes	Mintz/Weichenrieder (2010); KPMG (2017)
origin_tax	General FDI origin country corporate tax rates, including average/typical local taxes	Mintz/Weichenrieder (2010); KPMG (2017)
openness	total import plus total export of FDI target country, divided by its GDP	World Bank
contig	Dummy describing whether two countries are contiguous	CEPII GeoDist dyadic dataset; Mayer/Zignago (2011)
comlang_off	Dummy describing whether two countries share a common official language	CEPII GeoDist dyadic dataset; Mayer/Zignago (2011)
colony	Dummy describing whether two countries have had a common colonizer	CEPII GeoDist dyadic dataset; Mayer/Zignago (2011)
comcol	Dummy describing whether two countries have ever had colonial links	CEPII GeoDist dyadic dataset; Mayer/Zignago (2011)
bis	Target reports and provides (consolidated) data to the Bank for International Settlement[23]	Bank for International Settlements
ebrd	Target is shareholder country of the European Bank for Reconstruction and Development[24]	European Bank for Reconstruction and Development
adb	Target Regional and non-regional membership in the Asian Development Bank group	Asian Development Bank
miga	Target participation in programs ensured by the Multilateral Investment Guarantee Agency	Multilateral Investment Guarantee Agency

[23]Whether a country starts reporting in the first or fourth quarter is disregarded and only the year in which it started data interaction with the BIS is counted.
[24]The level of funds is not accounted, just whether interaction occurs.

We use the classical bilateral gravity variables identified and provided by CEPII researchers "contiguity", "common official language", "colony" and "common colony" as cultural barriers, as well as "distance" for physical barrier in country-fixed models as additional control variables. As those are time invariant, they are dropped for dyadic fixed effects where dummies for each possible country-pair are introduced. Institutional variables are dummies describing whether interaction/membership is in place or not; yearly fixed effects are utilized in all models.

Following Anderson & Yotov (2010, 2012), country and dyadic fixed effects validate our structural gravity estimations by dealing with issues of unobserved costs and potential data imprecisions; Fally (2012) adds that PPML estimators in fixed effects gravity perfectly fits the multilateral resistance terms and therefore our theoretical model, which is defended by Head & Mayer (2014) for the case of *heteroscedastic* data as ours (according to White- and Breusch-Pagan testing). Therefore from OLS estimators are forgone. Furthermore, tax, openness, GDPs per capita and GDPs are checked for endogeneity via the Durbin-Wu-Hausman test and are found to be *exogenous*. No serious *correlation* issue is found between our set of independent variables, however all models are also tested without "openness", as a correlation coefficient of 0.51 regarding "target_tax" is found; the effect on tax is found to be fairly small (the coefficient for tax changes from -1.97 (model (5), see below) to -2.11 when excluding trade openness as control variable). Therefore, "openness" is included as a control variable in all models presented subsequently. The following section presents all empirical findings.

Empirical Findings

Country-Fixed and Dyadic Fixed Estimations

In a first step, the data is split into several time periods beginning with 1985-2011 and then the data is extended by two years for each subsequent model, as widely varying results are found when evaluating previous research where data for various time frames was used.[25] Therefore, how the coefficients change over time is observable – as in Table 2.

Country and year fixed effects were included in models (1)-(4) but are not displayed for reasons of space. Standard errors were clustered by each possible country-pair in all models. We find a significant negative effect of distance, a significant positive effect of target country GDP and a significant negative effect of GDP per capita on FDI inflows across all time periods. Neither significances nor coefficient sizes change in a critical manner.

Regarding target country corporate tax level, the following is observed: An effect of -3.984*** (std.error 0.977) for the data period 1985-2011 (1), an effect of

[25]Many current FDI gravity researchers use OECD data up to 2012 only (BMD3), as the BMD4 data up to 2017 has just currently been released at the beginning of 2019, and merging BMD3 with BMD4 data has, according to the best of this author's knowledge, not been done so far; however, this is viewed this as unproblematic, as described below.

-3.653*** (std.error 0.914) for 1985-2013 (2), an effect of -2.298** (std.error 0.950) for 1985-2015 (3) and no significant effect in model (4) which covers the time period 1985-2017. Therefore, an increasing effect of corporate tax level as FDI attracting variable over time is noted.

Table 2. *PPML Panel Country-Fixed-Effects Estimation Results for FDI Inflow, by Time Periods*

	(1)	(2)	(3)	(4)
VARIABLES	inflow_11	inflow_13	inflow_15	inflow_17
ln_dist	-0.406***	-0.399***	-0.388***	-0.387***
	(0.0681)	(0.0661)	(0.0632)	(0.0612)
ln_target_gdp	4.521**	5.178***	4.821***	3.634**
	(1.852)	(1.642)	(1.430)	(1.419)
ln_origin_gdp	2.593*	2.785*	2.358	2.680*
	(1.549)	(1.442)	(1.577)	(1.394)
ln_target_gdp_per_capita	-3.699*	-4.297**	-3.868**	-2.581*
	(1.901)	(1.713)	(1.526)	(1.530)
ln_origin_gdp_per_capita	-1.716	-2.109	-1.638	-1.961
	(1.652)	(1.486)	(1.659)	(1.464)
target_tax	-3.984***	-3.653***	-2.298**	-1.165
	(0.977)	(0.914)	(0.950)	(0.927)
origin_tax	0.104	0.247	0.745	0.216
	(1.130)	(1.066)	(0.939)	(0.910)
openness	0.0804	1.210***	1.712***	1.800***
	(0.305)	(0.317)	(0.291)	(0.260)
contig	0.201	0.178	0.111	0.0783
	(0.157)	(0.155)	(0.156)	(0.161)
comlang_off	0.202	0.136	0.198	0.129
	(0.142)	(0.140)	(0.133)	(0.127)
colony	0.240**	0.313***	0.188	0.209*
	(0.120)	(0.110)	(0.115)	(0.110)
comcol	5.791***	5.694***	5.405***	5.357***
	(0.480)	(0.480)	(0.419)	(0.423)
bis	-0.342**	-0.396***	-0.420***	-0.376***
	(0.158)	(0.150)	(0.139)	(0.138)
ebrd	-0.591**	-0.646***	-0.567**	-0.501**
	(0.258)	(0.247)	(0.244)	(0.244)
adb	-0.285	-0.479	-0.591	-0.629
	(0.366)	(0.408)	(0.424)	(0.425)
miga	-0.0573	-0.0950	-0.0963	-0.0745
	(0.124)	(0.141)	(0.144)	(0.145)
Constant	-26.42**	-28.42***	-17.38*	-21.95**
	(10.49)	(9.240)	(10.54)	(10.14)
Observations	15,678	17,522	19,425	21,357
R-squared	0.484	0.481	0.466	0.461

*Hint: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

When viewing results for trade openness, the opposite effect is found: While in model (1) openness is not significant, it becomes significant in (2) (coefficient 1.210***, std.error 0.317), and the coefficients grow in model (3) (1.712***, std.error 0.291) and (4) (1.800***, std.error 0.260), indicating that trade openness of target country becomes an increasingly important FDI determinant.

While the dyadic gravity control variables seem not to be affected by the choice of data framework, relatively constant effects for our financial institutions are found: ADB and MIGA membership have no significant effect on FDI, while EBRD shareholder target countries and target countries which exchange data and cooperate with the BIS attract significantly less FDI in all models, albeit varying little between different time periods.

It is also interesting to comment on the R-squared in this framework, as with increasing observations from model (1) to model (4), a decreasing R-squared is observed which indicates that the additional observations increase the variance of the data and therefore decrease the fit of the model (Head & Mayer 2014; Shepherd 2017). If this is viewed in the context of observed FDI flow decrease in the more recent years, part of that effect could also be an unsatisfactory quality level of data, as data for the latter years gets constantly updated by gathering and aggregating micro data, a process which takes time. Therefore, the time frame from 1985-2015, i.e. model (3), is chosen and the variables added in a cumulative manner in order to observe potential interactions between the independent variables. Results are presented in Table 3.

At first sight, no noticeable incidents or major changes are observed, supporting the choice of control variables. It is, however, worth noting that when switching from model (5) to model (6), where the BIS variable is introduced, a minor increase of the magnitude of "target_tax" from -1.966** (std.error 0.950) to -2.222** (std.error 0.325) is observed.[26] This indicates two things: a) countries who are NOT cooperating and exchanging data via the BIS profit more, respectively, from a fall in the corporate tax rate, and b) as soon as countries exchange data and cooperate, corporate tax becomes a less important determinant for FDI. In addition, "openness" changes from model (7) (1.593***, std.error 0.325) to model (8) (1.713***, std.error 0.291)[27] and a minor increase of R-squared is observed as well; therefore, ADB and MIGA are included as control variables even though they have no significant impact on FDI flow. The fact that EBRD interaction has a negative effect on FDI inflows could be interpreted as an indication that EBRD as an institution works in the sense that the joint profit maximization of the OECD multinationals can take into account a broader range of investment opportunities abroad, naming in 49 post-socialist transition economies whose institutional reforms and infrastructure projects – often relevant for profitability – are reinforced by EBRD activities; the negative coefficient thus reflects enhanced investment opportunities abroad due to EBRD presence and is a special aspect that deserves further analysis in future research.

[26]The correlation coefficient between tax and BIS is noted with 0.20.
[27]The correlation coefficient between openness and ADB is noted with -0.19.

Table 3. *PPML Panel Country-Fixed-Effects Estimation Results for FDI Inflow, Cumulative, 1985-2015*

	(5)	(6)	(7)	(8)	(3)
VARIABLES	inflow	inflow	inflow	inflow	inflow
ln_dist	-0.389***	-0.388***	-0.388***	-0.388***	-0.388***
	(0.0633)	(0.0633)	(0.0633)	(0.0632)	(0.0632)
ln_target_gdp	3.996***	4.512***	4.542***	4.779***	4.821***
	(1.412)	(1.407)	(1.409)	(1.406)	(1.430)
ln_origin_gdp	2.320	2.353	2.354	2.357	2.358
	(1.582)	(1.579)	(1.578)	(1.578)	(1.577)
ln_target_gdp_per_capita	-3.081**	-3.593**	-3.620**	-3.823**	-3.868**
	(1.510)	(1.495)	(1.497)	(1.501)	(1.526)
ln_origin_gdp_per_capita	-1.582	-1.632	-1.633	-1.637	-1.638
	(1.664)	(1.659)	(1.659)	(1.659)	(1.659)
target_tax	-1.966**	-2.222**	-2.244**	-2.290**	-2.298**
	(0.950)	(0.946)	(0.948)	(0.947)	(0.950)
origin_tax	0.723	0.739	0.738	0.740	0.745
	(0.933)	(0.936)	(0.936)	(0.938)	(0.939)
openness	1.566***	1.591***	1.593***	1.713***	1.712***
	(0.323)	(0.325)	(0.325)	(0.291)	(0.291)
contig	0.110	0.110	0.110	0.111	0.111
	(0.156)	(0.156)	(0.156)	(0.156)	(0.156)
comlang_off	0.198	0.198	0.198	0.198	0.198
	(0.134)	(0.133)	(0.133)	(0.133)	(0.133)
colony	0.187	0.188	0.188	0.187	0.188
	(0.115)	(0.114)	(0.115)	(0.115)	(0.115)
comcol	5.392***	5.403***	5.403***	5.404***	5.405***
	(0.421)	(0.420)	(0.420)	(0.419)	(0.419)
bis		-0.427***	-0.428***	-0.459***	-0.420***
		(0.154)	(0.154)	(0.151)	(0.139)
ebrd			-0.553**	-0.567**	-0.567**
			(0.244)	(0.244)	(0.244)
adb				-0.590	-0.591
				(0.424)	(0.424)
miga					-0.0963
					(0.144)
Constant	-17.72*	-17.06	-17.34	-17.45*	-17.38*
	(10.56)	(10.54)	(10.55)	(10.53)	(10.54)
Observations	19,425	19,425	19,425	19,425	19,425
R-squared	0.463	0.464	0.464	0.466	0.466

*Hint: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

In Table 4 the results for the country-fixed model (3) are compared with the dyadic-fixed model (9), as proposed as an alternative (or even improved) methodology in literature.

Table 4. *PPML Country-Fixed Versus Dyadic-Fixed Results, 1985-2015*

	(3)	(9)
VARIABLES	inflow	inflow
ln_dist	-0.388***	
	(0.0632)	
ln_target_gdp	4.821***	4.793***
	(1.430)	(1.461)
ln_origin_gdp	2.358	2.104
	(1.577)	(1.640)
ln_target_gdp_per_capita	-3.868**	-3.864**
	(1.526)	(1.560)
ln_origin_gdp_per_capita	-1.638	-1.469
	(1.659)	(1.730)
target_tax	-2.298**	-2.417**
	(0.950)	(0.946)
origin_tax	0.745	0.101
	(0.939)	(0.914)
openness	1.712***	1.655***
	(0.291)	(0.289)
contig	0.111	13.46***
	(0.156)	(3.275)
comlang_off	0.198	7.282
	(0.133)	(4.753)
colony	0.188	-1.265
	(0.115)	(3.325)
comcol	5.405***	6.688***
	(0.419)	(2.368)
bis	-0.420***	-0.362***
	(0.139)	(0.135)
ebrd	-0.567**	-0.513**
	(0.244)	(0.251)
adb	-0.591	-0.609
	(0.424)	(0.412)
miga	-0.0963	-0.0678
	(0.144)	(0.144)
Constant	-17.38*	-36.83***
	(10.54)	(7.800)
Observations	19,425	18,710
R-squared	0.466	0.541

*Hint: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

Model (9) excluded 157 regressors (country-pair dummies) to make sure that the estimates exist (too few observations), leaving 18,710 observations instead of 19,425 observations for model (3); Distance as a time non-varying variable is also excluded in the dyadic model. For model (3) it should be noted that the coefficient is in line with the literature, the same holds for GDP and GDP per capita of the FDI receiving country in models (3) and (9). It is however very surprising that the results, and even R-squared, for both models vary only slightly; this comparison

has – according to author's knowledge – not been done so far in previous gravity FDI flow research.[28] The result for corporate tax is slightly higher in model (9) with a coefficient of -2.417** (std.error 0.946), the coefficients for BIS and EBRD are slightly smaller than in (3); further control variables remain basically the same.

Empirical Findings

We use model (3) and model (9) for evaluating our country and dyadic results, and will additionally critically discuss the findings in model (4).

- GDP of target country, our proxy for economic size, is found positive in model (3) with a coefficient of 4.821*** (std.error 1.430) and positive in model (9) with a coefficient of 4.793*** (std.error 1.461).

  ➔ **Hypothesis 1 is accepted**; an increasing economic size of the FDI target country increases the FDI inflow into that country.

- GDP per capita is as well almost equal in model (3) and model (9) with a coefficient of -3.868** (std.error 1.526) in the country fixed case; increasing GDP per capita therefore decreases FDI inflows into that country, representing locational advantages for FDI in the producing sector where wages play an important role.

  ➔ **Hypothesis 2 is accepted**; an increasing GDP per capita on the part of the FDI target country decreases FDI inflows into that country.

- Distance is only measured in model (3) where it is found to be highly negatively significant with a coefficient of -0.388*** (std.error 0.063), meeting previous findings in the literature.

  ➔ **Hypothesis 3 is accepted**; an increasing distance between two interacting countries decreases the FDI inflows into that country.

- The corporate tax rate of the target country is found to be negatively significant in model (3) with -2.298** (std.error 0.950) and in model (9) with -2.417** (std.error 0.946); the corporate tax level is therefore proven to be an important determinant for FDI inflows; a drop of 1 percentage point of corporate tax will lead to approximately 2.3% -

[28]This is very useful for gravity researchers, as dyadic fixed effects estimations with many countries and observations are associated with sometimes quite high operating expenses in the sense of time and computing power, not speaking of frequently occurring failures or infinite iterating when calculating in Stata; for an econometric discussion see Stamman et al. (2016) and Stammann (2018).

2.4% more FDI inflows, which meets the result frame of a majority of previous studies targeting corporate tax and FDI.

➔ **Hypothesis 4 is accepted**; increasing the level of corporate tax for the FDI target country results in decreasing FDI inflows.

- The variable "origin_tax" which describes the corporate tax level in the FDI sending country is not found to be significant in any of our models.

  ➔ **Hypothesis 5 is rejected**; a high domestic corporate tax level does not lead to significantly more FDI outflows. Corporate tax therefore has no effect on whether or not FDI decisions are made, but does have an effect on the decision to which country the FDI will go.

- Looking at the results for "target_tax" in Table 2, a strongly decreasing effect of corporate tax over time is found, which however is still significant in models (1)-(3) but loses significance in model (4). Especially when extending the data from 2013 to 2015, the variable experiences a vast drop. There is a variety of reasons why this might be the case, which is discussed in below; nevertheless, it can be speculated that the tax variable will regain its significance when the time frame is extended up to 2019 or 2020.

  ➔ **Hypothesis 6 is accepted**; the negative corporate tax-FDI relationship vanishes over time.

- The BIS variable is found to be highly significant with -0.420*** (std.error 0.139) in model (3), and -0.362*** (std.error 0.135) in model (9); we as well find EBRD shareholders with -0.567** (std.error 0.244) in (3) and 0.513** (std.error 0.251) in (9) respectively; ADB and MIGA are not found to be significant.

  ➔ **Hypothesis 7 is accepted**; it is found that especially interaction with institutions is what matters here, and simple membership is a rather bad proxy; in addition, it is found that exchanging financial data via the BIS has an effect on the tax variable, as the degree of the effect on FDI inflows increases for countries who do not share data with the BIS. The effect is however decreasing as well, and expected to vanish with political disintegration in other fields as trade for example; while trade openness is only included as control variable in the underlying research, it is nevertheless important to note an increasing and quite impactful effect on FDI over time.

Conclusion and Policy Implications

Bilateral FDI flow data from 1985-2017 for all OECD countries is evaluated, and a dataset – which has not been utilized for gravity equations up to this point – is compiled in order to clarify the role of corporate tax levels on firm decisions whether and where to invest. In the course of the research, the need to control for interaction with international financial institutions is identified. The empirical findings are consistent with a majority of previous findings and additionally expand the available knowledge about FDI and tax by providing new results relevant for policy makers.

The results assert that the role of corporate tax has been overestimated so far on FDI target decision, and additionally has no significant impact at all on the question of whether or not to invest, but rather on where to invest. While this research is almost entirely consistent with the numbers proposed by Feld & Heckemeyer (2011), after controlling for an (overestimating) publication bias, of a 2.28% FDI increase with 1 percentage point drop of corporate tax level, whereas model (3) presented herein determines a 2.298% FDI increase, there is sufficient reason to argue that the actual impact is even lower when considering a macro-data bias.[29] In addition, it is found that the impact of corporate tax decreases over time, and in fact has no impact on FDI when utilizing the dataset up to 2017. It is however reasonable to question the data quality of newer observations (2017) as the BMD4 databank is currently still getting updated almost weekly. The corporate tax reduction conducted in the US in 2018, for which data is not yet available, however, has the potential to reflect a comeback of significance for the tax variable; the reason might primarily lie in the leading role the US has as FDI attractor in the data, but also the current "America First" strategy by president Trump.

Increasing unilateralism, along with economic and political disintegration encourage aberrations in terms of national strategies vis-á-vis fiscal politics and retreating engagement in international cooperation and institutions, which is proxied in the present research with several financial institutional dummies. While pursuing this kind of unilateralist and individualist approach will attract additional FDI as long as it is an international outsider strategy, the effect will vanish as soon as more and more countries "drop out" of the global cooperation network.[30] Furthermore, it is shown that international cooperation leads to a decreasing effect of FDI attractiveness via a low corporate tax level, or put differently, fights/ prevents micro-level tax avoidance strategies and tax havens, assessed as being damaging to the global economy (Bolwijn et al. 2018). The choice of proxies for international financial cooperation works with regard to capturing unobservables which can be described by the OECD BEPS program as well, which analyzes shortcomings and aims to improve enforcement of international law, fair taxation and rule-setting.

[29]The usage of macro data is likely to overestimate the effect of tax, as this is mainly relevant for larger multinationals which stand for a major share of the data.

[30]The same accounts for corporate tax levels; as soon as an international downward tax reduction begins, the effect for single deviator vanishes and everyone will be worse off.

From a qualitative perspective, Taubenheim & Mrkvicka (2018) rank the US in particular as being problematic case for taxing foreign facilities in 2017/2018, even though various international tax cooperation laws are in force. This might also indicate that the willingness for implementation is not always fully present in bilateral relationships, and the target country's corporate tax level can be an investment incentive – even in the presence of double-taxation-credit treaties, a discussion started by Slemrod back in 1990 but still lacking in theoretical explanation.

As a concluding remark, the reader is referred to the two quotations in the beginning of this paper: While it is statistically proven that reducing corporate tax levels leads to increasing FDI inflows, this effect is smaller than expected and vanishes over time due to other gains from international cooperation; if deviation from international cooperation is chosen as a national strategy (unilateralism), tax however gains importance. Unilateralism on the other hand trigger various effects decreasing FDI inflows, as trade openness is likely to decrease (and is of increasing importance for FDI, see Table 2), the opportunity costs for other nations to themselves deviate decrease and therefore bilateral tax differences are likely to decrease as well; which will further reduce the effect of low tax levels in the long run (see Footnote 29). Implementing low corporate tax levels in order to keep domestic firms within the country and reducing their incentives to invest abroad are not found to be relevant.

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Appendix

Table A1. *Average Corporate Tax Rates in OECD Countries, in %*

Countries	**1990**	**1995**	**2000**	**2005**	**2010**	**2015**
Australia	39	36	34	30	30	30
Austria	30	34	34	25	25	25
Belgium	40	40.2	40.2	33.9	33.9	33.9
Canada	41.5	42.9	42.4	36.1	31	26.5
Chile			15	17	17	24
Czech Republic		41	31	26	19	19
Denmark	40	34	32	28	25	22
Estonia			26	24	21	20
Finland	44.5	25	29	26	26	20
France	42	36.7	37.8	33.83	33.33	33.33
Germany	54.4	55.1	52	38.31	29.41	29.72
Greece	46	35	40	32	20	29
Hungary	40	18	18	16	19	19
Iceland			30	18	18	20
Ireland	43	38	24	12.5	12.5	12.5
Israel			36	34	25	25
Italy	46.4	53.2	37	37.25	31.4	31.4
Japan	50	50	40.9	40.69	40.69	33.86
Korea			30.8	27.5	24.2	24.2
Latvia				15	15	15
Lithuania				15	15	15
Luxembourg			37.5	30.38	28.59	29.22
Mexico	36	34	35	30	30	30
Netherlands	35	35	35	31.5	25.5	25
New Zealand	33	33	33	33	30	28
Norway	50.8	28	28	28	28	27
Poland		40	30	19	19	19
Portugal	40.2	39.6	35.2	27.5	25	21
Slovak		40	29	19	19	22
Slovenia			25	25	20	17
Spain	35	35	35	35	30	28
Sweden	53	28	28	28	26.3	22
Switzerland	30.6	28.5	24.9	21.99	18.75	17.92
Turkey			33	30	20	20
UK	34	33	30	30	28	20
USA	38.7	39.6	39.3	40	40	40

Source: Mintz & Weichenrieder (2010), KPMG (2017)

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Public Finance Management: Challenges and Opportunities

By Liudmila Tkachenko[*]

The paper reveals the essence of the system of public financial management (PFM), defines its key elements of PFM system and articulates goals and objectives. The author's definition of PFM is given. A comparative analysis of managerial financial cycles in the public and private sectors of the economy is carried out. The historical aspect of the PFM reforms is also analyzed, and various approaches to financial management (income and expenditure) in the public sector are studied. Factors influencing the effectiveness of the PFM reforms are revealed. The challenges faced by financial managers in implementing public finance reforms are analyzed, and the opportunities that can be used to achieve the objectives of the PFM system, some of which are simultaneously challenges (Blockchain and open government data (OGD)), are analyzed. (*JEL* H5, H50)

Keywords: *Public Finance Management, Efficiency of PFM Reform, Key Elements of the PFM System, Blockchain in the Public Sector, Open Government Data.*

Introduction

The public sector of the economy, as a rule, established itself as a leading choice in the economy of developed countries. The effective functioning of this sector depends on qualified management, to make management decisions with respect to such organizations.

It should be noted that the most modern management technologies in the field of finance developed and proved to be successful in practice for commercial organizations. Commercial organizations are aimed at profit and welfare of its shareholders. These goals are easily measurable and formalized in enough indicators showing the achievement of the organization's business objectives.

The entities of the public sector are significantly different from commercial organizations. The purpose of entity of public sector is to provide public goods, such as services in the field of law enforcement, health, education and others, rather than increasing shareholder wealth. The economic effect of such services is difficult to measure. The effect of the provision of those services cannot be measured by referring to the cost benefits, because the benefits of such services are impossible to calculate in monetary terms. For example, benefits from the provision of health services, is to increase the public health of the nation. The complexity in measuring of the effectiveness of public sector entities requires the

[*]Associate Professor, Department of Finance and Accounting, Institute of Economics and Management, National Research Tomsk State University, Russia.

use of appropriate tools by management in the field of public finance management.

To date, there is no single approach to understanding what public financial management is. Clarity in the definition will allow to more clearly formulate the principles that will serve as the basis for building the structure and processes of financial management in the public sector to identify existing problems and the lack of resources. The main goal of building these processes is to improve the efficiency of public finance management, increase the transparency of the budget process, and increase the accountability of the subjects of their processes. In most cases, the achievement of these goals requires large-scale reforms in this area affecting related sectors of the economy (for example, the private sector) and the involvement of a large number of actors (for example, civil society) in this process.

At the present stage, governments of different countries in the implementation of PFM reforms face different challenges. So, the complexity and multiplicity of the process of managing public finances, in itself, is a challenge for those responsible for the results of this process.

Governments of various countries are under pressure to improve public sector performance and at the same time contain expenditure growth. While factors such as ageing populations and increasing health care and pension costs add to budgetary pressures, citizens are demanding that governments be made more accountable for what they achieve with taxpayers' money. (Curristine et al. 2007: 2)

In addition, the modern stage of public finance management is complicated by the presence of such phenomena as: the global economic crisis; globalization, exacerbating the effects of the crisis; terrorism; disease; public opinion, rapidly emerging in social networks; new technologies; uncertainty and other factors.

In modern conditions, public finances managers have to take into account a variety of factors and various risks in order to solve the tasks set by the society for effective financial management. To this end, public finance managers are forced to change approaches to management from traditional to new approaches.

New financial technologies, such as blocking, can be classified as new approaches to financial management in the public sector. This technology is known, to a greater extent, in connection with financial markets. However, such properties of this technology as the availability of data and the inability to hide the change in information (about changes become known to all participants in the chain) with haste can also be used in the management of public finances.

Undisputed challenge and the opportunity to improve all processes in financial management are open government data (OGD), the usefulness of which is their accessibility and the ability to use all participants in the budget process to solve various tasks. However, it must be remembered that these data should be presented within certain limits, so as not to create threats to state security. In addition, the use of these data imposes an additional responsibility on all users to maintain confidentiality.

The present study is devoted to the search for answers to the following questions: what is Public Financial Management (PFM); are there differences in

financial management cycle in the public and private sectors of the economy; what are the key elements of the PFM system; which means an effective PFM system and its objectives; what approaches to reform implementation exist; what factors influence the effectiveness of PFM reforms; what are the challenges and opportunities for the PFM to achieve the goal.

Literature Review

This literature review consists of a review of existing publications by research theorists who have studied issues of reforming PFM, the key elements of such a complex process, which is the issue of PFM, issues of evaluating the effectiveness of PFM, and practitioners in public finance.

To reveal the relevance of the research topic and justify its choice, the following works were used as sources: PEFA 2009, 2016, Curristine et al. 2007, Global Financial Management Leaders Survey 2015.

Thus, in particular the source of PEFA 2009, 2016, is a methodological guide for assessing the quality of financial management in the public sector, describes its key elements and indicators of evaluation.

The article by Curristine et al. (2007), briefly discusses potential key institutional factors that can contribute to improving the efficiency of the public sector. The authors argue that there is enough evidence that some institutional variables help improve efficiency, mainly: functional and political decentralization to subnational governments; certain human resource management practices; and scale up operations. However, the most notable conclusion is the lack of empirical data and a systematic assessment of the effect of institutional variables on performance. (Curristine et al. 2007: 32)

Further, literature review is presented in the context of scientific issues studied in the "Research Questions" section of this paper.

The Definition of Public Financial Management (PFM)

Any research requires clarification of the definitions used in it. That is why at the beginning of the paper the analysis of the existing definitions of public finance management was conducted.

Thus, the existing definitions of financial management, formulated by researchers (Erasmus and Visser 2002), practitioners (Lawson 2015), found in the methodological literature (PEFA 2016) and reference literature (Order of the Ministry of Finance of Russia 2017) were analyzed. The analysis made it possible to identify the shortcomings of the existing definitions of the PFM and to formulate the author's definition.

Finance Management Cycle in Public and Privet Sector of the Economy

In the context of this research topic, it is useful to study the elements of the financial management cycle in the public sector.

The most successful publication covering the content of the financial management cycle, in the opinion of the author of this paper, is the publication (Lawson 2015).

In addition to this, a comparative analysis was conducted of the elements of the financial management cycle in the public and private sectors of the economy. Analysis of the elements of the financial management cycle in the private sector is based on the practical experience of the author of this paper.

Key Elements of the PFM System

For a more detailed analysis of key elements of public sector financial management that contribute to the efficient management of public finances, studies have been conducted (Rakner et al. 2004) and Killick (2005).

The analysis of the above sources allowed to focus on the gap between the legally defined principles of public finance management and informal practices that simulate the process of cost allocation in accordance with the budget estimates.

PEFA (Public Expenditure and Financial Accountability 2016) and Guthrie (2005) were used to investigate the size and order of the public sector financial management system. The study of these sources allowed us to determine the key elements of the PFM system, the presence of which will allow increasing its efficiency (PFM system).

Effective PFM System and Its Objectives

Key aspects of the PFM system have been identified and main objectives were made possible by examining the PFM practice works (Lawson 2015).

Different Approaches to PFM Reform

A detailed analysis of PFM reforms and existing approaches to revenue and expenditure management in the public sector was facilitated by the work (Review of Public Financial Management Reform Literature 2009).

This paper explores the experience of reforming public financial management and was commissioned by DFID on behalf of the Ministry of Foreign Affairs of the Netherlands, the Swedish International Development Cooperation Agency (SIDA), Canadian International Development Agency (CIDA) and the African Development Bank (AfDB). This review will be useful to all researchers interested in the issues of reforms in the management of public finances and their evaluation.

Factors Affect the Effectiveness of PFM Reforms

Successful implementation of reforms in the PFM in each country requires certain resources and capacities. The work (Olander 2007) describes four interrelated elements that need to be considered when assessing and developing the capacity of a PFM.

PFM Issues and Opportunities

In addition to the traditional and current problems faced by all subjects related to the management of public finances, there are problems caused by globalization, new technologies (blockchain) and the informatization of society.

To conduct a risk analysis and challenges that need to be considered when managing finances in the 21st century, work was useful (Baubion 2013).

An invaluable contribution was made by work (Berryhill et al. 2018) on the use of blockchain technology in the public sector.

In covering questions about open government data (CRP), the work of (Ubaldi 2013) was helpful.

Research Methods

The main method of this scientific research was to review scientific sources (such as books, journal articles, guidelines, laws and abstracts) on the topic of publication. This review was aimed at analyzing, interpreting and critically evaluating the literature. Sources were synthesized to identify patterns, conflicts, and gaps. As a result, the author of this article shows the state of modern knowledge regarding the problems of research.

Research Questions

The Definition of Public Financial Management (PFM)

Public Financial Management (PFM) has seen rapid innovation over the past decade. Once focused narrowly on budgeting, PFM's scope has expanded dramatically, drawing new ideas and reforms from all corners of economics, political science, accounting and public administration. Its evolution has long to run but has already resulted in the emergence of, what the IMF describes as, 'ground-breaking' multidisciplinary public financial management practices. (Global Financial Management Leaders Survey 2015).

Any scientific study requires clarity of the key definitions that are used in it. It should be noted that there is the lack of an unambiguous approach to the definition of financial management in the public sector to date.

Table 1 contains several definitions of PFM. The first three definitions are taken from different sources. Typically, they contain information that PFM is a set of established rules, tools and processes. Existing definitions of PFM do not contain the objective of managing financial resources and do not take into account the risks associated with this process.

Table 1. *Analysis of Definitions of Public Financial Management*

Sources of definitions	Definitions
PEFA[31]	System of tools for assessing public finances within the four stages of the budget process, aimed at achieving three main results: overall budgetary discipline, strategic sharing of resources, efficient use of resources to provide services.
Erasmus and Visser [32]	The activities of civil servants, including decision-making and other functions that allow to determine the optimal ways of using limited resources for effective achievement of political goals.
Lawson[33]	PFM is the set of laws, rules, systems and processes used by sovereign nations (and sub-national governments), to mobilize revenue, allocate public funds, undertake public spending, account for funds and audit results.
Ministry of Finance of Russian Federation[34]	A set of processes and procedures that ensure the effectiveness and performance of the use of budgetary funds and cover all elements of the budget process (budget planning, budget execution, accounting and reporting, internal control and audit).
Author's Definition	A system of principles and methods for the development and adoption of managerial decisions by public authorities and non-profit organizations regarding the formation, distribution and effective use of financial resources with the aim of improving the well-being of the country's population, involving the systematic monitoring of these decisions, as well as identifying emerging risks and the development of measures to prevent them.

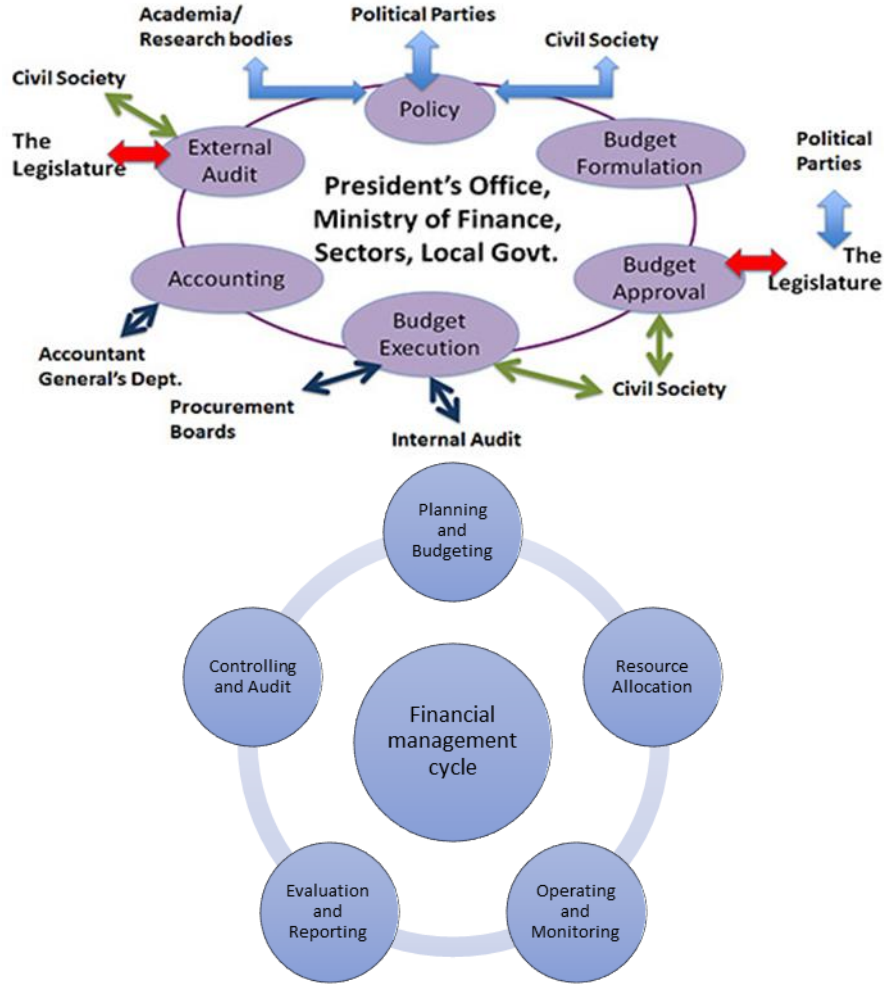
Therefore, based on the analysis of the existing definitions of the PFM, the author of this paper proposed his own definition, which eliminated the shortcomings mentioned above.

Finance Management Cycle in Public and Privet Sector of the Economy

While PFM definitions continue to vary, it is increasingly recognized that it covers not only technical accounting issues but also overall taxation, costs and debt management of the government, which in turn affects the allocation of public financial resources and income distribution. There is also a tendency to the fact that this is not a purely technical system or a set of subsystems, but a system of multiple role players, complex relationships and dynamic and interrelated processes, as shown in Figure 1.

[31]PEFA Assessing Public Financial Management. Washington DC 20433, USA, February. A Framework for 2016.
[32]Erasmus and Visser (2002: 983).
[33]Lawson (2015).
[34]Order of the Ministry of Finance of Russia from 16.12.2017 № 62n "On the organization of monitoring the quality of financial management, implemented by state administrators of budget funds of the federal budget".

Figure 1. *Finance Management Cycle in Public and Privet Sector of the Economy*

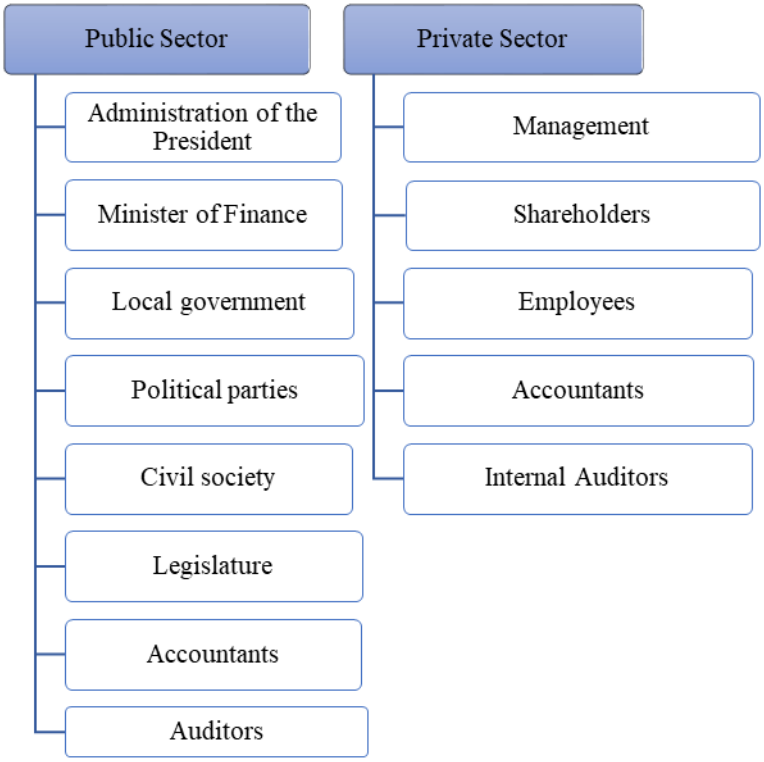


Source: Lawson (2015) & Author.

Comparative analysis of PFM and FM cycles allows to draw a conclusion about the similarity of the financial management process itself. So, both cycles include the planning and budgeting phase, the budget approval phase, the accumulation and retrieval phase of the resources needed to achieve the goals and objectives, the accounting and reporting phase, the monitoring phase, and the auditing phase.

However, if we compare the participants taking part in these processes, we will notice that the participants in the PFM are much more than in FM. The results of the analysis are shown in Figure 2.

Figure 2. *Comparative Analysis of Actors Involved in Financial Management in the Public and Private Sectors of the Economy*



Source: Compiled by the Author.

A significant number of actors involved in the public finance management cycle require coordination, approval and evaluation of the actions and outcomes of these actions at each stage of the PFM cycle from the point of view of each participant. Each participant in this process has its own interests to its results and an understanding of its effectiveness. The complexity of harmonizing actions and, taking into, account the views of all actors is in itself a challenge. It is necessary to ensure the effectiveness, transparency and accountability of the PFM process.

Describing the role of each actor in this process, it should be noted the unqualified importance of professional specialists in this process, such as accountants, auditors, lawyers, managers, procurement specialists and taxes. Thanks to the efforts of these specialists, a complex PFM process can technically be implemented.

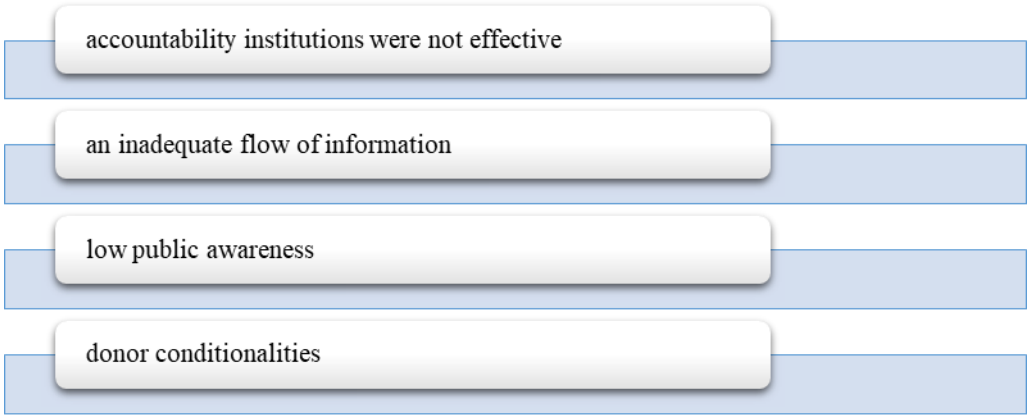
A significant role in this process belongs to the central government of each jurisdiction and to local governments. The role of the government as an executive body in this process is to distribute public financial resources for various purposes.

A special role in this process belongs to civil society. The requirements of civil society to increase transparency and accountability in the management of public financial resources are constantly increasing and are a challenge now, which the government must constantly respond to.

Key Elements of the PFM System

It should be noted that due to the politicized nature of the process of agreeing, adopting and approving the budget, some researchers note a gap between official institutions (how they should work) and informal practices (how everything works). Informal practices often "make the system work", but, can slow development and generate corruption. Rakner et al (2004: 54) describe the budgetary process as a "theater", which masks the actual allocation of resources and expenditure patterns. Killick (2005) concludes that this undermining of official institutions leads to large deviations between budget estimates and actual expenditures. The reasons that led to this you can see on Figure 3.

Figure 3. *The Reasons of Large Deviations Between Budget Estimates and Actual Spending*



Source: Compiled by the Author.

To solve these problems, key elements of the PFM system were identified. We investigated the critical dimensions identified by PEFA (Public Expenditure and Financial Accountability 2016)[35] and Guthrie (2005), compared them and concluded that most of these key elements coincide, but some differences were found.

PEFA identifies the critical dimensions of an open and orderly PFM system. They are:

i) budget comprehensiveness transparency;
ii) policy based budgeting;
iii) predictability and control in budget execution;
iv) accounting and reporting;
v) external scrutiny and audit;
vi) budget credibility.

It is important to remember that public finance comprises a complex set of closely interrelated subsystems (e.g. tax and customs, budgets, expenditure, inter-

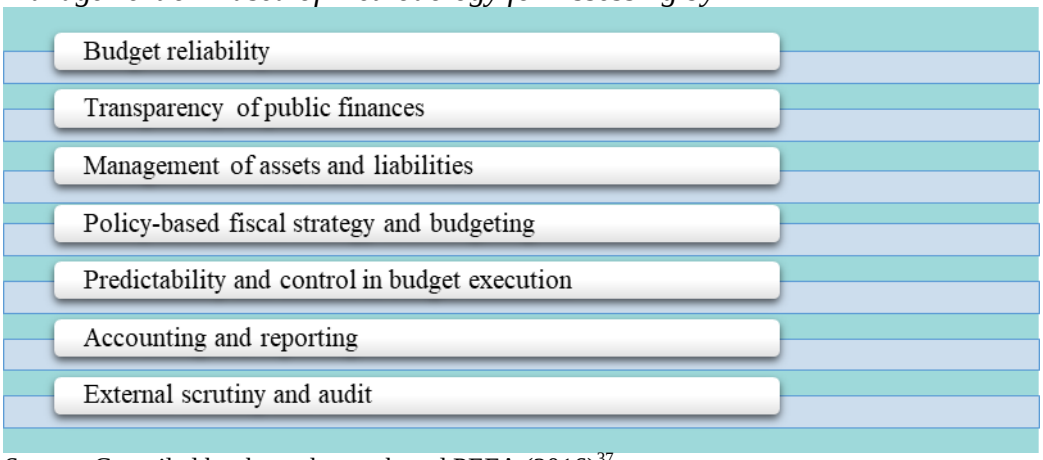
[35]https://pefa.org/content/pefa-framework.

governmental finance, parliamentary oversight, internal and external financial control). Reforming a particular subsystem may have consequences for a number of related areas. Guthrie identifies five key dimensions to New PFM[36]:

i) changes to financial reporting systems (cash to accrual);
ii) devolution of budgets;
iii) market based costing and pricing systems;
iv) a performance measurement approach and
v) performance based (internal and external) auditing.

We compared the key elements of PFM from different sources and came to the conclusion that the content of most elements coincides. For example, in both analyzed sources there are elements such as budget transparency, accountability and reporting, control and audit. Despite the fact that PEFA alone does not include such an element as an efficiency measure, it is certainly present, because "PEFA is a methodology for assessing public financial management performance. It identifies 94 characteristics (dimensions) across 31 key components of public financial management (indicators) in 7 broad areas of activity (pillars)" (Figure 4).

Figure 4. *Seven Areas of Performance Assessment of Public Financial Management on Based of Methodology for Assessing by PEFA*



Source: Compiled by the author on based PEFA (2016)[37].

The PEFA program provides a framework for assessing and reporting on the strengths and weaknesses of public financial management (PFM) using quantitative indicators to measure performance. PEFA is designed to provide a snapshot of PFM performance at specific points in time using a methodology that can be replicated in successive assessments, giving a summary of changes over time.[38]

[36]Review of Public Financial Management Reform Literature (2009). London: DFID.
[37]https://pefa.org/sites/default/files/PEFA_2016_Framework_Final_WEB_0.pdf.
[38]https://pefa.org/what-pefa.

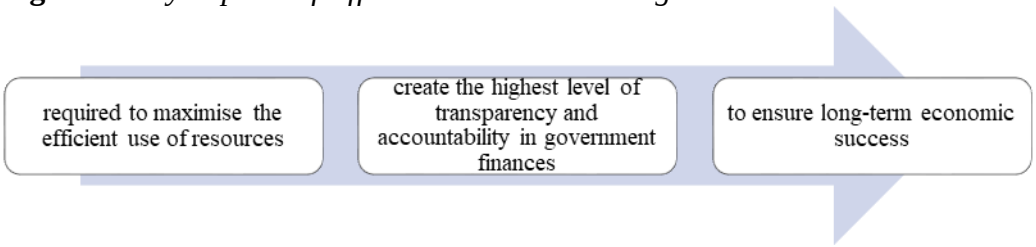
Returning to the comparison of key elements, it is necessary to recall that the Guthrie selects an element "market based, costing and pricing systems", that PEFA does not have.

With regard, to the use of market pricing in the public sector, each jurisdiction solves this problem in its own way. For example, the cost of the educational service provided by the university in the Russian Federation on a budgetary basis is calculated at standard costs approved by the Ministry of Science and Higher Education of the Russian Federation. At the same time, the price of an educational service provided on a paid basis cannot be lower than the price of a similar service on a budgetary basis. The system of market pricing in this case is practically impossible to apply, because if the demand for this educational service is small, the market price may be lower than the standard cost, which cannot be applied, because this is a violation of the law.

Effective PFM System and Its Objectives[39]

Effective Public Financial Management (PFM) systems are required to maximize the efficient use of resources, create the highest level of transparency and accountability in government finances and to ensure long-term economic success, as shown in Figure 5.

Figure 5. *Key Aspects of Effective Financial Management*

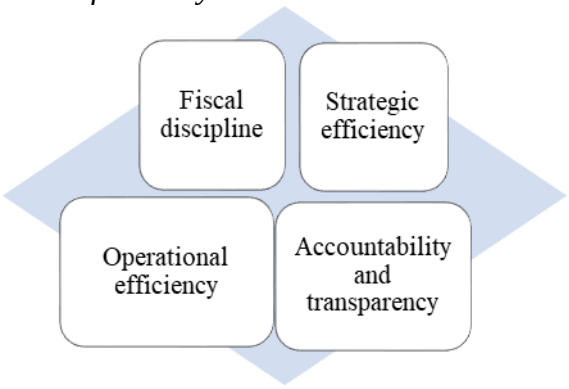


Source: Compiled by the author on the basis of Lawson (2015).

From the requirements of effective financial management, we can formulate its objectives, which are presented below in Figure 6.

[39]Measuring the effectiveness of any process, especially such a complex one as financial management in the public sector, deserves close attention and special research. Detailed consideration of approaches to measuring PFM performance is not expected in this article.

Figure 6. *Objectives of PFM System*



Source: Compiled by the author on the basis of Lawson (2015).

The primary objective of the PFM system is to maintain budgetary discipline. Fiscal discipline should ensure that the level of tax collection and public expenditure is consistent with the objectives of the budget deficit. It should ensure that government borrowing is not generated.

Secondly, the PFM system should ensure the efficiency of the allocation of public resources, namely the compliance of allocated state resources with strategic state programs.

Thirdly, this PFM system should provide operational efficiency, namely, the achievement of a price-quality ratio in the delivery of services.

Finally, the PFM system should be transparent, open, with the obligatory presence and control and accountability of the persons responsible for the use of public financial resources.

To achieve the goals of financial management in the public sector at the current stage, many governments are implementing PFM reforms. To understand the essence of these reforms, the historical aspect of the transformations in the field of public finance was considered.

Different Approaches to PFM Reform

During the seventies and eighties, OECD countries (the Organization for Economic Cooperation and Development) and some developing countries began to review the management of their public sector, as shown in Figure 7. By the mid-1990s, scientists and practitioners realized that the portability of these ideas to developing countries was facing challenges.

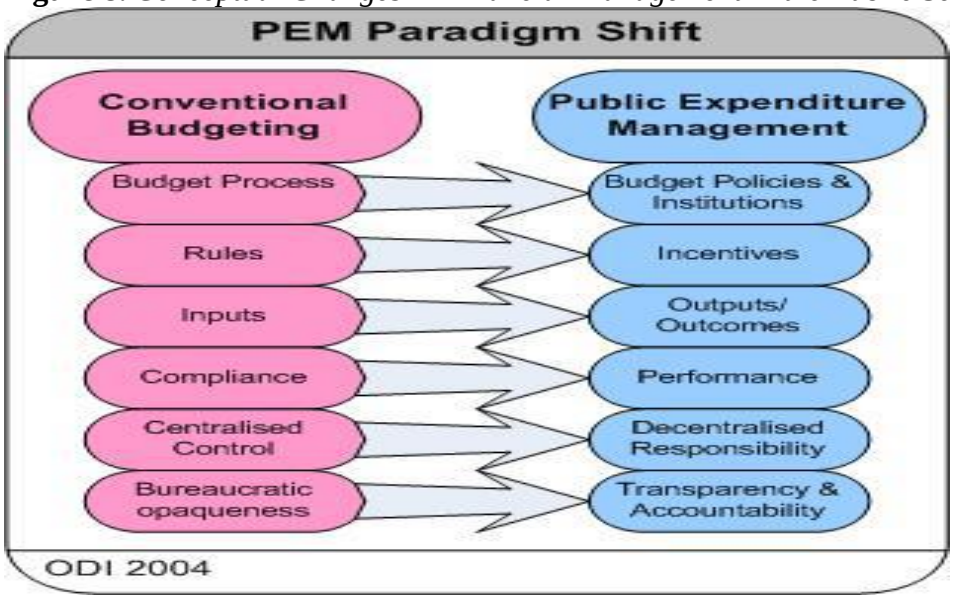
At the same time, the World Bank has proposed its own approach to assisting in implementing PFM reforms to countries that are concerned about the implementation of such reforms, and has developed its own approach to public expenditure management (PEM), as shown in Figure 8.

Figure 7. *Drivers of PFM Reforms*

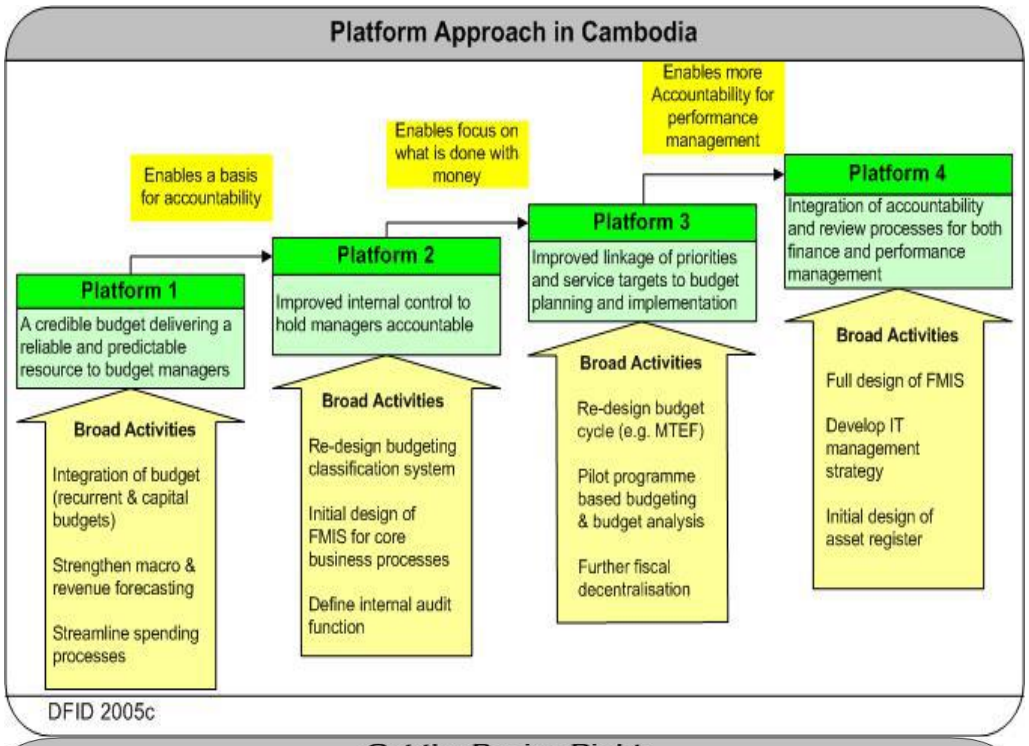
Financial crisis	• Tanzania, UK, Canada, Argentina, Asian economies
Political change	• South Africa, the countries of the former Soviet Union
Changes in public expectations / public pressure	• Great Britain, Canada, Colombia, Guatemala
Post-conflict conflict	• Rwanda, Burundi, Mozambique, Afghanistan, Liberia, Timor-Leste
New technologies	• E-procurement systems in Chile, Mexico, Korea and the Philippines
Regional needs	• The West African Economic and Monetary Union (WAEMU), the accession of the European Union (EU)
Donor pressure	• Heavily Indebted Poor Countries Initiative (HIPC) and other donor requirements

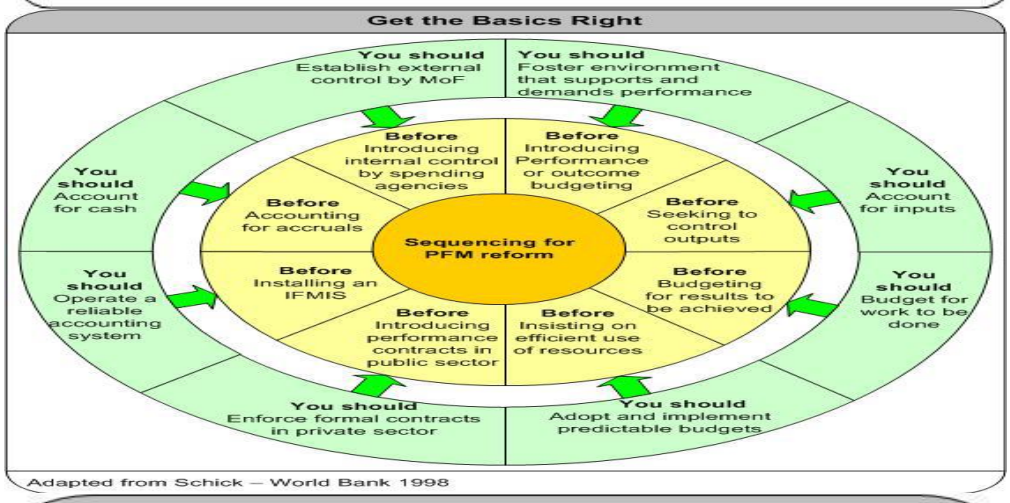
Source: Compiled by the author on basis Review of PFM Reform Literature (2009)[40]

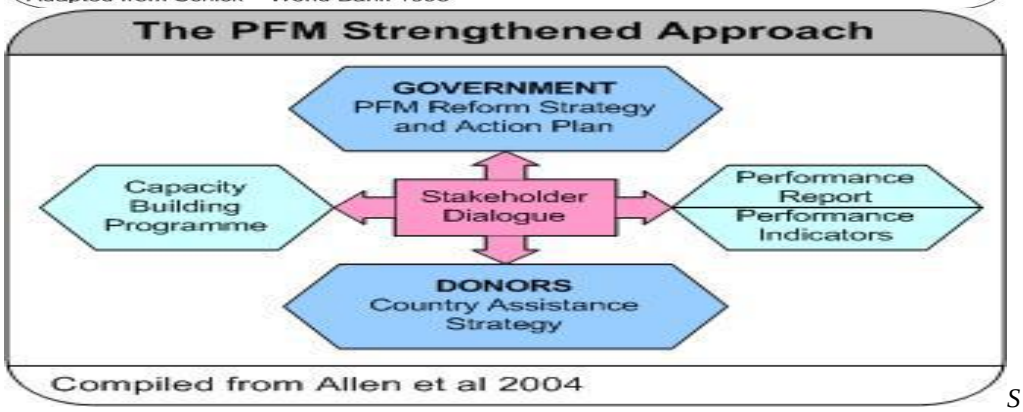
Figure 8. *Conceptual Changes in Financial Management in the Public Sector*



[40]Review of Public Financial Management Reform Literature, Evaluation Report EV698, 2009, p.4. Available at: https://bit.ly/2YHLyzC.







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Source: Review of PFM Reform Literature (2009: 9, 10, 12)[41]

[41] https://bit.ly/2YHLyzC.

As shown in Figure 8, the emphasis in the approaches to the implementation of the PFM reforms has shifted to take into account the significance of the complex network of actors and institutions involved in the budget process and to link costs with measurable results.

The approach to public expenditure management focuses on incentives and informal practices and budgeting. Supporters of the approach emphasize that in order to improve public expenditure management, changes are required in budget institutions, the role of trusts and supervisors, the rules by which they declare, allocate and use resources and the information available to them.

By early 2000, governments and donors from developing countries had begun to wonder why PFM reforms had achieved only limited success. The subsequent search for answers led to the following conclusions.

First, the budget is a political process, not just a technical one, and that in many countries informal behavior and practice abolish formal ones.

Secondly, these reform programs require countries to participate and a political commitment to achieve real sustainable progress.

And thirdly, this coordination and harmonization of donors is important. This improved understanding has led to the development of three different but potentially mutually reinforcing approaches to PFM reform, namely the political economy model, the platform approach is more focused on the consistency of reforms in a specific country context and the strengthened approach that determines the relationship and role of all actors in reform in the field of public finance.

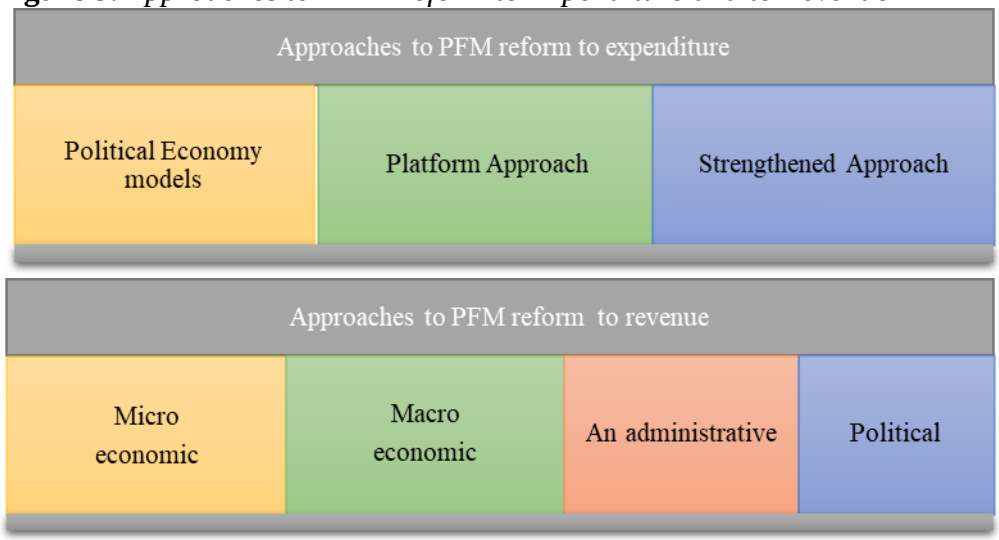
The above models and approaches are mainly applied to the reform of expenditure management, rather than to revenue management (Figure 9). To manage revenues, a different set of models was proposed.

With regard to the four main theoretical approaches to public expenditure management, it can be noted that they have an impact on tax revenues. These:

(i) Approach to management in the public sector of the economy, which emphasizes the effectiveness and fairness of taxation systems (microeconomic approach);
(ii) The macroeconomic approach, which emphasizes the impact of the taxation system on the distribution of household incomes, the level of savings, inflation and public debt;
(iii) an administrative approach that emphasizes the efficiency of the costs of administering taxes;
(iv) A political approach that recognizes the inherent political nature of the taxation process.

Because of the politicized approach to managing public revenues, this article excludes consideration of policy-related approaches.

Figure 9. *Approaches to PFM Reform to Expenditure and to Revenue*



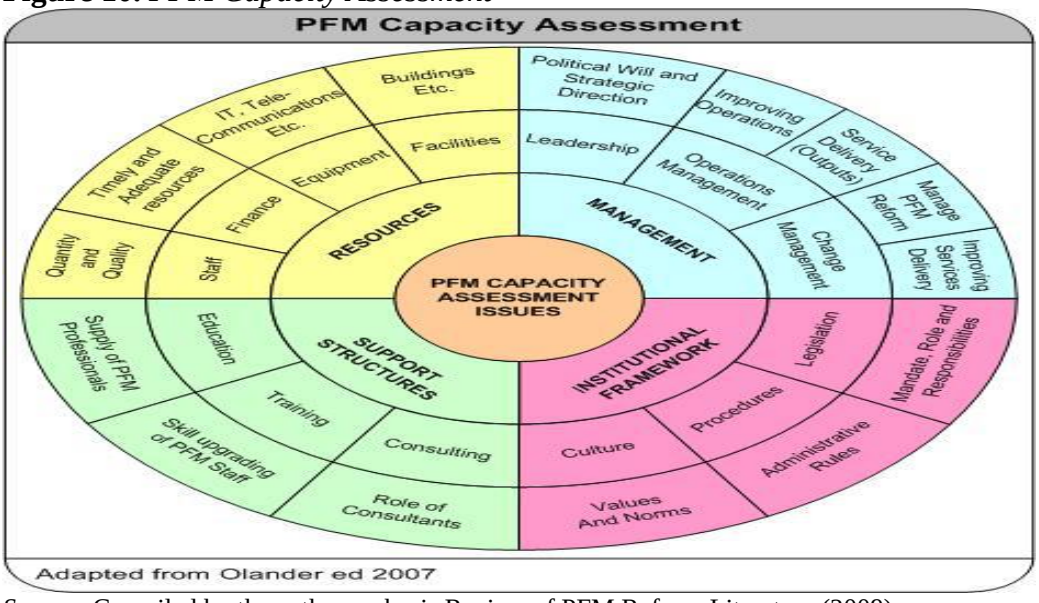
Source: Compiled by the author.

Factors Affect the Effectiveness of PFM Reforms

Successful implementation of PFM reforms requires certain opportunities, including available resources in the country for the implementation of PFM reforms (capacity).

The United Nations Development Program (UNDP) defines capacity as "the ability of individuals, institutions and societies to perform functions, solve problems, establish and achieve goals." Olander (2007) describes four inter-related elements that need to be considered when assessing and developing PFM capacity (Figure 10).

Figure 10. *PFM Capacity Assessment*



Source: Compiled by the author on basis Review of PFM Reform Literature (2009).

First, resources include the availability of a sufficient number of staff with professional skills, the availability of sufficient and timely financial resources, equipment and facilities.

Secondly, a management style is considered that includes leadership and political will, operational management and change management of the PFM reform program.

The third element implies the existence of an institutional framework, takes into account legislation, procedures and organizational culture.

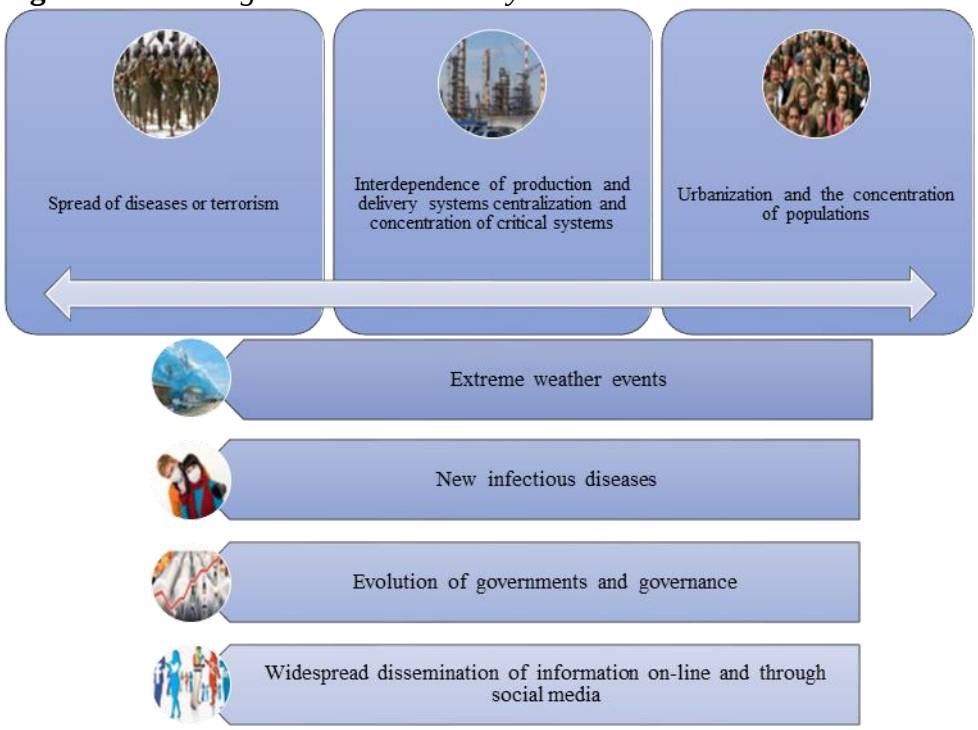
The latter element refers to support structures, including the role of higher education institutions and professional organizations, training through training and the role of consultants.

PFM Issues and Opportunities

In addition to the problems associated with a lack of capacity for PFM reform, it is necessary to remember the processes taking place in the economy and the world that are beyond control and management and that affect PFM.

Obviously, countries implementing PFM reforms may suffer from a lack of resources, weak governance, a lack of readiness for an institutional reform structure and a lack of a supportive structure. The listed problems, of course, are problems that make PFM reforms difficult, but these problems are amenable to control and management. Uncontrolled problems include, first of all, globalization and its consequences, which are listed in Figure 11.

Figure 11. *Challenges to PFM Caused by Globalization and Other Factors*



Source: Compiled by the Author.

Today, the advantages of globalization are widely used, namely: better allocation of resources, higher production level and standard of living, and greater access to foreign goods and services.

At the same time, globalization is also perceived as increasing inequality within and between countries, easing weaknesses, the threat of employment of unskilled and illiterate workers and their standard of living, and thus increasing poverty. In fact, the process of globalization and the market forces that accompany it must be properly developed and used to become a comprehensive force for sustainable and human-centered development. In these efforts, governments, international financial organizations, the private sector, NGOs and civil society have to make serious efforts and play a more constructive role in cooperation so that globalization works for the benefit of people in a spirit of partnership.

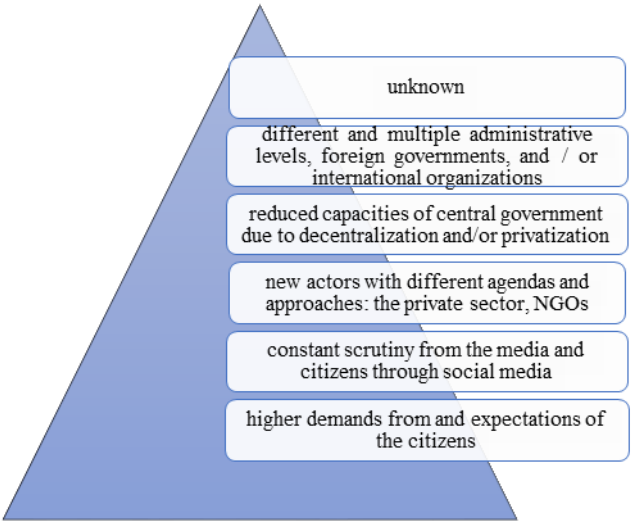
To the extent that globalization is perceived as a factor in the deterioration of income distribution, it seems that it increases the need for government regulation, while at the same time it reduces the government's ability to intervene because of the reduced availability of financial resources. Developing countries and countries with economies in transition may need to undertake major public expenditure reforms to improve competitiveness in the world market and reduce structural unemployment. Reforms in public financial management that have been implemented in some countries over the past two decades show that improving budget transparency by strengthening budgetary mechanisms, measuring results and effectiveness with respect to objectives, public accounting and performance audit, civil service reform will contribute to effective allocation of resources and increase confidence in the budget process. Successful financial management reform also requires macroeconomic control over the budget balance, prioritization of expenditures, a consistent legal and regulatory framework, financial transparency and public participation in decision-making, In particular, the state administration in the 21st century will have to activate public interest and public feedback into policy-making. The accessibility, quality and accessibility of information and fiscal data are important for empowering citizens and their participation in the decision-making process that can be realized through greater transparency and an effective accountability framework.

In our opinion, taking risks into the management of public finances is an adequate tool that will reduce the negative consequences of globalization.

Globalization, recent crises and natural disasters are challenging political leadership and risk management in many countries, often due to unforeseen or unforeseen circumstances, and due to weak links and disruptions in the flow of information.

These problems require governments to adapt their processes, structures, tools and equipment to manage the destructive events of a new form and allocate financial resources for these purposes. The problems faced by risk managers today are listed below in Figure 12:

Figure 12. *Challenges for Government Risk Managers in XXI Century*



Source: Baubion (2013: 8).

At the same time, governments need to maintain capacity to deal with more traditional crises as in the past. The innovations required to adapt to new features of crises and societies are not replacements for, but rather complements to existing capacities and can be built on them.

Table 2 shows the main differences between the traditional approach to crisis management and the approach that allows coping with new crises. While governments need to adapt their crisis management capabilities to the characteristics of new crises, develop new approaches and tools, they must also maintain the ability to cope with classic crises.

At the present stage of financial management in the public sector, managers face to face with challenges in the field of technology and information society.

First of all, we mean Blockchain technology. The effect of blockchains in the public sector is at best misunderstood and most often ignored.

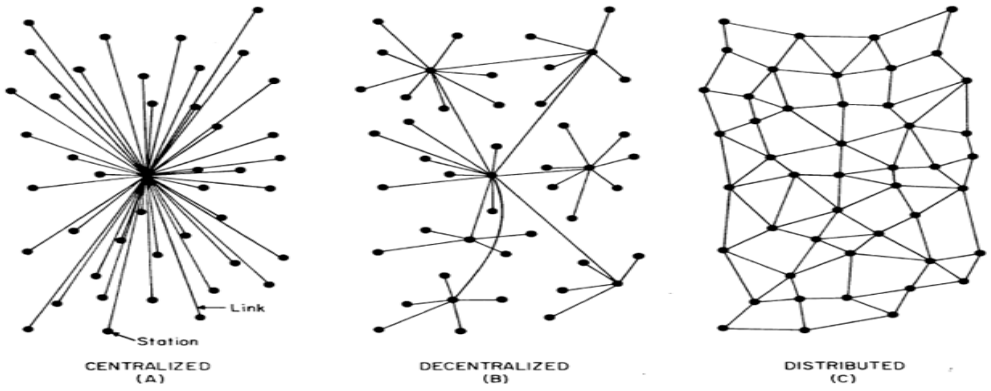
As illustrated on Figure 13, Blockchain technology's underpinning assumption is that all transactions will be visible to all nodes in the system at all times. To achieve this, in general, all nodes hold identical 'ledgers' of transactions that are rapidly updated any time a new set of transactions is added. This enables a key feature of the Blockchain architecture: consensus models where nodes in the system confirm the validity of transactions that occur on the platform, and flag inappropriate dealings when necessary.

Table 2. *Comparative Analysis of the Traditional and New Approach to Risk Management*

Traditional Crisis Management	Dealing with Novelty
Preparedness Phase	
Risk assessment based on historical events	Risk assessment includes horizon scanning, risk radars and forward looking analysis to detect emerging threats. Frequent updates and different timescales, international analysis sharing, multidisciplinary approaches are key attributes
Scenario based emergency planning	Capability-based planning and network building
Training to test plans and procedures	Strategic crisis management training to learn agility and adaptability and create networks and partnerships
Early Warning Systems based on monitoring, forecasting, warning messages, communication and link with emergency response	Strategic engagement from centers of government
Response Phase	
Command and control system	Crisis identification / monitoring: role of expertise
Standard Operating Procedures	Flexible and multi-purpose crisis management teams and facilities
Strict lines of responsibilities	Common concepts across agencies to inform leadership with high adaptative capacities
Sectoral approaches	Similar tools and protocols that could be utilised for multi-crisis
Principle of subsidiarity	International co-operation
Feedback to improve SOPs	Management of large-response networks
	Ending crisis and restoring trust
	Feedback

Source: Baubion (2013: 21).

Figure 13. *Distributed Networks Compared to Centralised and Decentralized Networks*



Source: Berryhill et al. (2018: 12)

Although Blockchain technology developments have been most extensive in the financial services industry, the discussion and application of Blockchains is also rapidly emerging in the public sector. Governments are taking action to learn more about Blockchain technology and to introduce Blockchain concepts—and the associated opportunities and challenges—with policy-makers and civil servants.

Figure 14. *Blockchain in the Public Sector*

Source: Berryhill et al. (2018: 21).

As illustrated in Figure 14, at least 46 countries around the world have launched or are in the planning stages to launch over 200 Blockchain-related initiatives. Case studies on several of these initiatives are presented in Table 3.

Table 3. *Top 10 Types of Projects and Industries Using Blockchain-Related Initiatives*

Rank	Types of projects (count)	Industries
1	Strategy/Research (42)	Government Services (173)
2	Identity (Credentials/Licenses/Attestations) (25)	Financial Services (73)
3	Personal Records (Health, Financial, etc.) (25)	Technology & Internet of Things (26)
4	Economic Development (24)	Healthcare (23)
5	Financial Services/Market Infrastructure (20)	Real Estate (22)
6	Land Title Registry (19)	Supply Chain (19)
7	Digital Currency (Central Bank Issued) (18)	Energy (13)
8	Benefits/Entitlements (13)	Transportation (13)
9	Compliance/Reporting (12)	Education (8)
10	Research/Standards (12)	Telecom (4)

Source: Berryhill et al. (2018: 22).

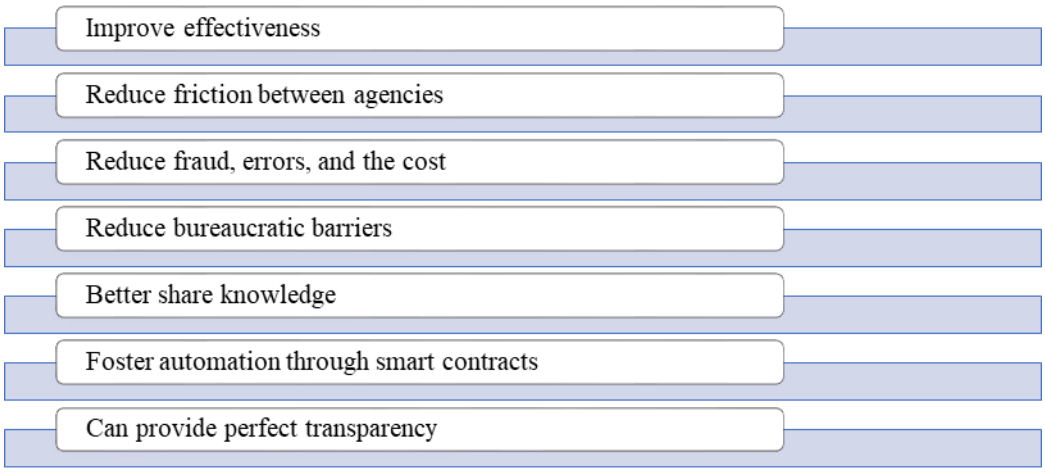
Obviously, Blockchains are simply permanent, unchanged and distributed transaction lists with a lot of technical capabilities to ensure that this list can be trusted.

Now, due to the fact that governments are deeply focused on economic efficiency and accountability and regard these aspects as key characteristics of the

state financial policy being formed, this technology certainly deserves a close study with a view to its possible use in solving various tasks in the area of public financial management.

From the already existing case studies, it can be said that Blockchain technology has the potential in the following areas of financial management in the public sector, listed below in Figure 15.

Figure 15. *Opportunities of Blockchain in the Public Sector*



Source: Compiled by the Author on based Berryhill et al. (2018).

In addition to increasing government transparency and public awareness of government programs and activities, the discovery of data can also help gain information on how to improve the effectiveness of public financial management. Improving data transparency provides the basis for public participation and cooperation in creating innovative services. In addition, the openness of the data is expected to improve the decision-making process by both governments and individuals. In particular, it is expected that the public will be able to use government data to make informed and more accurate decisions and improve the quality of life.

At the same time, governments will be able to more easily access a wider range of different information contributing to making decisions in the credibility of which will be easily verified.

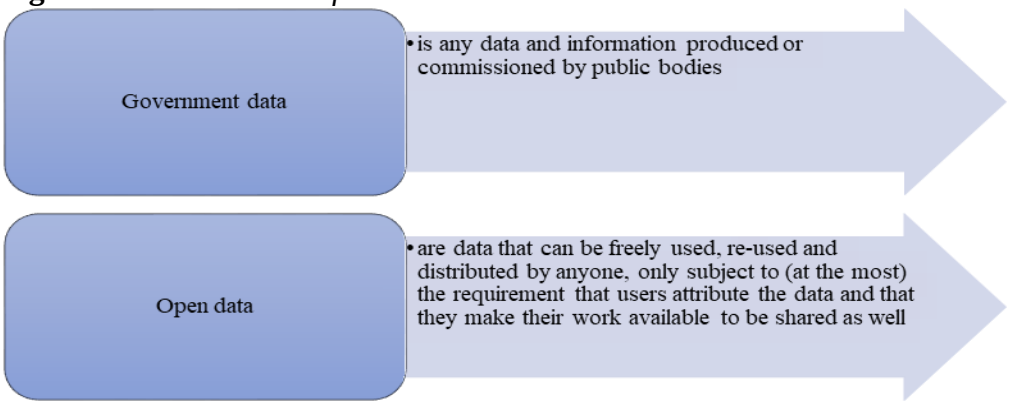
Finally, OGD is also seen as an important source of economic growth, new forms of entrepreneurship and social innovation.

However, it is worthwhile to express a warning, since the OGD remains an unexplored territory. Everything should have a reasonable limit. The disclosure of any information should be carefully balanced, especially that information that can damage public security and citizens' privacy.

The data must be relevant, easily accessible, usable and reused by all. It is important for Governments to draw public attention to the usefulness, relevance and accessibility of their data in order to ensure their continuous improvement and updating. Improved data accessibility can ensure closer cooperation with both governments and between government agencies and the wider society, including the private sector, civil society organizations and citizens. This stimulates a shift in

the organizational culture of the public sector, not only to openness, transparency and accountability, but also to exchange, cooperation and wider involvement of the public. The two main elements of OGD are normally defined as follows (Figure 16):

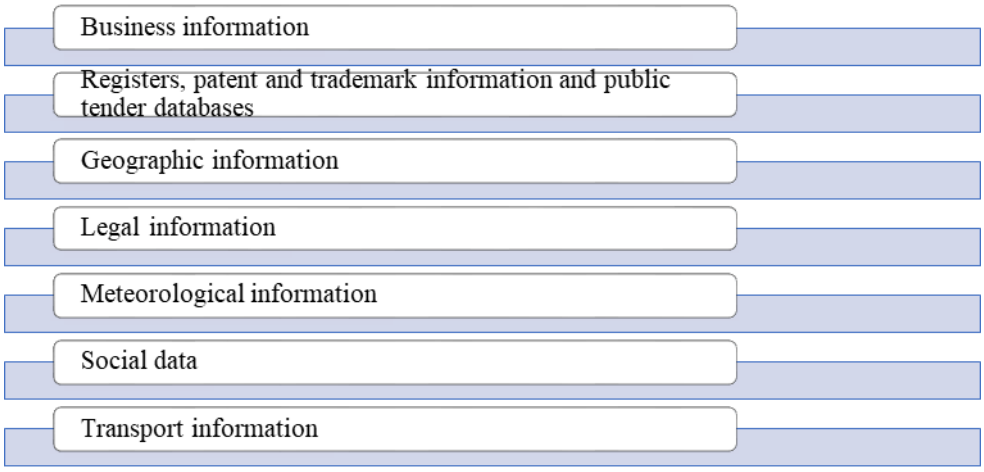
Figure 16. *The Elements of OGD*



Source: Compiled by the Author based on Ubaldi (2013).

Examples of OGD initiatives listed on Figure 17 and include:

Figure 17. *Opportunities of OGD*



Source: Compiled by the author on the based Ubaldi (2013).

Below is a list of recognized main beneficiaries of OGD:

i) Government. At the macro level, OGD provides opportunities for new ways of making decisions and allocating resources to improve the overall efficiency of government operations (for example, accelerating efforts to reduce fraud and error, further progress in tax gaps) and to better deliver public services while improving the quality of government interaction and all other subjects interacting with him on various issues.

ii) Citizens. It is expected that the data of the open government will allow wider participation of the public in the development of measures to

respond to public needs. The Internet portal illustrates the intersection of the mobile government and OGD. The discovery of public sector data (for example, crime rates, gas emissions, teachers per pupil in urban schools) makes citizens more informed and allow them to make more informed personal choices. To summarize, it can be argued that OGD can help improve the quality of life of the country's population.

iii) Civil society. Civil society initiatives that are based on OGD can be found in many countries. The overall objectives of these initiatives include demonstrating the benefits of OGD to the government and the public.

iv) Expansion of the economy, private sector and public services: OGD can stimulate a competitive market, for example, for public sector services. It is expected that the private sector (technology developers) will be one of the main users of the data sets for commercial exploitation of OGD. Stimulating profits can help stimulate innovation and experimentation, while it can be expected that better ideas will be emulated and improved, since no service provider has a monopoly on data.

Using Open Data does not guarantee transparency and accountability of the government. As stressed by Yu et al. (2012) "A government can be open, in the sense of being transparent, even if it does not embrace new technology, and a government can provide open data and still remain deeply opaque and unaccountable".

Results

The study revealed the factors adversely affecting the efficiency of public sector entities. The following factors can be attributed to them:

i) Issues of control and organization of production, including: the conditions of the "soft budget constraint" (subsidies, there is no threat of bankruptcy); there is no purpose of profit maximization; there are no incentives to improve efficiency; the difficulty of long-term investment planning; bureaucratic goals (maximizing the size of the organization); limitations on the type and quality of material costs (purchase specification); the impact of the policy, the political aspects of economic decision-making; a low level of risk-averse (emphasis on formal procedures).

ii) Features of stimulation of work of civil servants, including: a weak threat of dismissal; low wages compared with similar work in the private sector; the lack of incentive performance pay systems; the difficulty in determining the results of work of civil servants; corruption.

iii) Features of industry competition, including: no competition (postal service); the conditions of the natural monopolies (the bureaucratic monopoly).

In addition to this, the results of this study include:

i) Based on the analysis of existing definitions of public financial management, its author's definition is given;
ii) Based on a comparative analysis of management cycles in the public and private sectors of the economy, common and different features of both management cycles were identified;
iii) The revealed features of the public finance management system have made it possible to identify its key elements;
iv) The author's view on an effective financial management system in the public sector is presented, and its objectives are defined;
v) The historical aspect of reforms in the PFM is disclosed;
vi) Approaches in the financial management of incomes and expenditures in the public sector have been explored;
vii) Factors influencing the effectiveness of the PFM reforms have been identified;
viii) Identified challenges in the PFM and formulated opportunities that contribute to the achievement of the PFM's goal.

Conclusions

The conducted research allowed the formulation of the following conclusions:

i) Due to the specifics of public sector organizations, not all the traditional tools used in financial management in commercial organizations are applicable in the PFM;
ii) The effectiveness of public organizations is difficult to measure and cannot always be measured by quantitative indicators;
iii) Public sector organizations need to be more open to new technologies and innovations, they have to be used wisely.

Financial management in the public sector is a conservative type of professional activity. Not immediately responds to innovations and changes. In addition, the use of new technologies and tools requires a large number of approvals with different units. Ultimately, in order for their application to become possible, financial resources are needed, the rationale of which requires effort and time.

But only using modern technologies and approaches, while not losing the classical professional knowledge and skills required in this field of professional activity, we will be able to answer all the challenges that specialists who are involved in the PFM have to face.

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