

ECONOMIC POLICY FOR REAL SECTOR AND R&D FINANCING: BASIC INSTITUTIONAL MODELS¹

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ABSTRACT

The paper considers institutional models that define the macroeconomic policies for real sector financing as well as the R&D financing serving further as a technological base for real sector development in various nation-states. The hypothesis is tested that two institutional models in these spheres could be singled out, so called "a state as the main investor" and "a state as the regulator". To check this hypothesis, data about the 20-year dynamics of financing in Russia (and China) and in the USA are used. Institutional matrices theory, or X- and Y-theory (Kirdina, 2012) is used to explain the differences. In this regard, a reflection of the investment characteristics in national statistics of the two countries due to institutional differences is also discussed.

KEY WORDS: *real sector financing, R&D financing, finance institutions, Russia, China, the US*

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1. INTRODUCTION

It is impossible to reproduce the real sector of economy and the sphere of R&D, ensuring the economic growth, without mobilization of the relevant financial resources. Economic entities are provided with the necessary financial funds through the activity of set of institutions that form various institutional models of financing of the real economy and R&D sector. To the greatest extent the differences between these models are determined by the ratio of the market and the government institutions.

Generally, the study of economic growth in mainstream economics explicitly or implicitly assumes the domain of neoclassical market model where the growth is the product of innovation activity of competing companies. This assumption is deemed to be a fundamental truth. This approach assumes that the government shall just search for the optimal level of interfering in the economy, which allows the whole economy to overcome all sorts of obstacles and traps for the stable economic growth.

At the same time, there is another point of view on the problem of the government, markets and economic growth. It is based on the fact that we need to examine carefully the empirical data in order to understand where and when government economic intervention is good, and where and when it is bad, as well as the way it affects the overall economic growth (Fligstein 2005).

The paper is aimed at identification of alternative institutional models of financing of the real sector and the R&D sector, ensuring economic growth and economic reproduction on the basis of empirical-statistical investigation, as well as analyzing the reasons of their operation. Two countries, the Russian Federation (Russia) and the United States of America (the US), with traditionally

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opposed to each other ways of organizing of economic life have been chosen a priori for the analysis.

The paper is organized as follows: Section 2 provides an overview of the statistical data analysis. The results of the statistical comparison of the composition of investments made in the real sector of Russia and the US with view of sources and the property structure are given. In this case some features of the national statistical accounting systems of each country, affecting the results of the comparative analysis, are also considered. The result of this comparison is the conclusion on the action of two different institutional models of financing of economic reproduction processes in the economies of Russia and the US - "state as an investor" and "state as a regulator", respectively, which are given in section 3. In order to explain the reason why in the analyzed countries prevail the identified models, the author uses the concept of X-and Y-institutional matrices. Its main provisions, the most significant in the present context, are given in section 4. The paper ends with the conclusions given in section 5.

2. STATISTICAL COMPARISON RESULTS

The term "institutional model" used in the article is understood as the structure of key institutions providing finance for a real sector as well as R&D sphere. They nominate the structure of major sources that invest in them. Fixed-asset investment is a main focus of the analysis. The data on fixed investment sources in the corporate sector of the US and Russian economies over the past 20 and 15 years respectively are used in the overview.

It is known that the comparison of fixed investment source structures in Russia and the US is made difficult by the different structure of data obtained by the Federal State Statistics Service of the Russian Federation (Rosstat) and the US Census Bureau.

The first difference concerns the composition of the enterprises examined. Thus there are data on fixed investment sources for companies of all forms of ownership (excluding small business entities) including profit and non-profit organizations in Russia. State and non-state property entities (private, state-owned, mixed, joint property, etc) are fused here. They include enterprises of all branches among them financial and agricultural enterprises (Metodologicheskie polozheniya ... , 2009).

As such the US statistic data has the investment sources structure represented for corporate, non-financial, non-agricultural sector (excluding individual businessmen and small enterprises), i.e. for a lesser range of economic entities as compared to the Russian data. However, the statistics used in Russia and the USA covers the bulk of the economic entities and therefore can be used for a comparative analysis of the major trends.

The second difference is related to the structure of sources and uses of financial funds. So, for the Russian enterprises analyzed statistics distinguishes accounting for fixed capital expenditures, highlighting internal and external sources. Internal sources structure includes profits after tax and dividends, capital consumption allowance and other equity capital. External sources include bank loans, net new equity issues, high-level organizations' assets, government (of all levels) budget funds, non-budgetary funds and foreign investments (Ibid.).

In turn, the structure of financial funds for the US corporate sector, the resources for the economic reproduction of the real sector clearly do not singled out. Internal (with the same structure) and external sources are singled out here as well. But in this case corporation investment includes fixed investment as well as financial investment. In our overview we took into consideration net increase in liabilities to evaluate "raised funds". This "net increase" includes, on the one hand, net funds raised in markets with net new equity issues and credit market instruments, i.e. corporate bonds, bank loans, other loans and advances, trade payables, and on the other hand, "other issues" i.e. trade payables, miscellaneous liabilities, and foreign direct investment in the US etc.

As such, there are no such sources outlined (apparently due to being non-characteristic and insignificant) as high-level organizations' assets and governments budget funds in the US statistic data for the corporate sector. However there are industrial revenue bonds (IRB) included in

municipal securities. They represent a kind of securities issued by municipal and regional governments to finance local capital investment projects. Peculiarities of this financial instrument attribute this expense group as an equivalent to investment financing at the expense of budgetary funds.

How can we explain the revealed features of statistical records of these two countries? For the Russian Federation the process of distinguishing the data on fixed capital expenditures has a long, at least, the Soviet history, when its capital investment programs were centrally formed. These programs required the special accounting for all funds for this purpose, that has been preserved in modern Russian statistics of fixed capital expenditures.

Table 1: Corporate Funds – Sources and Uses, current prices, 1990-2010

	Units	1990	1995	2000	2005	2006	2007	2008	2009	2010
Funds for investment total	\$ bn	608	1,001	1,972	2,050	1,925	2,336	1,400	1,141	2,008
	%	100	100	100	100	100	100	100	100	100
Internal funds (+IVA), including	\$ bn	424	610	735	1,089	1,089	1,058	1,069	1,049	1,181
	%	69.8	60.9	37.3	53.1	56.6	45.3	76.4	91.9	58.8
- profits after tax and dividends	\$ bn	27	114	13	515	342	264	73	25	227
	%	4.4	11.4	0.6	25.1	17.8	11.3	5.2	2.2	11.3
- capital consumption allowance	\$ bn	352	443	620	575	598	626	810	824	735
	%	58.0	44.3	31.4	28.1	31.0	26.8	57.8	72.2	36.6
- others	\$ bn	45	52	103	-2	149	169	186	200	220
	%	7.4	5.2	5.2	-0.1	7.7	7.2	13.3	17.5	10.9
Net increase in liabilities, including	\$ bn	184	391	1,237	961	836	1,277	331	92	827
	%	30.2	39.1	62.7	46.9	43.4	54.7	23.6	8.1	41.2
- Net funds raised in markets	\$ bn	72	179	244	-18	-99	-44	-43	-69	81
	%	11.8	17.9	12.4	-0.9	-5.1	-1.9	-3.1	-6.0	4.0
among them: local Industrial Revenue Bonds	\$ bn	0	3	1	8	5	8	3	6	8
	%	0	0.3	0.1	0.4	0.3	0.3	0.2	0.5	0.4
- Others	\$ bn	112	212	993	979	935	1,321	374	161	746
	%	18.4	21.2	50.4	47.8	48.6	56.6	26.7	14.1	37.1
- among them: Miscellaneous liabilities	\$ bn	83	131	673	782	826	1,285	601	220	555
	%	13.6	13.1	34.2	38.1	42.9	55.0	42.9	19.3	27.6
among them: Foreign direct investment in the US	\$ bn	59	55	249	99	191	287	235	101	169
	%	9.7	5.5	12.6	4.8	9.9	12.3	16.8	8.8	8.4

Source: Table 752. Corporate Funds - Sources and Uses: 1990 to 2010, U.S. Census Bureau, Statistical Abstracts of the United States, Washington, 2012. p. 495. (Covers nonfarm nonfinancial corporate business), and www.census.gov/compendia/statab/2012/tables/12s0752.xls

As for the US economy, the private nature of corporate ownership limits the completeness of business information disclosure. On the one hand, the presentation of the data in terms of depreciation, reducing the income tax, certainly profitable for corporations and is reported in full. At the same time, outsiders' access to the insider information on the investment portfolio profile is not always desirable. Therefore, US statistics does not allocate specific ways of uses for corporate funds.

Inconsistency of data structure for survey entities and peculiarities of external financing sources grouping outlined, impose certain restrictions on comparative analysis of the Russian Federation and the US statistical data. It is necessary to keep these restrictions in mind. However, as it will be shown below, these discrepancies do not cancel the validity of conclusions made.

What are the trends of the US corporate sector financing sources structure? The information is given in the Table 1.

As we can see, internal financing sources have been dominating in general in the US over the past 20 years (note that the same trend was in the years before). Their segment is 60% on average. If to take into account the abovementioned assumption that not all external resources are directed to the fixed capital expenditures, the share of internal sources is obviously much higher. In 2009 (the most difficult year of the global financial crisis) it increased to over 90%, e.g. The biggest percentage of internal investment sources is comprised of capital consumption allowance. It amounts in general to one third and more of an aggregate amount of sources and in the period under review it was no less than one half of corporate internal financing sources with maximum of 75-85%.

As such the raised funds in the form of credits, loans, security yields, direct foreign investment and other liabilities amount in general to less than one half. Thereat the percentage of market borrowings that are clearly identified (credit, loans, corporate securities, etc.) is steadily decreasing within the structure of raised funds, but the other parts increase, among them dominating miscellaneous liabilities. They include in general various instruments of risk hedging. Over the past 20 years their percentage exceeds that of traditional financial instruments.

Table 2: Composition of fixed investment according to financing sources in the Russian Federation, current prices, 1998-2010, %

	1995	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Funds for investment, total	100	100	100	100	100	100	100	100	100	100	100	100	100
Internal funds, including	49	52	48	49	45	45	45	44	42	40	39	37	41
- profits after tax and dividends	21	16	23	24	19	18	19	20	20	19	18	16	17
- capital consumption allowance	23	x	18	19	22	24	23	21	19	18	17	18	21
- others	5	x	7	6	4	3	3	3	3	3	3	3	3
Net increase in liabilities, including	51	48	52	51	55	55	55	56	58	60	61	63	59
bank credits and loans	-	9	10	9	12	13	15	14	16	17	18	18	15
- budgetary and non-budgetary funds	33	26	27	23	22	21	19	21	21	22	21	22	20
- high-level organizations' funds	x	x	x	x	12	13	13	11	13	11	14	16	18
- others	18	13	15	19	9	8	8	10	8	10	8	7	6
among them: Foreign direct investment	x	x	5	x	x	x	x	7	x	x	5	6	4

x – data is not available

Source: Структура инвеститсии в оснвнвои капитал по источникам финансирувания (Composition of fixed investment according to financing sources), billions of rubles. Federal State Statistics Service of the Russian Federation web-site. <http://www.gks.ru/wps/wcm/connect/rosstat/rosstatsite/main/enterprise/investment/nonfinancial/#>

The level of foreign investment in the US corporate sector is at 10% on average. The percentage of a budgetary fund counterpart such as industrial revenue bonds amounts to less than 1%.

The data on composition of fixed investment in the Russian Federation demonstrate to a certain degree the opposite (Table 2).

“Foreign direct investment” criterion, see: Investitsi v Rossiiskoi Federazii v 2011, (Investment in the Russian Federation in 2011) The table: Struktura investizii v osnovnoi kapital po istochnikam finansirovaniya (Composition of fixed investment according to financing sources.)

First, there is a different ratio of internal and external fixed investment in Russia: it is on average 45% vs. 55%. In other words if the most part of real sector investment in the US is comprised of equity capital, the situation in Russia is completely reversed, that is more than a half of investment comes from external sources.

The second difference is a weak role of capital consumption allowance: while it is the biggest part of corporate equity capital used for real sector financing in the US, in the Russian Federation it amounts to less than a half. As a result capital consumption allowance in the whole fixed investment structure of Russian economic entities does not amount to 50% as in the US but in fact amounts to barely one fifth of assets used for these purposes.

The third difference deals with the external investment sources composition and quantitative difference in their structure. There is a predominant source in Russia; it involves central distribution from state budgets of different levels and non-budgetary state funds. It steadily surpasses the market raised funds. Thereat the percentage of credits and similar instruments is at the same time gradually increasing, and the percentage of government subsidies is slightly decreasing.

Peculiar to the Russian Federation is such source of investment as high-level organizations’ funds. Their percentage is gradually increasing that makes them as significant in investment as capital consumption allowance, profit, budget funds and credit market instruments.

The final difference is the percentage of direct foreign investment that is twice as low in the Russian Federation as in the US and amounts to more than 5%.

To better understand the outlined differences let’s compare the investment of the Russian Federation and of the US in terms of property forms although statistical views for property forms in the Russian Federation and in the US are not completely identical. First, let’s see the US related statistics.

The proprietary structure in the US includes two principal forms: state, or government property (federal, regional and local governments) and private property. Fixed investment data are represented in this very structure.

As it can be seen in the Table 3 the percentage of the state, or government sector in gross fixed investment was between 16% and 23% over the years.

Table 3: Gross fixed investment in the US, 2003-2010, %

	2003	2004	2005	2006	2007	2008	2009	2010
Private sector	82.8	83.7	84.4	84.2	82.9	81.0	77.2	77.4
Government sector	17.2	16.3	15.6	15.8	17.1	19.0	22.8	22.6

Source: Table 5.9. Changes in Net Stock of Produced Assets (Fixed Assets and Inventories) taken from Bureau of Economic Analysis, U.S. Department of Commerce web-site. <http://www.bea.gov/iTable/iTable.cfm?reqid=9&step=3&isuri=1&903=177>

Fixed investment structure of the two sectors reflects the percentage of state and private sectors in joint fixed assets of a country. Persistent data show that main state sector funds

percentage after the Great Depression (when the percentage amounted to 14-15%) was not more than 23%. As the state sector is represented only by governments of all levels (federal, state and local governments), it is clearly seen that the USA corporate sector is represented mainly by private enterprises. It is one of the reasons for practical absence of government subsidies in the USA corporate funds, we suppose.

As for the Russian Federation peculiarities it has a far more complex structure of property. There are 26 basic forms of property within the country according to the All-Russian Classifier of Property Forms introduced on the 1st of January 2000. One more form has been distinguished among federal property forms starting from 2010 – it is state corporation property. Fixed investment data based on property types in Russia is shown in the Table 4.

Table 4: Fixed investment in the Russian Federation, based on property types*, %

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Funds for investment, total	100	100	100	100	100	100	100	100	100	100	100	100
- state property	27	25	22	24	19	21	21	20	20	21	18	17
- municipal property	6	6	5	6	4	4	4	4	4	4	3	3
- private property	34	42	47	47	52	51	53	56	56	60	62	61
- mixed property (no foreign participation)	32	25	21	19	18	15	13	12	11	8	9	12
- state corporation property	-	-	-	-	-	-	-	-	-	-	1	2
- joint property (with foreign participation)	1	2	5	4	7	9	9	8	9	7	7	5

* Foreign property percentage between 12% in the beginning of 2000's and 6-8% in 2009 – 2011 was excluded from the overview.

Source: Investitsii v osnovnoii kapital v Rossiiskoi Federatsii po formam sobstvennosti (Fixed investment in the Russian Federation based on property types, current prices), billions of rubles. Federal State Statistics Service of the Russian Federation web-site. <http://www.gks.ru/wps/wcm/connect/rosstat/rosstatsite/main/enterprise/investment/nonfinancial/#>

First, it is obvious that the percentage of fixed investment in state property enterprises (20% average) is almost equal to budgetary funds and non-budgetary state funds percentage in investment over the same period as shown in the table 2. Moreover, the trend is similar as well. That is why it is quite reasonable to assume that state funds are invested predominantly in state enterprises.

Second, the presence of property types other than state and private property stands out. First of all it is mixed and joint enterprise property types with fixed investment over the years from one fourth to one fifth of the total investment amount. What is the reason for them being singled out? Is the only reason the transitional character of the Russian economy? But there is no such structure nowadays in the Eastern Europe countries that moved over as Russia from «socialism to capitalism» – their statistics on the matters discussed strictly reproduce that of the US³.

³ It is characteristic that unlike western neighboring countries of the Russian Federation, the statistics of the People's Republic of China points out the same property types. The large-sized grouping includes state, municipal, private, mixed Chinese, joint Chinese and foreign property (Chung 2010, p. 13).

Ambiguity of property types in the Russian Federation has a long history and reflects one of the major civil law problems, still not solved, that is based on the understanding of a legal entity meaning. The modern Russian textbooks on the civil law theory state that in the Russian Federation “the question of a legal entity meaning is still open” (Status juridicheskikh lits, 2006, p. 6). Moreover the authors point that there is no significant advancement in the Russian civil law science (Tolstoy 2000, p. 103).

We think that the main difficulties are linked with a persistent inability to isolate economic and proprietary rights of any entity from state participation. There are theories prevailing in the global practice that compare legal entity with separate estate. If estate owners of any legal form are private individuals then these legal entities make up private proprietors. If the owners are government bodies of different levels (from the upper, federal, to the lower, municipal) then such kind of property is governmental. However, it has not been possible to separate property in such an obvious way over the whole period of the Russian history due to the fact that “the state property even with some legal entity based on it remained the state property anyway” (Status juridicheskikh lits, 2006, p. 4). In the USSR the way out of this juridical dead end was the theory of two-level state property proposed by Anatolii V. Venediktov (Venediktov 1940; 1948, p. 657-672) and supported by Sergei N. Bratus’ (1947), Olympiad S. Ioffe (1958) and many other civilists (Grazhdanskoe pravo 1998, p. 176). According to this theory “the juridical personality of a legal entity is based not only on the unity of state property but on operative administration of its parts as well” (Legal Entity Status (Status juridicheskikh lits 2006, p. 4). In other words at the upper level the unity of the state property was preserved that is belonging to the Soviet state and all the Soviet people was fixed. At the second level the right of operative administration was given to different legal entities that were able to enter legal relationship with each other.

During market-based reforms in Russia at the end of the 20th century and in the beginning of the 21st century as shown in the statistics the property types could not be fully segregated onto private and state (government) types due to, as we can see, a number of intermediate types. Moreover we think that the statistics have become complicated and inconsistent probably due to being oriented at the set political priorities.

According to official statistics, the share of investments in privately owned enterprises in the Russian Federation now makes 61%, compared to 77% in the US. In this case, if the US economy share of the latter is decreased in the last decade, then the Russian share, on the contrary, is growing. Does this mean that there is a corresponding decrease in the share and the impact of the government institutions in the investment process? Detailed analysis of the organization of statistical accounting in modern Russian Federation forces to put this statement in doubt.

Firstly, the structure of the property with the government participation becomes more representing: it includes the share of state-owned corporations.

Secondly, pursuant to the overview of the rules of Property type code assignment being in effect on the territory of the Russian Federation (Instruktsiya o porjadke ucheta juridicheskikh lits... 2001), sometimes private property is not always private in every sense of this word. For example, mixed property types include those founded by parties with governmental (federal, regional, municipal) and other structures, according to these rules. But if legal entities with any type of mixed property found other economic entities, the latter are considered as private property enterprises (Ibidem, Part 1, cl. 4.6.24). It is obvious that in such cases the function of the first-order founders (governmental structures) is preserved though officially this organization is recognized in statistics as private property.

The third example is the property codification of joint stock companies established in the course of privatization with a golden share in state property. According to the rules mentioned, such companies are identified as one of mixed property types (Ibidem), though it is more correct to identify it as modified state property.

Fourthly, the joint (with foreign participation) property includes enterprises established not only by private but also public institutions with foreign capital.

Taking into consideration the foregoing it is possible to assume that the official statistics on

the actual role of state funds in real sector financing are underrated in Russia.

The differences revealed in the financing channels of the real sector in the US and the Russian Federation allow to single out the two institutional models of the economic reproduction, which can be called "state as a regulator" in the first case and "state as an investor" - in the second. In the first model, the investment resources are concentrated in the business community, and the main task of government is to create conditions encouraging investment and economic growth. The second model involves the concentration of investment resources and its centralized management by government institutions.

It is typical that in times of crisis, accompanied by the general decline in investments the identified models appear to be more vivid. If in the US in times of crisis, the share of internal sources increases. In the Russian Federation in the same period of crisis the situation is vice versa. The share of internal sources decreases, while the typical for the "state as an investor" model the share of raised funds increases.

3. INSTITUTIONAL MODELS "STATE AS AN INVESTOR" AND "STATE AS A REGULATOR"

Financing of the real sector is part of the process of economic reproduction, which also includes funding for Research and Development (R&D) sector and the provision by the banking system of "long-term money" necessary for economic growth. The difference in specified institutional models is observed in these spheres of the Russian and US economies too.

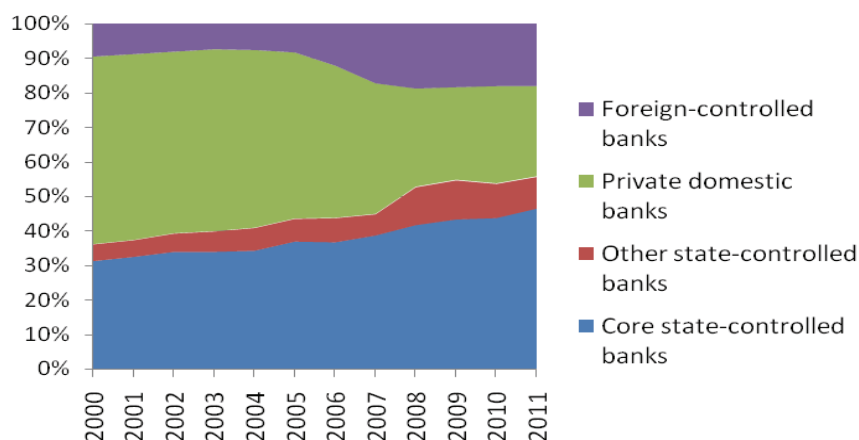
In addition to the above mentioned statistics for the Russian Federation we can add financing information of R&D – a necessary pre-phase for securing the growth of economy real sector. State (governmental entities) dominates in R&D activities in the Russian Federation and in the R&D financing structure serving further as a technological base for real sector development. Herewith the analysis of the dynamics of the Russian index in recent years shows that the state share of financing is gradually increased from 63.4% in 2007 to 70.7% in 2010 (Nauka, tehnologii i innovatsii Rossii 2011, p. 31). Apparently, in the Russian Federation the state is a major investor in R&D sector, in contrast to the US economy, where corporate (businesses) investment prevail. In the US economy, the share of public expenditures in the cost structure for R&D, providing the technological basis for the development of the real sector in 2009 made only 27.1% (Rossiiskii innovatsionnyi indeks 2011, p. 31).

The same situation is observed in the banking sector of these two countries compared. In the USA, as is known, there are practically no state-owned banks. Thus, the loans required for the development of the real sector issued by banks are the funds of private (by ownership) credit and banking system. The Russian economy in 1980-1990s in the early transformation period also attempted to replace the state banking system, historically prevailing in our country, by private one. For this purpose the state-owned banks were privatized, the organization of new private banks were allowed, foreign credit institutions with private capital entered on the territory of the country. However, the analysis of the dynamics of the Russian banking sector shows that there is a return of the state into the banking sector (Figure 1).

Already by 2000, the proportion of state-controlled banks has increased to one-third, and since 2010 to more than half, and continues to grow (Vernikov 2012). The reasons of such the banking system evolution have been shown in our studies (Kirdina and Vernikov, 2013). Thus, in the credit and banking system of the Russian Federation the state, in contrast to the US economy, plays more important role in the financing of the real sector compared to the private entities.

The model "state as an investor" domination does not cancel the state's role as an investment process regulator. Even more the harmony between these two models is a necessary condition for a successful development of any country. However for the countries with economic institutions of an X-matrix domination (besides the Russian Federation we also place China and a number of other countries in this group – it will be discussed in the next paragraph) such harmony is based on the frame character of the institutional model "state as an investor".

Figure 1: Combined market shares of Russian banks by form of ownership, end of respective year



Source: Kirdina and Vernikov 2013.

China showing progress in its economy modification over the last decades, can fully demonstrate this statement nowadays. As the specialists note the state plays a major role in China investment process (L'vova 2011, p. 10-11). First, we refer to the direct and indirect investment support of large-sized state companies. It is they who play the key role in and outside the Chinese economy. Moreover, as noted by worried observers from the western countries "the state-owned enterprises in China are potentially poised to alter the rules of global economic competition" (Schuman 2012). The state-owned companies receive financial support in the form of state subsidies, regulatory privileges and various benefits. Despite the ideological rejection of the following policy the western experts are nevertheless forced to acknowledge that such companies are "a potentially powerful mix that can reshape the global competitive environment" (Ibid.) and it contributes to the extension of influence of China over the international markets.

Second, in China with the domination of the "state as an investor" model the state banking system role is great as such the State development bank provides up to 80% of all loan portfolio (Zhifeng 2011). As a result there is a multistep investment system established in China. It includes state and private investment. Thereat the state acts as the main investor but at the same time attracts by all means private (including foreign) investment. The system includes development of long-term investment plans, activities to improve investment climate, and a scientific approach to price formation. Within investment area free pricing is coupled with measures of strict control over expenditures and prices. Auditions on price formation for infrastructure facilities are conducted as well as strategies and plans are openly developed. It often helps to avoid substantial errors.

The advantages of the institutional model "state as an investor" are central resource support of the branches with the highest priority and evasion from cyclical changes. At the same time its main problems are insufficient motivation of would-be innovators, risk of corruption and investment thieving at the local levels. It is noted in the expert's publications (see for example, Yanrui Wu, Zhengxu Wang and Dan Luo 2009). Struggling with such risks implies the improvement of the model "state as an investor" itself as well as the necessary compensating action of the alternative model "state as a regulator".

The institutional model "state as a regulator" that is characteristic to the USA is described in numerous publications on the state investment activity regulation. That is why we will give here only some examples.

So, such regulation results in the above-mentioned investment structure data (table 1) showing a high percentage of capital consumption allowance in the US corporations' real sector

investment. It refers to the state policy of so called “accelerated capital allowance”. In the Russian academic literature this phenomenon is described in details by Michail M. Sokolov (2010) in his reviews of the US and the Russian Federation economic strategy concerning capital consumption allowance. The US took this strategy before the rest consistently improving the rate of fixed assets replacement and indirectly financing investment activities using state budget funds (Fedorovich and Patron 2007). Capital consumption allowance in this context is deemed to be the most important element of tax policy as it represents a share of corporate tax-exempt profit. Therefore in a short-term period an increase of allowance leads to tax revenues reduction in the budget (Mal'tseva 2012). At the same time in the context of development prospects this strategy proves to be effective.

The choice in favor of the “state as a regulator” model over the “state as an investor” model is described by the investment companies program for small business aimed to support venture capital financing in the US. If at first the US considered venture capital investment support as direct participation in the capital of companies formed then later restricted itself to providing state guarantee for bonds issued by venture capital companies. As the researchers note that “the US abandoned venture investment support with participation in the equity capital of the venture capital companies due to heavy losses” (Spitsyn 2010, p. 9) in favor of indirect supportive actions.

The advantages of the “state as a regulator” model are high investment activity of market entities and in this respect a higher rate of technological progress. It is the decentralization in some experts' opinion that provides permanent innovation flow for market economies (Kornai 2012). The problems of this model are cyclicity and ‘financial bubbles’ risks (Perez 2002), that emerge in the stock markets as a result of profit pursuit by isolated market entities. The institutional model “state as a regulator” risk reduction is achieved by its improvement as well as by incorporation of the alternative “state as an investor” model complementing the general practice of real sector financing in the countries with market based economy.

4. INSTITUTIONAL MATRICES THEORY (IMT), OR X- AND Y-THEORY

We shall try to explain the reason for the domination of the “state as regulator” model with real sector financing in some countries and the domination of the “state as an investor” model in the other countries based on the institutional matrices theory (Kirdina 2001; 2010).

This theory represents human society as a social system structured in three spheres: *economy, politics and ideology*:

- economic sphere with interrelations that involve resources used for the production and reproduction of work and business-related activities;
- political sphere with interrelations for regular and organized public and civil society actions that aim to achieve defined local, regional or national objectives; and
- ideological sphere with interrelations that embody important social and cultural ideas and values of a nation's people.

These main spheres are strongly interrelated morphologically as parts, sides or components of an indivisible whole. Each sphere is regulated by a corresponding set of basic institutions. Institutions permanently reproduce the staples of social relations in different civilizations and historical periods. Basic institutions integrate a society into one whole that develops sometimes with conflicts and at other times with harmony, sometimes with competition and at other times with cooperation.

Institutions have a dual character: they are objectively determined and also at the same time ‘human-made,’ which involves subjective and teleological features. On the one hand, institutions manifest self-organizational principles in a society as a co-extensive political-economic-ideological system. On the other hand, institutions are the result of purposeful human reflection with regard to relevant laws and rules; they emerge, extend and are shaped as human-made entities.

As Thorstein Veblen wrote, “Social institutions are not only the result of selection and adaptation processes, shaping the prevailing and dominant types of relationships and spiritual position, at the same time they are special modes of the existence of a society, forming a special system of social relations and, hence, in turn, are an effective selective factor” (Veblen 1899, p. 188). Aggregations of interrelated basic economic, political and ideological institutions are defined by IMT as *institutional matrices*. Historical observations and empirical research as well as mathematical modelling and a broad philosophical approach constitute the ground for our hypothesis about two particular interdependent types of institutional matrices existing around the world. Namely, we call the two types X-matrices and Y-matrices and compare the unique identities of each one in relation to the other. These matrices differ in function according to the set of basic institutions forming them.

The X-matrix is characterized by the following basic institutions:

- in the economic sphere: *institutions of a redistributive economy* (a term introduced by Karl Polanyi (Polanyi 1977). Redistribution-oriented economies are characterized by a situation where the center (at the top) regulates the movement of goods and services, as well as the rights to their production, reproduction and use;
- in the political sphere: *institutions of a unitary (centralized) political order*;
- in the ideological sphere: *institutions of communitarian ideology*, the essence of which is expressed by the idea of collective, shared, public values and rights governing over individual, sovereign, private values and rights, i.e. the priority of We over I.

The Y-matrix is characterized by the following basic institutions:

- in the economic sphere: *institutions of a market economy. Market-oriented economies are characterized by a situation where horizontal exchange relations between economic agents exist*;
- in the political sphere: *institutions of a federative (federative-subsidiary) political order*;
- in the ideological sphere: *institutions of an individualistic ideology*, which proclaims the dominance of individual values and rights over the values and rights of larger communities, where groups are subordinate to personalities, i.e. the priority of I over We.

In real-life societies and nations, X- and Y-matrices interact, with one of them permanently prevailing and governing. Nevertheless, the matrices are not and cannot be entirely exclusive of each other, even that both X- and Y-matrices co-exist concurrently in any given case. This is what distinguishes IMT as an approach based not on conflict, but rather on cooperation and collaboration.

In other words, the social structure of any society can be singled out as a dynamic binary-conjugate structure of these two dialectically interacting, yet alternative complementary institutional complexes. The governance of one of the matrices over the other is usually constant in the course of history. The dominant institutions of the prevailing matrix therefore serve as a performance framework for harmonizing complementary institutions from the other matrix.

We contend that X-matrix institutions predominate in Russia, China, and India, along with most Asian and Latin American countries. In these cases Y-matrix institutions are also “a must,” but they have a complementary and additional character instead of a governing voice in society. And conversely, Y-matrix institutions prevail in most European countries and in North America as well as Australia and New Zealand, whereas X-matrix institutions also exist but at a smaller ratio.

All economic, political and ideological X- and Y-institutions coexist in different combinations and are embodied in many institutional forms. Thus, though we are outlining the general features of X- and Y-matrix institutions, in real-life situations the extreme cases are never fully demonstrated. The most efficient and effective functioning of X- and Y-matrices in each society requires an appropriate institutional balance with all morphologically interconnected institutions.

Why do X- or Y-institutions following historically determined institutional forms dominate in the structures of societies? The material and technological environment is seen as a key

historical determinant of whether either an X-matrix or a Y-matrix prevails, along with culture and social actions⁴. The national environment can stress an indivisible *communal* system, wherein removal of some elements can lead to disintegration of the whole system or it can amplify a *non-communal* system with possibilities of functional and technological division (Bessonova et al. 1996, p.17-18). The institutional content of a nation developing within a communally-oriented environment is achieved by the tasks of coordinating joint efforts towards efficient and effective usage. In this way, X-matrices are formed under communal conditions.

A non-communal environment, on the other hand, is divisible into separate, disconnected elements; it is more easily able to disperse and can exist as an aggregate of dissociated, independent technological objects. In this case, an individual or group of people (e.g. families) can participate using parts of the non-communal environment in their economy, can maintain their effectiveness, and use the obtained results themselves, without cooperating with other members of the society. When this is the case, the main function of the surrounding social institutional structures is to assure interaction between the atomized economic, political and social agents. Y-matrix institutions are shaped in such a non-communal environment.

To make a summary, in communal environments X-matrix institutions are dominant and Y-matrix institutions are complementary, while in non-communal environments the institutional balance is reversed.

The ratio of dominant and complementary institutions is defined by the changing conditions of political-economic-ideological development. At one extreme, there is an outright dominance of one type of institutional matrices, yet without conscious implementation of complementary 'other matrix' institutions. This tends to result in a general systematic collapse (e.g. USSR's breakdown in the 1980s and '90s) or in a social and economic crisis (e.g. the US's recent 2007-'09 recession).

The opposite extreme implies an attempt to replace historically dominant institutions with complementary ones. This move leads to revolutions through reconstructing dominant institutions into new forms (e.g. the French Revolution as a reaction to economic and political centralization and, alternatively, the Russian October Revolution (1917) as the outcome of an attempt at "building capitalism") or unsustainable socio-economic development (e.g. some Latin American countries). The main task of social and economic policy making in each country is thus to support the optimal combination (cf. proportional balance) of predominant and complementary institutions. For example, economic policy aims to find the best proportion between market and planned redistributive institutions as well as means to their modernization (Kirdina 2001). People and authorities can actively help to achieve this balance faster and more efficiently with concentrated "teleological" efforts, rather than just letting "unguided" evolutionary history (cf. "the invisible hand") take its course.

The institutional model described as "state as an investor" is typical for countries where X-matrix with the redistributive economy, the unitary (centralized) political order and the communitarian ideology prevails. The institutional model "state as a regulator" is characteristic for countries where Y-matrix with the market-oriented economy, the federative (federative-subsidiary) political order and individualistic ideology dominates.

5. CONCLUSION

Comparative statistical data and analytical surveys show that it is possible to distinguish two basic institutional models – "state as an investor" and "state as a regulator" in real sector and R&D financing. Even though they do not exist separately but rather coexist, one of the models strongly dominates over the other one. The dominating position of any of the models is related to social, economic and political processes and the type of a predominant institutional matrix. It is

⁴ The role of cultural factors for economic development is investigated in work of the so-called civilization approach (see e.g. Rosefelde, 2008). In IMT these factors are not investigated.

reasonable to keep in mind the mentioned differences during the institutional overview of economic growth problems and mechanisms. We hope to continue a comparative institutional analysis to test the hypothesis about the relationship and interaction between two abovementioned models in a context of other nation-states.

REFERENCES

- Bessonova, O., Kirdina, S., O'Sullivan, R. (1996), *Market Experiment in the Housing Economy of Russia*, NSU, Novosibirsk.
- Bratus', S.N. (1947), *Juridicheskie litsa v sovetskom grazhdanskom prave (Legal entities in the soviet civil law)*, Juridicheskoe izdatel'stvo, Moscow, In Russian.
- Bureau of Economic Analysis, U.S. Department of Commerce, <http://www.bea.gov/iTable/iTable.cfm?reqid=9&step=3&isuri=1&903=177>
- Chung, J. (2010), *Investitsionnoe obespechenie razvitija legkoi promyshlennosti: na materialakh RF and PRC (Light industry investment: based on materials of the Russian Federation and the People's Republic of China)*, GUTiD, Sent-Petersburg, In Russian.
- Fedorovich, V. A., Patron, A. P. (2007), *SSHA: gosudarstvo i ekonomika (The USA: state and economy)*, IUC RAS, Moscow, In Russian.
- Fligstein, N. (2005), "States, Markets and Economic Growth", in V. Nee & R. Swedberg (Eds.), *The Economic Sociology of Capitalism*, 119-143, Princeton University Press, Princeton.
- Grazhdanskoe pravo. Uchebnik. (Civil law. Textbook) (1998)*, E.A. Sukhanov (Ed.), 1, BEK, Moscow, In Russian.
- Instruktsiya o porjadke ucheta juridicheskikh lits, ikh obosoblennykh podrazdelenii v Edinom gosudarstvennom registre predpriyatii i organizatsii, 1 (The procedure of a legal entities and their standalone subdivisions registration in the Uniform state register of enterprises and organizations, Part 1)*. (2001), <http://zakonprost.ru/content/base/part/292586>, In Russian.
- Investitsii v osnovnoi kapital v Rossiiskoi Federatsii po formam sobstvennosti (Fixed investment in the Russian Federation based on property types) (2012)*, Retrieved from the Federal State Statistics Service of the Russian Federation website. <http://www.gks.ru/wps/wcm/connect/rosstat/rosstatsite/main/enterprise/investment/nonfinancial/#>
- Investitsii v Rossii v 2011 (Investment in the Russian Federation in 2011) (2011)*, Federal'naya sluzhba gosudarstvennoi statistiki (Federal State Statistics Service), Moscow, In Russian.
- Ioffe, O.S. (1958), *Sovetskoe grazhdanskoe pravo: Kurs lektsii (Course on Soviet civil law)*, Leningrad State University press. In Russian, Leningrad.
- Kirdina, S. (2001), "Fundamental Difference in the Transformation Process between Russia and East European Countries", *Berliner Osteuropa Info*, No 16, 14-16.
- Kirdina, S. (2010), "Prospects of Liberalization for S&T Policies in Russia: Institutional Analysis", *Sociology of Science and Technology*, 1(2), 10-28.
- Kirdina, S., Vernikov, A. (2013), "Evolution of the Banking System in the Russian Context: An Institutional Analysis", *Journal of Economic Issues*. Vol. 47, No. 2, 475-484.
- Kornai, Y. (2012), *Innovatsii i dinamizm: vzaimosvyaz' sistem i technicheskogo progressa (Innovation and dynamism: interconnection of systems and technical progress)*, *Voprosy ekonomiki*, No. 4, 4-31, In Russian.
- L'vova, E.K. (2011), *Territorial'naya struktura investitsii kak factor ekonomicheskogo razvitiya Kitaya. (Territorial investment structure as an economic growth factor of China)*, Lomonosov MSU, Moscow, In Russian.
- Mal'tseva, A. V. (2011), *Sovershenstvovanie amortizatsionnoi politiki kak sposob nalogovogo stimulirovaniya investitsionnoi deyatel'nosti organizatsii real'nogo sektora ekonomiki (Allowance strategy improvement as a tax incentives method of investment activities for the real sector economy organizations)*, Retrieved from Institute of business and law, <http://www.ibl.ru/konf/151211/sovershenstvovanie-amortizacionnoy-politiki.html>, In Russian.
- Metodologicheskie polozheniya po sisteme statisticheskikh pokazatelei, razrabatyvaemykh v statistike stroitel'stva i investitsii v osnovnoi kapital (Methodological provisions on statistical indicators system developed in construction statistics and fixed investment) (2009)*, Federal'naya sluzhba gosudarstvennoi statistiki (Federal State Statistics Service), Moscow, In Russian.
- Nauka, tekhnologii i innovatsii Rossii (Science, technology and innovation of Russia) (2011)*, IP RAN RAN, Moscow.

- Perez, C. (2002), *Technological Revolutions and Financial Capital: The Dynamics of Bubbles and Golden Ages*, Edward Elgar Publishing, Cheltenham, UK and Northampton, MA.
- Polanyi, K. (1977). *The Livelihood of Man*, Academic Press, Inc., New-York.
- Rosefielde, S. (2008/2005/2002), *Comparative Economic Systems: Culture, Wealth, and Power in the 21st Century*, Wiley: Blackwell.
- Rossiiskii innovatsionnyi indeks* (Russian Innovation Index). (2011), Ministry of Science and Education, Moscow.
- Schuman, M. (2012), "Are China's Big State Companies a Big Problem for the Global Economy?", *Time*, 17.02.12, Retrieved from <http://pda.warandpeace.ru/ru/commentaries/view/66879/>
- Sokolov, M. M. (2010), "Evoluzionnye izmeneniya v amortizatsionnoi politike kak osoboy forme nalogovogo vozdeystviya na razvitie ekonomiki (Allowance strategy development as a special form of tax impact on economy development)", *Vse o nalogakh* (Complete guide to taxes), 10, 11, In Russian.
- Spitsyn, D. A. (2010), *Organizatsionnye formy i modeli venchurnogo finansirovaniya v SSHA* (Organizational forms and models of venture capital financing in the USA), IUC RAS, Moscow, In Russian.
- Status yuridicheskikh lits* (Legal entity status) (2006), Yustitsinform. In Russian, Moscow.
- Struktura investitsii v osnovnoi kapital po istochnikam finansirovaniya* (Composition of fixed investment according to financing sources). (2012). Retrieved from the Federal State Statistics Service of the Russian Federation, <http://www.gks.ru/wps/wcm/connect/rosstat/rosstatsite/main/enterprise/investment/nonfinancial/#>
- Tolstoy, Yu. K. (2000), "K razrabotke teorii yuridicheskogo litsa na sovremennom etape (Legal entity theory development at the present stage)" in V.N. Litovkin and V. A. Rakhmolvich (Eds.) *Problemy sovremennoogo grazhdanskogo prava* (Problems of contemporary civil law), 81-112, Gorodets, Moscow, In Russian.
- U.S. Census Bureau, Statistical Abstracts of the United States* (2012), U.S. Census Bureau, Washington.
- Veblen, T. (1898), "Why is economics not an evolutionary science?", *Quarterly Journal of Economics*, Vol. 12 No. 3, 373-397 .
- Venediktov, A. V. (1948), *Gosudarstvennaya sotsialisticheskaya sobstvennost'*, (State socialist property), USSR Academy of Sciences press, Moscow-Leningrad, In Russian.
- Venediktov, A. V. (1940), *Organy upravleniya gosudarstvennoi sotsialisticheskoi sobstvennost'yu* (State socialist property governing bodies), *Sovetskoe gosudarstvo i pravo* (Soviet state and law), Moscow 5-6; 24-51. In Russian.
- Vernikov, A. V. (2012). The impact of state-controlled banks on the Russian banking sector. *Eurasian Geography and Economics*, Vol. 53, No. 2, 250-266.
- Wu, Y., Wang Z., and Luo D. (2009), "China's investment record and its fiscal stimulus package", *The University of Nottingham, China Policy Institute*. Briefing Series, Issue 50, March.
- Zhifeng, U. (2011), *Slovo i delo: infrastrukturnyi proryv* (Words and facts: Infrastructure breakthrough). *Vedomosti*, 2.06.2011, 99 (2865). In Russian.