An analysis of the Soviet economic growth from the 1950's to the collapse of USSR[*].

(Second draft)

Numa Mazat Numa Mazat[**]

Franklin Serrano[**]

Abstract: The purpose of this paper is to study the Soviet economic growth from 1950 to 1991, focusing on the questions of capital accumulation and structural change. The period will be divided into three phases, corresponding to different levels of economic growth and structural features. The first phase, from the 1950s to the beginning of 1970s, corresponds to a regime of extensive accumulation of capital with fast growth of output and per capita GDP. The next phase, from the 1970s to the Mid-1980s, corresponds to a period of economic slowdown, with an attempt to move to a regime of intensive accumulation. The third and last phase began in 1985 with the *Perestroika* reforms. It is characterized by poor economic performance and the dismantlement of the Soviet Economic System. Kalecki's contribution to the study of socialist economics is used, along with elements of the structuralist tradition and the modern classical approach.

I. Introduction

Before the First World War, Russia was an under-developed and industrializing country. In the words of Spulber (2006, p. 152): "notwithstanding […] the attempts at partial industrialization, by the beginning of the twentieth century, Russia was still a backward, agrarian, semi-feudal country". In the early 1920's, after the First World War, the 1917's Revolution and the Civil War, USSR has lost part of his limited capacity production and still remains an essentially rural country[1]. In a context of

[*] The authors would like to thank, but by no means implicate, profs. Carlos Medeiros (IE/UFRJ) and Carlos Pinkusfeld (IE/UFRJ) for useful discussion about the topic.

[**] Professor, Institute of Economics, Universidade Federal do Rio de Janeiro (UFRJ), Brazil.

[1] In 1926, only 17,9% of the Soviet population lived in towns (DYKER, p. 3).

international unanimous hostility, USSR economic recovery and industrialization was a necessary condition to survive, but, could be financed externally by foreign credit and investment only to a minor extent. Despite this difficult situation, Soviet economic mobilization and the adoption of a planned command economic model, in almost autarkic conditions, proved to be successful and USSR became an industrialized power before the end of the 1930's.

The purpose of this paper is to study the Soviet economic growth from 1950 to 1991, focusing on the questions of capital accumulation and structural change. Kalecki's contribution to the study of socialist economics is used, along with elements of the structuralist tradition and the modern classical approach.

The evolution of the Soviet economy from 1950 to 1991 can be divided into three phases, corresponding to different levels of economic growth (see table 1) and structural features. The first phase, from the 1950s to the beginning of 1970s, corresponds to a regime of extensive accumulation of capital with fast growth of output and per capita GDP. The next phase, from the 1970s to the Mid-1980s, corresponds to a period of economic slowdown, with an attempt to move to a regime of intensive accumulation. The third and last phase began in 1985 with the *Perestroika* reforms. It is characterized by poor economic performance and the dismantlement of the Soviet Economic System.

The paper is organized as follows. Section II deals briefly with the main characteristics of the Soviet economic system. Section III examines the determinants of high growth rates observed in USSR from the 1950s to the beginning of 1970s. Section IV discusses the reasons of the slowdown of economic growth from the 1970s to the Mid-1980s. Section V is focused on the analysis of the consequences of Perestroika and Glasnost reforms on the Soviet economic system, ultimately provoking its collapse. Section VI offers brief final remarks.

II. Main features of the Soviet economic system

The USSR was a planned command economy, which operated under conditions of capital scarcity, with state ownership of the means of production. Production was

directed towards use and not towards sale and profit. Full employment of labor was constitutionally guaranteed. The state had the monopoly of foreign trade.

Central planning allocated resources for the entire production process. In the USSR, economic activity was defined and subordinated to the instructions from above. The plan was imperative. As Stalin (in ELLMAN, 1979, p. 17) put it: "plans are not forecasts but instructions". "In both its design and implementation stages, central planning is based on a hierarchical pattern of national economy, which in turn presupposes obedience and discipline" (KOWALIK, 1987, p.390). The central planning organ in the Soviet Union was the *Gosplan* (State Planning Commission). The Gosplan was in charge of the elaboration of the production plans.

Thus, the pricing system was administered and the *Gosplan* defined goals of physical production for the whole economy. As pointed out by Kalecki (1966 [1993]) and Nell (1997), consumption of the workers was the adjustment variable between aggregate supply and aggregate demand, through forced savings. The production potential was limited by the stock of fixed capital, and its actual degree of utilization could be held low by a scarcity of circulating capital inputs or workforce (FEL'DMAN, 1928 [1964]; KALECKI, 1966 [1993], 1970 [1993]). The Soviet economy, as a socialist economy, was 'resource constrained', with "utilization parameters of resources determined […] by the supply side" (KORNAI, 1979). The minimization of the costs and the increase of efficiency were not priorities.

There was no problem of effective demand in the Soviet Economy, on the contrary to capitalist economy. As stated by Kalecki (1970 [1993], p. 113), in "socialist economies […] the problem of effective demand is really solved […]: prices are fixed by planning authorities in relation to wages in such a way as to achieve full utilization of resources (and this is true not only in the long run but even in a short period)".

The priorities of the Soviet system, at least until the end of the 1960's, were in order:

1) Economic growth thanks to investment
2) Military spending
3) Level of personal consumption of subsistence (food, clothing, housing)

4) Public consumption (spending on health, education, other social and cultural services)

So, diversification of consumption patterns (including consumer durables) was not considered a top priority before the 1970s.

As a command economy, USSR was characterized by a resource mobilization towards rapid industrialization (GROSSMAN, 1987). In the Soviet economic system, a priority was given to the allocation of investments to producer goods industries rather than consumer goods ones. This strategy was very clear as far back as the First Five Year Plan (1928-1933). Feldman (1964 [1928], p. 194), one of the leading Soviet economists of the 1920's stated that an "increase in the rate of growth of income demands industrialization, heavy industry, machine building, electrification".

The emphasis on heavy industry rather than light industry can be explained by the importance of the Soviet military-industrial complex. As Clarke (2007, p.11) argues:

> "the soviet system […] was a system of surplus appropriation and redistribution subordinated to the material needs of the state and […] of its military apparatus. […]The development of the system was not subordinated to the expansion of the gross or net product in the abstract […] but to expanding the production of specific materials and equipment – tanks, guns, aircraft, explosives, missiles – and to supporting the huge military machine."

The Soviet economy was heavily militarized because the country was constantly confronted with the hostility of the other foreign powers and especially the United States (and also China after 1960)[2]. This militarization of the economy had strong structural implications. The entire production of key sectors was controlled by the *VPK*, the Soviet military-industrial commission. Thus, most technological innovations and scientific breakthroughs were generally first allocated to military uses. Many industries were designed to be able to switch from civilian activity to the production of military equipment in a short notice. Similarly, many products such as transportation equipment (aircraft, trucks) had to be of dual use (both military and civilian). The geographic dispersion of industrial complexes was decided for strategic not economic reasons. The existence of large stocks of inventories was also necessary in this context of a "permanent war economy".

[2] In Gerschenkron's words: "there is very little doubt that […] Russian industrialization in the Soviet period was a function of country's foreign and military policies" (GERSCHENKRON, 1962, p. 148).

There was collective ownership and management of the land in the USSR since the collectivization process in the 1930s[3]. The collective farms were divided in two major categories: the kolkhozes and the sovkhozes. The kolkhozes were cooperatives and the sovkhozes were state farms. "Grain […] was a strategic raw material indispensable to the process of running the State and of industrializing it" (LEWIN, 1985, p.142). The collectivization was a way to ensure the supply of agricultural produce to the increasing industrial workers class. It facilitated the transfer of a significant part of agricultural surplus to the capital accumulation in the industrial sector (PREOBRAZHENSKY, 1926 [1964]; ALLEN, 2003). Thus, Gerschenkron (1962, p.146) noted that:

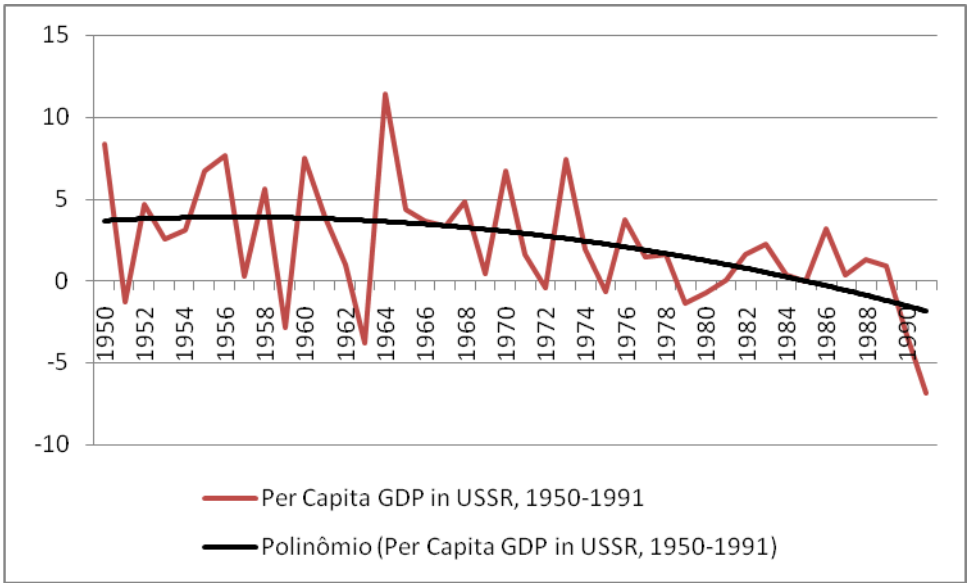
> "Once the peasantry had been successfully forced into the machinery of collective farms, once it became possible to extract a large share of agricultural output in the form of 'compulsory deliveries' without bothering much about the *quid pro quo* in the form of industrial consumers' goods".

III. The period of high economic growth (1950-1973)

The first phase, from the 1950s to the beginning of 1970s, corresponds to a regime of extensive accumulation of capital, with increasing rates of investment and fast growth of output and per capita GDP. Thus, the average annual per capita GDP rate was 3,6% during this period (see table 1). A major structural change, with large transfer of labor from agriculture to industry and technical progress incorporated in new machinery, happened. Agricultural production made a lot of progress during that period. The external trade structure of the USSR was marked by the limited size of foreign trade with capitalist countries.

[3] Private agricultural production also existed in the USSR. It covered household plots and privately owned livestock. Private agricultural output was negligible in grain and industrial crops but significant in the livestock sector and the production of fruits and vegetables (NOVE, 1977, p. 26-27).

Figure 1: Per Capita GDP growth rate in USSR, 1950-1991(1990 international Geary-Khamis dollars)



Source: Maddison (2006, p. 478-479).

Table 1: Average annual per Capita GDP growth rate in USSR (1950-1991)[4]

Period	Average per Capita GDP growth (%)
High economic growth (1950-1973)	3,6
Stagnation (1974-1984)	0,93
Perestroika (1985-1991)	-1,3

Source: Maddison (2006, p. 478-479).

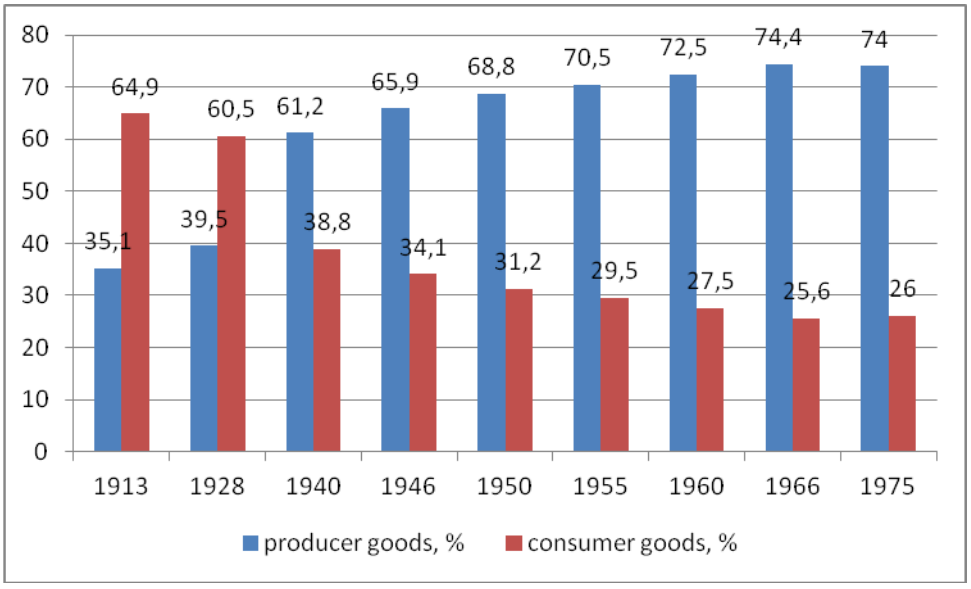
The economic development program of the USSR was based on a process of fast industrialization. The extensive Soviet growth model relied on the increase of the surplus thanks to the mobilization of additional resources.

[4] The reliability of official Soviet data has been the object of an intense controversy among scholars. Soviet statisticians were accused of manipulation for propaganda purposes by some Western specialists (mainly American). These accusations were generally rooted in ideological imperatives and "few indeed are those who believe that Soviet output statistics are invented. The consensus is that they represent the data which planners and statisticians themselves use" (NOVE, 1977, p.351). Other issue was the comparability of Soviet growth statistics with the Western ones. Soviet statisticians used the concept of 'Net Material Product' to measure the economic growth. 'Net Material Product' differed from 'Growth National Product' because it only took into account the activity of material production sectors, including only the services communication and information services supporting directly related the physical goods production, like freight transport, communication and information services,… (LAVIGNE, 1979, p.226-228; NOVE, 1977; ELLMAN, 1980). Reconstructions of Soviet growth statistics on Western lines have been made by many scholars and are very heterogeneous in terms of level of the average growth rate. But, they all show the same trend for the pattern of Soviet economic growth from 1950 to 1991 (KOTZ, 2007, p. 35).

The emphasis on heavy industry, capital goods and weapons was assumed by Soviet leadership. Besides, Stalin (1951 [1972]) wrote that "the national economy [of the USSR] cannot be continuously expanded without giving primacy to the production of means of production". In 1928, 'group B goods' (consumer goods) formed 60,5% of the Soviet industrial output and 'group A goods' (capital goods) constituted 39,5%. In 1950, the proportion was reverted and 'group B goods' (consumer goods) formed only 31,2% of the industrial production output whereas 'group A goods' (capital goods) constituted 68,8% (see figure 2).

But, the absolute priority on producer goods which characterized the Stalin era was soften when Kruschev rose to power. Kruschev declared in 1956: "now that we possess a powerful heavy industry developed in every respect, we are in position to promote rapidly the production of both the means of production and consumer goods" (DOBB, 1978, p.331). This strategy was confirmed in the 1960s[5]. Group A share in the Soviet industrial output continued to rise at a very low pace until the mid-1960s and begun to fall very slightly at the end of the 1960s and beginning of the 1970s (see figure 2). The attempt was to bring together the rates of growth of the producer goods and consumer goods sectors, maintaining the predominance of producer goods in the production of Soviet industrial output.

Figure 2: Division of Soviet industrial output between consumer and producer goods (in %).



[5] In the New Party Programme of 1961, "emphasis was again laid upon the importance of 'ensuring a rapid increase in the output of consumer goods' and 'an accelerated development of all branches of light and food industry'" (DOBB, 1978, p.327).

Source : ELLMAN (1979, p. 120).

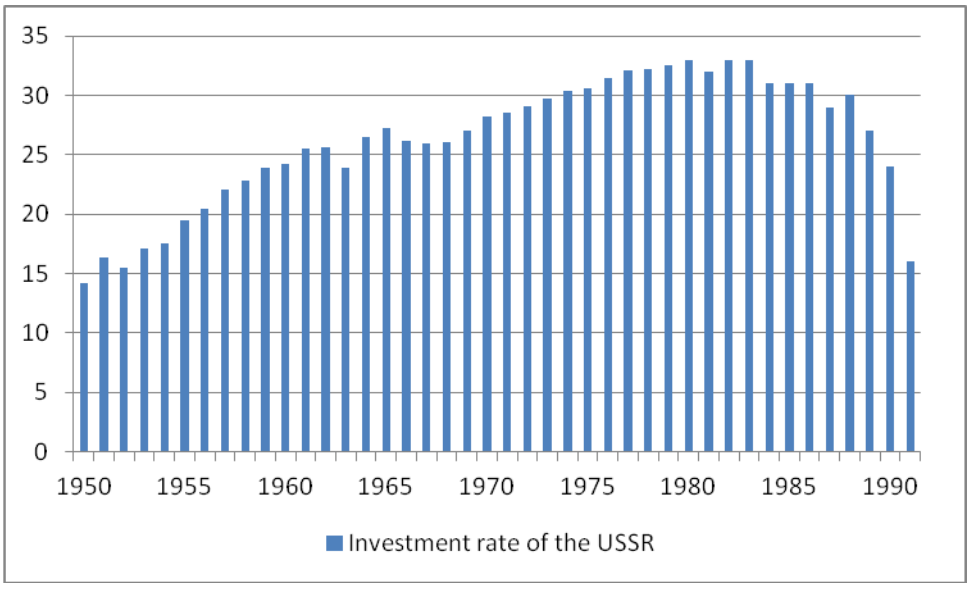
Innovation in the techniques and the productive organization, like the Fordism imported from the United States, were spread in the URSS all along the 1930's and generalized during the Second World War.

During the period of fast economic growth, the investment share increased a lot, from 14% in 1950 to almost 30% in 1973 (see figure 3). So, the growth rate of investment was higher than the growth rate of GDP during the period. This evolution was coherent with the model of extensive accumulation of capital chosen by the USSR, described above. In a situation of abundance of available labor force and of cheap circulating capital inputs, the only limiting factor in economic growth was capital. The investment was mainly concentrated in the heavy industry, and the sector of capital goods and weapons. But, the agriculture was not neglected and the tendency was to raise the share of agricultural investment in the total of investment.

This growth model was very successful until the 1970s and Gershenkron (1962, p. 150) could write in 1962 that:

> "By holding down forcibly the consumption of the population […], the Soviet government succeeded in channeling capital and human resources into capital formation".

Figure 3: Evolution of the investment share in the URSS (1950-1991)

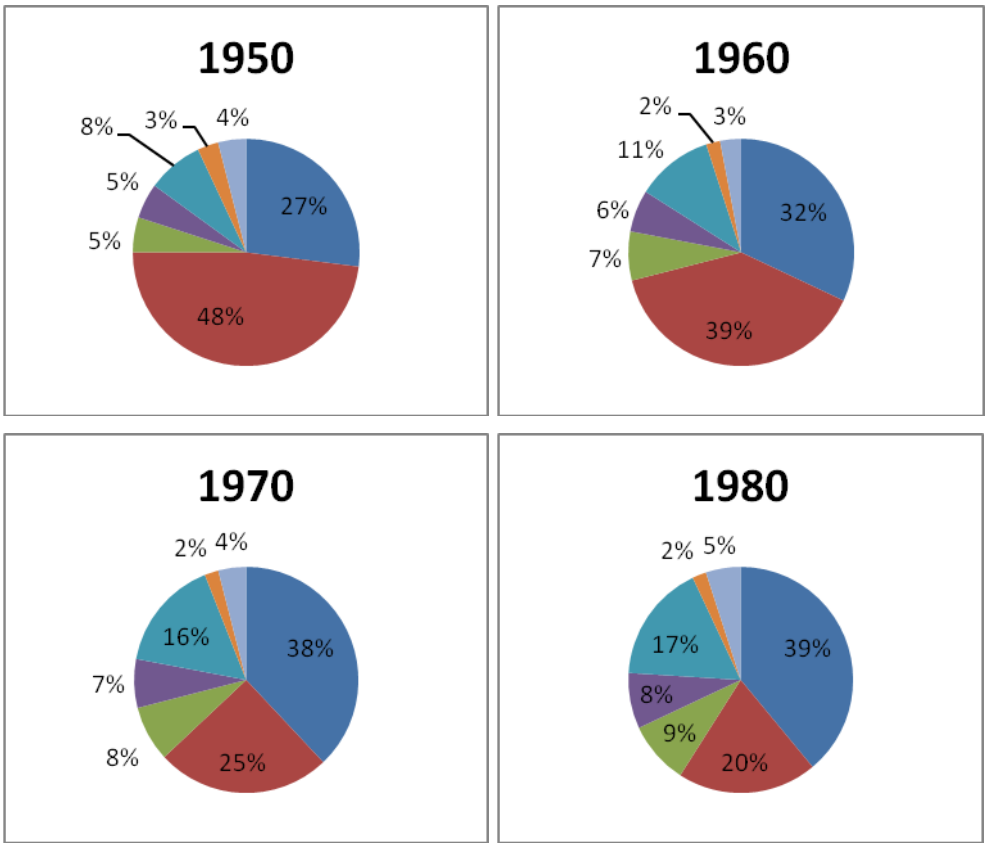


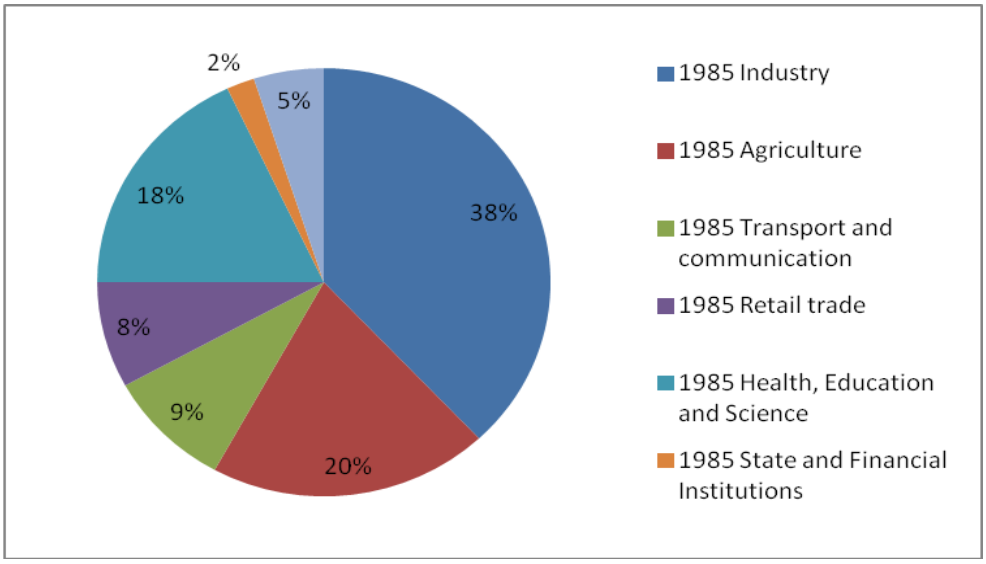
Sources: Joint Economic Committee (1982) & Federal State Statistics Service (2012).

With the emphasis on investment and producer goods, the consumption share dropped from 55% of the Soviet GDP in 1950 to 49% of GDP in 1970 (OFER, 1987). Despite this decreasing tendency, the patterns of consumption got better during the period, because of the relatively fast rate of growth of the economy and per capita income.

A major change in the structure of sectoral employment could be observed in the USSR during the period. It was the logical result of the intensive Soviet industrialization strategy, which begun in the 1920's and intensifies in the 1930's. Soviet growth was based on rapid expansion of industrial capital stock mobilizing the labor force which was in a situation of underemployment in the agricultural sector. This led to a large transfer of labor from agriculture to industry. So, in 1950, 48% of Soviet labor force worked in the agricultural sector whereas, in 1970, the proportion was only 25% (see Figure 4).

Figure 4: Evolution of the distribution of Soviet labor force (1950-85).

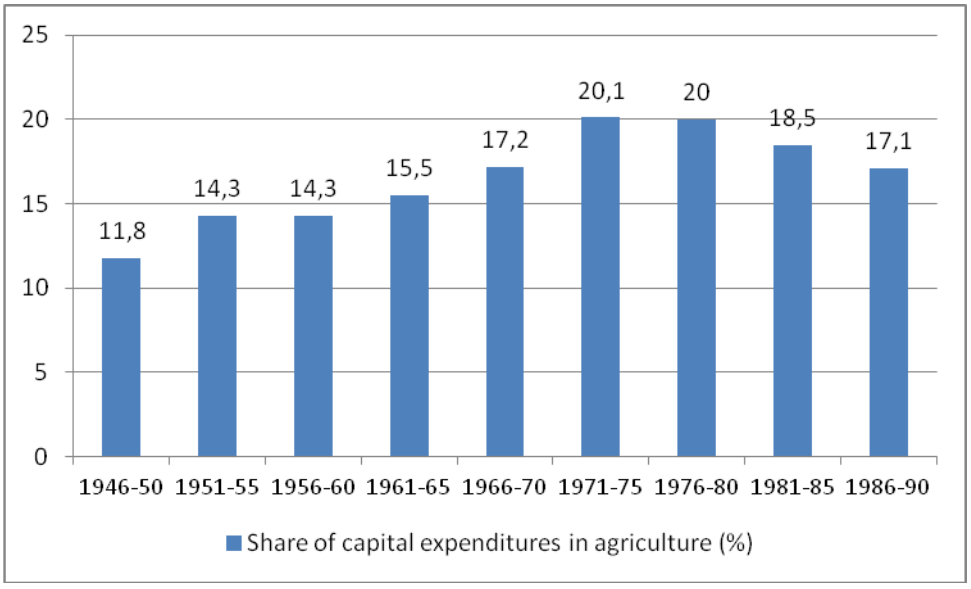




Source : Narkhoz in Slavic Research Center (2012).

After all, there was a structural high level of disguised unemployment in the Soviet rural areas, at least until the end of the 1950's. The productivity had also risen in the agricultural sector through investment in mechanization, even if its level was relatively low until the 1950's. The investment share of agricultural sector rose significantly from the 1950's (see figure 5) because Soviet leaders have noticed, already in this decade, that the disguised unemployment in rural zone was quickly disappearing. The end of easily available labor would mean that capital accumulation would lead to lower levels of economic growth. The level of agricultural output also should increase since Soviet URBAN population was rising and needing a better food supply.

Figure 5: Share of capital expenditures in agriculture (1946-1990).



Source : Narkhoz em Gaidar (2007, p. 87).

So, into preserving the Soviet growth model, it was necessary to enhance significantly the productivity of the agricultural sector. This was possible thanks to colonization of the "virgin lands" and more intensive mechanization, through an increase in agriculture investment. The colonization of the "virgin lands", advocated by Kroutschev, was an attempt to expand the cultivated land outside of the fertile *chernozern* fields which form the "black soil belt" in the South of Russia. Thanks to drainage, irrigation and the massive use of fertilizers and chemicals, the non-*chernozen* territories became large agricultural producers. This strategy yielded temporary success, at least until the early 1960's (GAIDAR, 2007, p. 85, VOLIN, 1970).

But, it is important to note that Soviet endowment in terms of agricultural soil and climate was particularly unfavorable, as compared to Western Europe and the United States. Soviet climate was characterized by the frequent occurrence of extreme cold and frost, limiting the length of the growing season and consequently the size of the harvests. It also explained the traditional weakness of animal rearing since the time of czarist Russia. Other trait of Soviet agriculture was the variation in yields from one harvest to another, essentially due to episodes of drought. Despite a high level of investment, mechanization and agronomical research, the increase of crop productivity only could be limited in the USSR because of these severe climatic features and natural conditions. They were responsible for the lower agricultural performance in the USSR than in Western European countries and the United States (BELLINGER & DRONIN, 2005).

The structural change led to a growth in labor productivity in the economy taken as a whole (see table 2), by the mere sectoral change with the transfer of workforce from agriculture to industry, which has a much higher level of productivity. The fast rise of productivity was also due to technical progress incorporated in new machinery, either in agricultural or industrial sector (see table 2). But, as pointed out by Nove (1972, p. 336), in the USSR, "such problems as training factory labor and building great new industrial complexes, seemed much more important than 'efficiency', or replacing machines by better machines".

Thus, improving the 'efficiency' of already installed productive capacity was not a priority of the Soviet economic system, at least until the 1970's. In almost all the sectors of the Soviet economy, every unit of output used to demand more resources to be produced than in the Western industrialized countries. For example, the average

quantity of raw materials and energy necessary to produce the same final good were, respectively, 1.6 and 2.1 times greater than in the United States in the 1970s (GAIDAR, 2007, p. 75). This situation was not due to an intrinsic 'inefficiency' of the central planning system. Actually, the 'efficiency' of installed productive capacity in the USSR was affected by the militarization of the economy, by the deterioration of the 'discipline' of Soviet workers and by the extreme climatic conditions in much of the country. The nature and the consequences of these *phenomena* will be presented below.

Table 2: Measures of Soviet economic performance (1950-1990)

Global		
	1950-78	1978-90
GDP	4,4	1,2
Population	1,3	0,9
GDP/capita	3,0	0,4
Labor force	1,6	0,3
Labor productivity	2,7	1,0

Setorial	**Agriculture**		**Industry**		**Others**	
	1950-78	1978-90	1950-78	1978-90	1950-78	1978-90
Value Added (VA)	2,4	-0,1	6,5	1,5	4,8	1,7
VA/capita	1,0	-1,0	5,0	0,6	3,4	0,9
Labor force	-0,7	-0,7	3,1	-0,2	2,6	1,0
Labor productivity	3,1	0,6	3,3	1,5	2,1	0,7

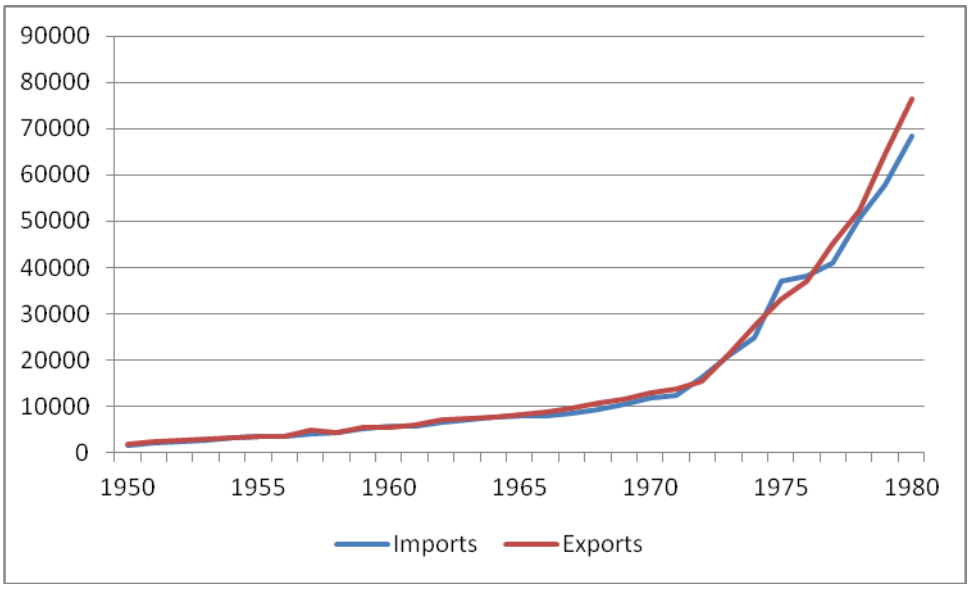
Fonte: Maddison (2001).

USSR emerged from the Second World War isolated, in the context of the Cold War with United States and its allies. The Soviet Union USSR did not benefit from the Marshall Plan[6] and ensured its satellites of Central and Eastern Europe would turn down

[6] Stalin was initially interested by the Marshall Plan proposal but finally rejected it because of the conditions (economic cooperation) the United States wanted to place upon participant states. Stalin was afraid that an economic cooperation between Western countries and the Easter block could lead to a loss

the American proposal (NOVE, 1992, p. 321-323). The creation of the Council of Mutual Economic Assistance (Comecon)[7] in 1949 was a Soviet answer to the Marshall Plan. Trade within Comecon was conducted under special arrangements, including barter deals, with the aim of developing the countries of the Soviet sphere and especially deepening their dependence on the USSR. So, the Comecon was an instrument to promote an economic integration of the Socialist block, the USSR being the dominant member. It was designed to create an 'international socialist division of labor' (LAVIGNE, 1979, p. 346). The terms of trade were very unfavorable to the Soviet Union, which exported raw materials and machinery and imports manufacturing products of poor quality or tropical goods from its allies[8]. Soviet raw materially were usually given away at well below world prices to the satellites countries. Plentiful credit with virtually no interest, subsidies and foreign aid were also granted (NOVE, 1992, p. 322-323; LAVIGNE, 1979). So, during the 1950's and the 1960's, the external trade structure of the USSR was marked by the limited size of foreign trade (see figure 6), primarily focused on the countries of the Comecon, for geopolitical reasons.

Figure 6: Evolution of total Soviet foreign trade from 1950 to 1998 (in millions of international Geary-Khamis US$)



of control over its satellites states. Besides, he said that "the only aim of Marshall Plan was to isolate the USSR" (Stalin in FEIJO, 2000, p. 185).

[7] The founding members of the Comecon were: USSR, Bulgaria, Hungary, Poland, Rumania and Czechoslovakia. Later, Cuba, Albania, German Democratic Republic, Mongolia and Vietnam also became members of the Comecon.

[8] Soviet exports were responsible for a major part of raw materials imports of the other Comecon members (60% of cotton and coal; 75% of petrochemicals; 80% of wood; 90% of iron ore and oil; 99% of gas) (LAVIGNE, 1979, p. 360).

Source: Smith, UN & International Statistic Yearbook, in Fernandes (1992).

IV. The period of economic stagnation (1974-1984)

The next phase, from 1975 to 1984, corresponds to a period of relative economic stagnation. The average per Capita GDP growth was less than 1% (see table 1)[9].

It had been shown that, in the traditional extensive Soviet model, economic growth was limited by capital and also depended on the availability of labor force and of cheap circulating capital inputs (raw materials). But, since the end of the 1960's, the USSR was suffering both of labor scarcity and of the depletion of natural resources at a low cost that existed during the earlier phase.

The labor scarcity was due to the depletion of the large reserves of underemployed rural workforce. The solution was to go on rising productivity in agriculture, by increasing investment in the agricultural sector, which had been done in the late 1950's and in the 1960's (see figure 4). But, this strategy was not working anymore because of low returns in agricultural investment. The intense chemicalization depleted soil mineral content, disabling the agricultural use of land in various areas. Moreover, despite huge investments in irrigation, virgin lands were region of weather extremes, where harvests were much less reliable and depended more on favorable climatic conditions than in the traditional agricultural zone of the Western and Southern USSR (BELLINGER & DRONIN, 2005, p.193-206).

Likewise, the excessive irrigation in some areas of the Soviet territory caused the exhaustion of hydrographic reserves. The most famous example of this phenomenon is the Aral Sea, used to supply with water the irrigation canals for cotton crop. The failure of Soviet agricultural strategy is demonstrated by the fact that state production of grain remained almost unchanged from the late 1960s to the late 1980s, despite the considerable investments in the sector during the period (GAIDAR, 2007). The Soviet agriculture Soviet yields were lower than Western countries yields for almost all agricultural products (COOK, 1992, p.199). Throughout its history neither Russia nor Soviet Union, under different social systems and patterns of organization of production

[9] It is worthy to observe that most of the capitalist industrialized countries also registered low growth economic rates in the late 1970's and in the 1980's.

and investment in agriculture never managed to overcome the formidable difficulties of improving productivity in very cold weather agriculture (BELLINGER & DRONIN, 2005)

Other factors explaining the chronic labor scarcity were the high level of women participation in gainful employment in the 1970's[10]. So there was no 'reservoir' of labor anymore. On the top of that, the demographic transition phenomenon[11] had been amplifying, since the late 1960's, reflecting the rising urbanization of the population, the growing female activity rate, the improvement in educational and the problem of housing shortage (BROWN et al., 1994, p. 25).

On the other hand, the traditional extensive Soviet growth model was also threatened by the depletion of natural resources at a low cost that existed during the earlier phase. The depletion of low cost mining districts and oil fields in the traditional areas of Western USSR led to a shift of investment from these regions to Siberia, where extraction was much more difficult and expensive, because of extreme atmospheric conditions and geographic remoteness (GADDY & ICKES, 2006).

In this situation of labor scarcity and depletion of natural resources at a low cost, the traditional Soviet extensive growth model could no longer be successful. By the 1970s Soviet leadership identified the problem already and tried to move to a regime of intensive accumulation, with minimization of the costs and increase of 'efficiency' (CIA, 1986). But, the attempt to change the composition of the investment and to raise the productivity into improving the 'efficiency' failed (see Table 3). This failure was due to the inability to change the attitude toward retirement and replacement of the installed fixed capital, the difficulty in the incorporation of technological innovation in civilian industry, the militarization of the economy, the deterioration of the 'discipline' of Soviet workers and the high cost of the industrialization in Siberia, as it will be shown below.

[10] 51% of the Soviet workforce in 1973 were women (NOVE, 1977, p. 216).

[11] The birth rate massive decreasing - from 4,4% in 1926 to 1,59% in 1975 – was not compensated by the drop of death rate - from 2,37% in 1926 to 0,86% in 1975 (MARCHAND, 2008, p. 258).

Table 3: Rates of change of real Gross Product, Factor Inputs and Productivities in the USSR (average annual percentage).

Period	Real Gross Product	Factor inputs			Factor productivities		
		Total	Labor	Fixed Capital	Total	Labor	Fixed Capital
1961-73	5,0	4,3	1,8	8,1	0,7	3,1	-2,9
1974-78	3,4	3,8	1,4	7,4	-0,3	2,0	-3,7
1979-85	2,1	3,1	0,8	6,4	-1,0	1,2	-4,1

Fonte: CIA (1986).

The ageing of installed fixed capital has been a permanent problem of the Soviet system. Thus, the service life of fixed capital in the USSR was very high if compared with capitalist countries (CIA, 1986; POPOV, 2002). It is explained by a very low retirement rate due to the focus on capital expansion[12], rather than the improvement of installed machinery and equipment. Popov (2002) provides a convincing explanation for that phenomenon:

> "The reason for massive investment in the expansion of capital stock at the expense of investment to replace retirement was the permanent concern of Soviet planners about expanding output and meeting production quotas. Replacing worn out aged machinery and equipment usually required technical reconstruction and was associated with temporary work stoppage and reduction in output. Even if the replacement could have been carried out instantly, the resulting increase in output (because of greater productivity of new equipment) was smaller than in case of the construction of new capacities or the expansion of existing capacities: in the latter case there was a hope that the new capacities would have been added to the existing ones that will somehow manage to operate several more years".

So, even with the USSR leadership's attempt to move to an intensive regime of accumulation, the policies toward an acceleration of the retirement and the replacement of fixed capital failed. So, the age of the capital stock rose (see table 4) and the fixed capital productivity decreased sharply (see table 3).

[12] By the 1980s, "while in the U.S. manufacturing 50-60% of all investment was replacing retirement, and only 40-50% contributed to the expansion of capital stock, in Soviet industry the proportion was reversed: replacing the retirement required about 30% of gross investment, while over 70% contributed to the expansion of capital stock or to the unfinished construction" (POPOV, 2002).

Table 4: Age characteristics of equipment in Soviet industry.

Years	1970	1980	1985	1989
Share of equipment with an age of:				
- less than 5 years	41,1	36,0	33,7	31,6
- 6-10 years	29,9	28,9	28,5	28,6
- 11-20 years	20,9	24,8	25,5	26,2
- over 20 years	7,8	10,3	12,3	13,7
Average age of equipment, years	8,3	9,3	9,9	10,3
Average service life, years	24	26,9	27,9	26,2
Accumulated depreciation as a % of gross (initial) value of capital stock	26	36	41	45

Source: Narodnoye Khozyaistvo SSSR (Narkhoz) in Popov (2010).

Another factor explaining the acceleration of the decrease of fixed capital productivity was the fall of capacity utilization fell, mainly because of labor scarcity.

The limited incorporation of technological innovation in civilian industry was another problem of the Soviet system and an obstacle to the transition toward an intensive regime of accumulation. Scientific research was at a very advanced level in the USSR, but the scientific innovations were only partially incorporated to the production process, except in the military-industrial complex. This situation can be explained by the confiscation of innovations by the military industry, these innovations being 'released' for civilian purpose only after MANY years. There was not the 'spillover' that can be observed in the United States between military and civilian industries (MEDEIROS, 2004). Most advanced research was done in scientific institute instead of the universities and many general scientific breakthroughs were, if considered as potentially having any military application immediately considered classified and kept within the military industrial complex. This helps to explains why Soviet technology in civilian sectors usually lagged behind that of the West and why this technological gap used to widen during the period (AMANN & COOPER, 1982).

Beyond its negative effect on the diffusion of the technological innovations, the militarization of the economy was a burden in terms of investment. The *détente* and the *Ostpolitik* of the 1970s seemed to signal a relaxation of the Cold War tension but the situation worsened at the end of the decade after the Afghanistan conflict and the coming to power of Reagan in the United States. So, the expansion and the diversification of investment in the civilian sector were considerably limited by the irreducible share of the surplus invested in the military industrial complex (MEDEIROS, 2011, p. 17).

Another major obstacle to the adoption of a regime of intensive was the so-called 'relaxation of discipline'. As it has been shown by Kalecki (1943 [1990]), a situation of full employment in a capitalist economy would create the conditions of a wage explosion, which happened in the West, contributing to the end of the Golden Age. In the USSR, the full employment and the progressively more open political system had negative effects on both the discipline and the economic mobilization. As the threat of unemployment had never existed in the USSR, the pressure of punishment was playing this role. However, the 'relaxation of discipline', which begun with the de-Stalinization[13] process under Krushev, intensified all along the 'Brejnev Era' since State coercion was becoming weaker and weaker. At the same time the situation of actual scarcity of labor from the mid seventies strengthened the bargaining position of workers relative to the managers of state firms. The deterioration of discipline meant a minor adherence to commands such as output targets, technological rules and regulations. Enterprises manager faced more and more difficulties into controlling their employees (ELLMAN & KANTOROVICH, 1992, p. 10-11).

At this stage, there were several attempts to improve the Soviet Welfare State, reorder priorities and reform the planning system to enable to increase the quantity and the quality of consumer goods. But, even if Soviet Welfare State did really improve during the period, it was not sufficient. Furthermore, the attempts to produce a broader range of products and enhance their quality were not successful and it was necessary to increase dramatically the imports of consumer goods, as it will be shown below.

The industrialization of Siberia also represented a significant economic burden for the USSR, hindering the intensification of the Soviet regime of accumulation. By the

[13] The ideological adhesion to the regime was also weakened by the de-Stalinization process.

1960s and the 1970s, giant civilian and military industrial projects were launched in the Siberia. The Soviet leadership intended to deepen the geographic dispersion of the industrial complexes in case of war[14]. But, the attempts were also to exploit the abundant natural resources in Siberia and to settle a scarcely occupied territory. The extreme climatic conditions in Siberia and particularly the cold[15] represented a huge loss in terms of labor and fixed capital productivity compared to the situation in temperate climate regions. The machines and equipment had to be adapted to resist to the extreme cold. Despite these efforts, the cost of repairs and maintenance of installed fixed capital was much larger in Siberia than in Western USSR. Soviet authorities had also to offer higher wages and expensive amenities to convince the workers to migrate to these inhospitable and remote regions. The remoteness of Siberia was also responsible for huge investments in transport infrastructure.

The industrialization of Siberia was really a heavy burden since:

> "In the late 1960s, the extreme cold regions claimed 30 percent of all Soviet trucks, 37 percent of the bulldozers, 35 percent of the excavators, 33 percent of the tower cranes, 62 percent of the drilling equipment, and 64 percent of the tracked prime-movers. […] Siberia claimed far more of its share of Soviet construction machinery than even its high rates of development would warrant". (GADDY & HILL, 2003, p. 50).

The switch from oil to gas in the Soviet in the Soviet industry into increasing the oil export capacity also, phenomenon which be explained later. It represented also a huge cost for the USSR, 'consuming' a lot of investment without increasing the industrial production. On the contrary, it contributed to lower even more the fixed capital productivity (SAGERS & TRETYAKOVA, 1986).

Furthermore, central economic planning was increasingly complex and difficult to be directed, because of the proliferation of the large number and varieties of new products to be administered.

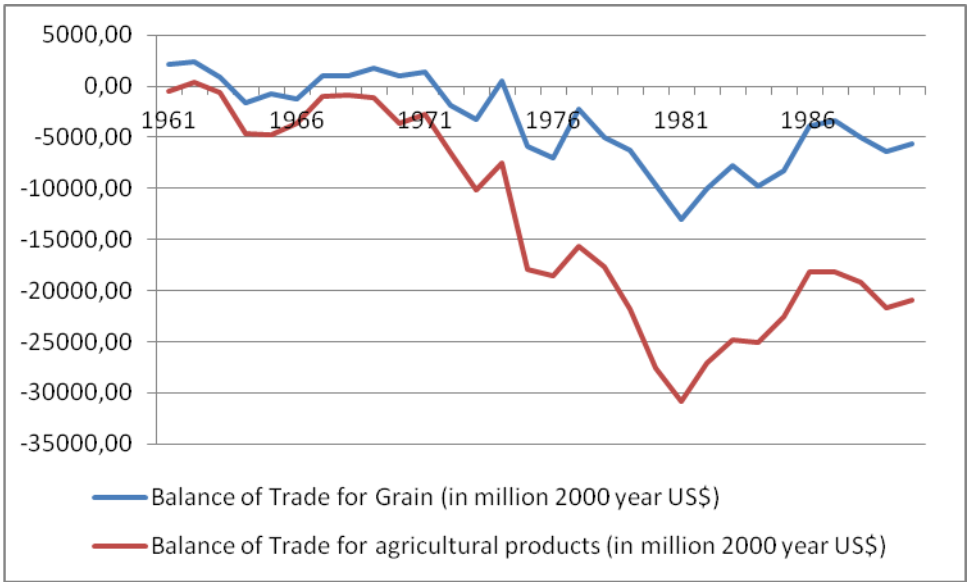
The attempt of Soviet leadership to move to an intensive regime of accumulation failed but, at the same time, life standards were increasing in the USSR with the

[14] During the Second World War, the Western part of the USSR, where a considerable share of the productive potential of the country was concentrated, was occupied by the German troupes. It had dramatic consequences on the Soviet war effort and the USSR almost lost the war. As a consequence, the industrialization of Siberia was intensified.

[15] The average January temperatures in Siberia range from –15 to –45 degrees Celsius (GADDY & HILL, 2003, p. 50).

urbanization of the population. Soviet demand for food and especially meat was rising much faster than the local supply, because of low agricultural productivity and stagnation in the production of grain. Despite rising income and increasingly costly agricultural production, food prices, controlled by the State, remained almost unchanged, at low level, which required larger and larger financial assistance for the agriculture and explains the rising demand (COOK, 1992, p.199). On the top of that, many cattle farms were created in the 1970s to attend the growing demand for meat. That meant a huge increase in the need for grain as livestock feed (GAIDAR, 2007, p.119). The only solution was to import these agricultural goods and it drove the USSR to become the largest importer of cereals in the world in the 1970s (GAIDAR, 2003). Besides, the balance of trade for grain and agricultural products worsened dramatically at the beginning of the 1970's (see figure 7).

Figure 7: USSR balance of trade for grain and agricultural products (1961-1990).



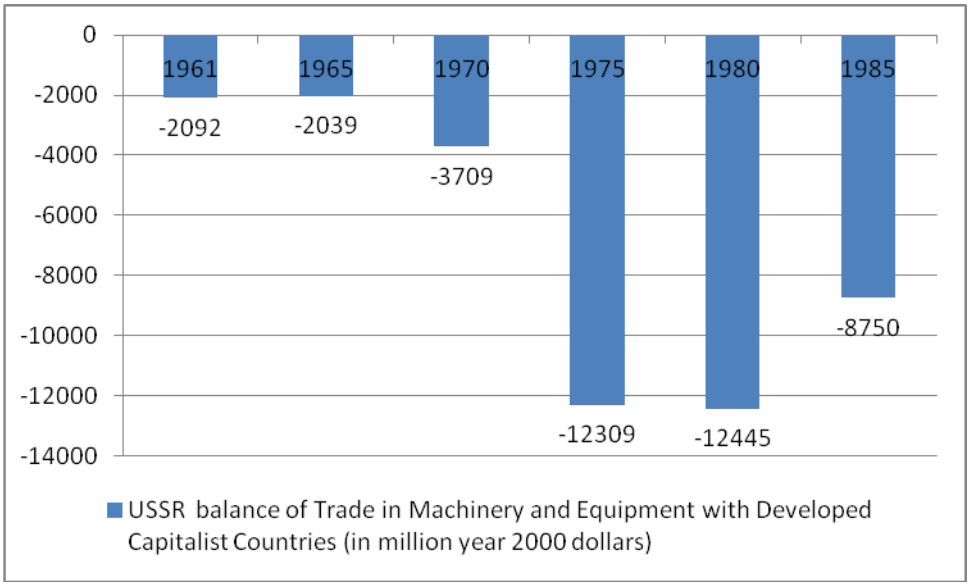
Source : FAO (2012) & COOK (1992, p. 196).

The Soviet population also wanted more consumption goods and consumer durables of better quality. But the cold war continued to require massive expenditure of resources in the military sector. At this stage several attempts to reorder priorities and reform the planning system to enable to increase the quantity and the quality of consumer goods, but they all failed. As local production was unable to fulfill entirely this demand, imports of these categories of product were necessary, especially from the West.

The Soviet Union had also to import technology and capital goods in the sectors of information technology, electronics and fine chemicals from the advanced industrial

Western economies. Buying Western goods was also considered useful to break production bottlenecks and eliminate shortages of specific products (HANSON, 1981, p.135). Technological transfers were aimed at accelerating the creation of new industries, the modernization of old ones and the increasing of productivity. Moreover, they were an attempt to solve the problem of the lagging Soviet technological progress in the civilian industry analyzed above. So, the USSR had to rely increasingly on the imports of capital goods from the West into limiting the widening of the technological gap (see figure 8).

Figure 8: USSR balance of Trade in Machinery and Equipment with Developed Capitalist Countries (1961–85).



Source : GAIDAR (2007, p. 99).

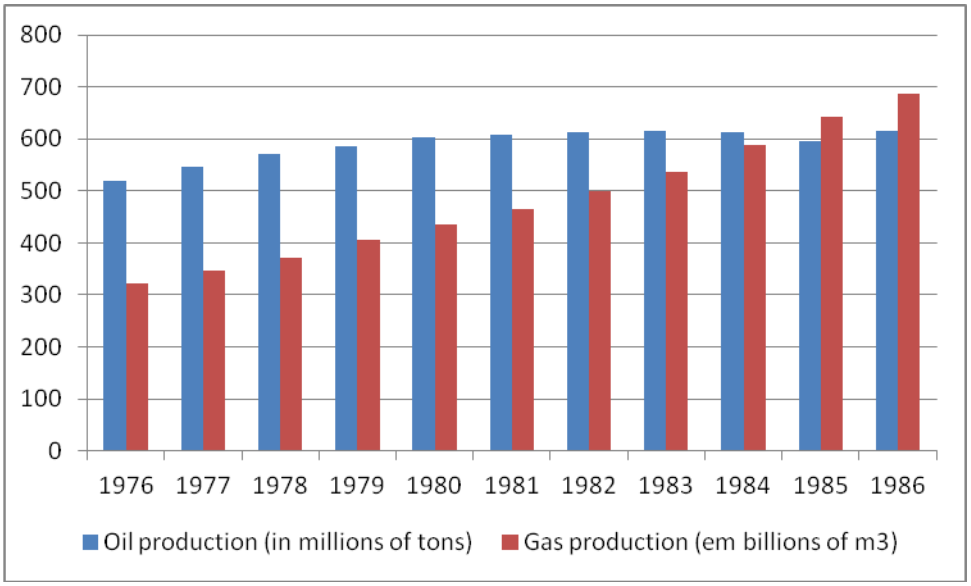
Because of the necessity to import agricultural products (mainly grain), consumer goods, technology and capital goods, the pattern of external trade of the USSR had to change drastically during the 1970's. However, USSR problem was to find a way of financing the rising imports in hard currencies needed by the country. The 1973 oil crisis provided this opportunity, allowing a boom of Soviet foreign trade

Soviet foreign trade experienced a boom after the 1973 oil crisis, driven by exports of oil and gas, whose price were unprecedented high. A massive switching from oil to gas in internal Soviet energy supply (see figure 9) enabled to raise dramatically the volume of oil available for export (SAGERS, M. J. & TRETYAKOVA, 1986). The construction of gas pipeline mostly financed by foreign investment[16] was also a way to

[16] The first agreement was signed with Germany in 1970.

export gas and obtain more hard currencies from Western European countries[17]. Soviet weapons exports also benefited from the large amount of petrodollars in the hands of OPEC countries. Consequently, Soviet foreign trade averaged almost 20% of Soviet GDP in 1980. It means that USSR, a still autarkic country in 1950, had reached a level of trade openness almost equal to that of the United States at the end of the 1980's.

Figure 9: Evolution of Soviet oil and gas production (1976-1986).



Source: Joint Economic Committee (1987).

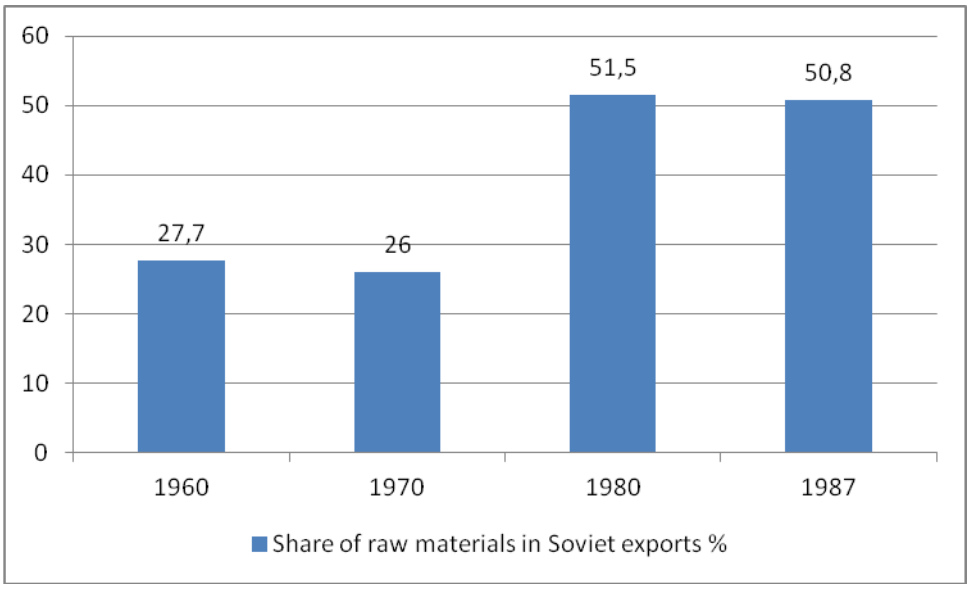
As a consequence of all this process, the profile of foreign trade partners also evolved. The annual Soviet trade with the OECD members jumped from less than 20 percent of USSR total trade in the 1960s, to 31 percent in the 1970s (JOINT ECONOMIC COMMITTEE, 1979, p. 52). Soviet exports to Western economies increased at an annual growth rate of 26 percent from 1970 to 1980 (SMITH, 1993). Soviet imports from the West also increased at a fast pace during the 1970s and the USSR incurred major trade deficits with its hard-currency trading partners. Theses deficits could be easily financed by foreign loans thanks to the context of abundance of liquidity (petrodollars) in the 1970s.

Another consequence was a deep change in the structure of Soviet foreign trade. The share of raw materials in the total exports of the USSR increased a lot, rising from

[17] Western European country were eager for Soviet gas because the explosion of oil international price. All along the 1970's and the 1980's, they realized a gas for oil substitution (SAGERS, M. J. & TRETYAKOVA, 1986).

26% in 1970 to more than 50% in 1980 (see figure 10). So, the share of manufactured and capital goods was decreasing.

Figure 10: Evolution of the share of raw materials in the total exports of the USSR (1960-1987).



Source: Federal State Statistics Service – Russia (2012).

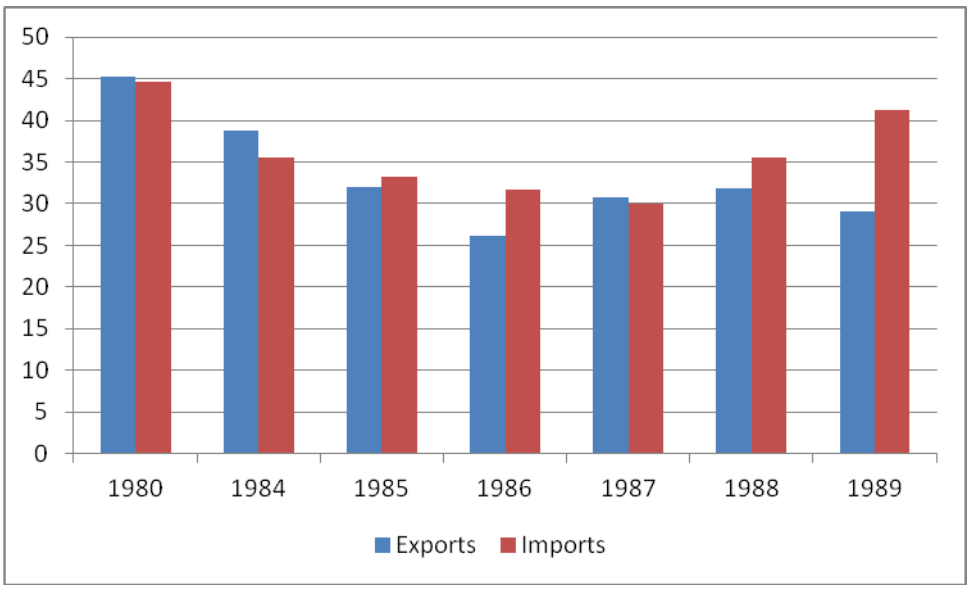
The new trend in the Soviet foreign trade created a situation of structural external vulnerability. First of all, the share of raw materials (mainly oil and gas) in the Soviet balance of trade was becoming higher and higher. This specialization in raw materials was a factor of vulnerability because the value of Soviet exports was depending more and more on the evolution of international prices, specially of energy (oil and gas), which are very volatile.

The structural external vulnerability was also reinforce by the vital and growing dependence of the USSR on the imports of such important goods that agricultural products, machines, equipments and technology. This situation was even more unusual and worrying if considering the fact that USSR was one the two Superpowers of the world at the time.

Besides, when, after the peak of 1979, international oil prices began to decrease, the value of Soviet exports dropped. The international abundance of liquidity had finished after Paul Volker's decision to raise brutally the interest rates of the American Federal Reserve in 1979. So, Soviet imports from capitalist developed countries had also to be diminished in the beginning of the 1980s (see figure 11), which deepened shortages of meat and consumer goods. On the top of that, the United States and some of its allies decided to forbid the exportation to the USSR of many goods in retaliation

of the Soviet intervention in Afghanistan[18]. It was part of a global strategy of the United States to weaken the USSR in the 1980s, using Soviet external dependency. Some analysts also consider that the drastic fall of international oil price in the MID 1980S , caused by a sudden massive increase in the exports of Saudi Arabia was part of this strategy (SCHWEIZER, 1994).

Figure 11: Soviet trade with capitalist developed countries 1980-1989 (billion 2000 dolars).



Source: GAIDAR (2007, p. 123).

From the 1970s, the structural external vulnerability became a permanent feature of the ussr, and the very low price of oil from the mid 1980s had an important impact on the final collapse of the Soviet system in the following decade.

V. The *Perestroika*: the dismantlement of the Soviet economic system (1985-1991)

The next phase, from 1985 to 1991, corresponds to a period of economic recession. The average per Capita GDP growth was -1,3 % (see table 1).

The accession of Mikhail Gorbachev in 1985 marked the beginning of the *Perestroika* (reconstruction in Russian) period. The economic reforms implemented were intended to deeply change the Soviet system. According to Gorbachev, the two

[18] The number of goods which export to the USSR was forbidden raised from 125 in 1979 to 800 in 1982 (FERNANDES, 1992).

main goals of the *Perestroik*a reforms were to stop the slowdown trend of Soviet economy and to raise the life standards of the population. Soviet reformers considered that these two interconnected objectives could be achieved through the resolution of the problem of the 'relaxation of discipline' and a change in the means of coordination of the economic system. They thought that the rigid central economic planning must be softened, with a certain degree of decentralization was required and a direct participation of the workers to the management of the enterprises. But, the most radical change in the mode of functioning of the Soviet economy intended by the *Perestroika* was the creation of a private sector and the introduction of market mechanisms. Thus, Nuti (1990) wrote about the *Perestroika* in 1990 that:

> "In the last five years the Soviet Union has introduced many measures of economic policy and radical reform intended to reduce the scope of central planning and to activate market mechanisms, in order to mobilize resources, increase their productivity directly and through greater integration of the Soviet economy into world trade, so as to resume and accelerate economic growth".

A spate of laws and decrees was passed to implement the reform program. The Law on State Enterprise, which granted substantial autonomy to state enterprises, was adopted in 1987. The Law on State Enterprise defined that central plans were becoming indicative and not obligatory any more. Enterprises were given target for the value of their output by the central planning but detailed plans of inputs-outputs for each company were abandoned. Government contracts were substituting state orders and only a part of the production of enterprises was bought by the State. The remainder of enterprise output should be sold through wholesale trade directly between the companies. Thus, Soviet enterprises were free to determine the nature of part their output. The pricing system was not any more entirely controlled by the Gosplan. A growing number of prices could be set freely, even if the price of basic and strategic goods (energy, raw materials, health sector...) remained under State control.

Moreover, Soviet enterprises became free to choose the buyers of the remainder products. The self-financing of the enterprises, through retained earnings and bank loans, was also adopted (GOLDMAN, 1992).

The introduction of workers self-management in the Soviet enterprises, inspired by Yugoslavian experience, was intended to create a motivational system so as to solve the problem of the 'relaxation of discipline', even though quite the contrary happened. Labor Councils, elected by the employees in each enterprise[19], were responsible for the

[19] The management of the enterprise, including the director, was also elected by the workers.

discipline, the determination of the level of wages and for the distribution of profits between investment and incentive funds for employees (Kotz, 2007, p. 76-77).

The autonomy of the state enterprises had many negative consequences on the operation of the Soviet economic system. It disorganized the coordination of the economy previously ensured by the Gosplan, which was losing progressively its control over the Soviet Economy. It created bottlenecks and deepened the shortages (DI LEO, 1991). The Labor Councils took also advantage of the autonomy by increasing the share of profits going to the incentive funds at the expense of investment (see table 5). Thus, the share of profits retained by the enterprises going to incentive funds represented 82% in 1988 and almost 95% in 1989 (see table 5). Most of the increase in incentive funds was used to raise wages. Thanks to the *Glasnost*[20], strikes became allowed. It resulted in a wave of workers strikes which led to other wage increases (COOK L.J., 1992). Soviet system was more and more behaving like a capitalist economy. These words of Kalecki (1943 [1990], p. 351), quoted from the same text used in section IV show it clearly and happened to be premonitory:

> "Under a regime of permanent full employment, the 'sack' would cease to play its role as a disciplinary measure. The position of the boss would be undermined and the self-assurance […] of the working class would grow. Strikes for wage increases and improvements in conditions of work would create political tension".

The accelerated increase of real wages, in a context of growing shortages, worsened the problem of excess demand in the USSR. It also contributed to the growing inflation in the country.

Table 5: Distribution of enterprise profit in the USSR, before and after the 1987 reform (billion roubles).

	1986	1987	1988	1989
Total profit of state enterprises	198	206	237	265
Profit paid to State budget	101	95	92	95
Share of the Total profit paid to State budget	0,51	0,46	0,39	0,36
Profit retained by enterprises,	91	97	119	138
Of which: paid into enterprise incentive funds	34	33	97	130

[20] The Glasnost ('openness' in Russian) established freedom of individual expression and opinion.

Source: Narkhoz in Ellman & Kantorovich (1992, p. 115).

Before the Law of 1987, the Soviet State had had a total control over the enterprises, obtaining from them whatever revenues were required for the central budget. But, the situation totally changed with the adoption of the enterprise autonomy since the State could not collect any more whatever tax it need. Thus, the rising size of the incentive funds also meant that the share of profit paid to state budget was lowering (see table 4). It aggravated the increasing state deficit.

The freedom to determinate the prices of products out of the state contract disorganized the pricing system. The consumer goods enterprises, which had become profit-seeking because of their newly acquired autonomy, shifted their production from basic goods to 'new products', which embodied minor alterations to existing items and were more profitable. After all, these 'new goods', for which State controlled prices did not exist, were higher-priced and carried a larger markup. The effect of this enterprises strategy was a rising shortage of basic consumer goods. The activity of the illegal secondary markets was also growing fast, with 'backdoor channels' for people able to pay above fixed retail prices of basic goods (SMITH, 1993, p. 107-109; KOTZ, 2007, p. 79). So, many goods had, at the same time, a state price, a free-market price (for some very closed variant of the good) and a black market price. As State statistics did not take into account the 'new goods' and the products sold on the black market, they did not captured the hidden inflation and official records did not show the inflationary process in progress (SMITH, 1993, p.109). The prices depended also sharply on the place of residence (ELLMAN, 1990).

The Law on Individual Labor Activity, approved in 1986, had been a first step in the direction of the creation of a private sector in the USSR but its scope was very limited. However, the Soviet Law on Cooperatives, approved in 1988, represented the real birth of Soviet private sector. According to this law, the cooperatives could function as private enterprises and do not obey to the plan. Multiple memberships of production cooperatives by a single person were also allowed, which means the opportunity to create a new class of businessmen with activities in multiple sectors of the Soviet economy. Cooperatives had the right to engage in credit activities, i.e. they constituted the embryo of a system of private financial institutions. Cooperatives had access to foreign trade and they could retain part of their export earnings supposedly to finance their imports necessities. They also could participate in joint ventures. A cooperative

could hire employees who were not members of the cooperative. It meant that private employment was introduced in the Soviet system. The size of earnings was not limited. Cooperatives can sell or lend their means of production. The markup was supposed to be controlled by central authorities. Actually, cooperatives were free to set their prices (NUTI, 1989).

The cooperatives were intended to be small-scale businesses providing goods and services which were not offered by big State enterprises. But, cooperatives had all kinds of activities and many of them became big companies and operated in trade and finance. So, the Law on Cooperatives gave birth to a lot of capitalist firms. The cooperative model was so successful that, by July 1989, barely one year after the approval of the law, almost three million people were working in cooperatives (JONES & MOSKOFF, 1989). At the end of 1991, they were more than 6,2 million (NOVE, 1992, p. 403). Many cooperatives were created by the managers and employees of the state companies. They usually bought goods produced by their own enterprise at state controlled prices, processed them in the cooperative, usually without any significant alteration, and sold them at much higher free prices. These practices contributed to increase even more the shortage of consumer goods in the USSR. Furthermore, many State enterprise managers became real capitalists and accumulated huge wealth thanks to their 'cooperative activity'.

This accumulation of wealth in the hands of State managers increased dramatically thanks to the decentralization of foreign trade, established by the decree "On the Foreign Trade Activity of State, Cooperative, and other Enterprises" in December 1988. This decree removed State controls over foreign trade. So, many cooperatives bought good (specially raw materials, metals, oil,…) at the low State domestic prices and sold them abroad for hard currency (GUSTAFSON, 1999, p. 27). It was very lucrative and some managers enriched themselves a lot, forming a group of wealthy capitalists for whom "proceeding to capitalism was essential to the survival of their new businesses" (KOTZ, 2007, p. 90). They played a central role in the collapse of the USSR by financing the pro-capitalist coalition and deepening the Soviet economy imbalances.

The partial freedom of State enterprises to set prices and the total one of Cooperatives disrupted the Soviet distribution system. State enterprises and cooperatives took advantage of the free price-setting to increase prices, which allowed

higher profits. So, thanks to the increase in profitability and their autonomy, cooperatives and State enterprises could raise their employees' wages. The consequence was a differentiation in wages in State enterprises depending on the extent of their free price-setting[21]. Though, cooperatives, which had an entirely autonomous price-fixing, could offer the highest wages. Besides, average wages were 2,5 higher in cooperatives than in State enterprises. All this process had been identified by Kalecki almost 40 years before Perestroika in a paper about 'central price determination'. He wrote:

> "Under the system of [autonomous] price-setting, enterprises may, despite everything, exploit various opportunities for unjustified price increases and thereby raise their profits. […]
> A further problem arising out of autonomous price-fixing by enterprises should be pointed out. This is the possibility that unwarranted differences in income between workers in different enterprises may arise, which may cause dissatisfaction" (KALECKI, 1958 [1992], p. 119).

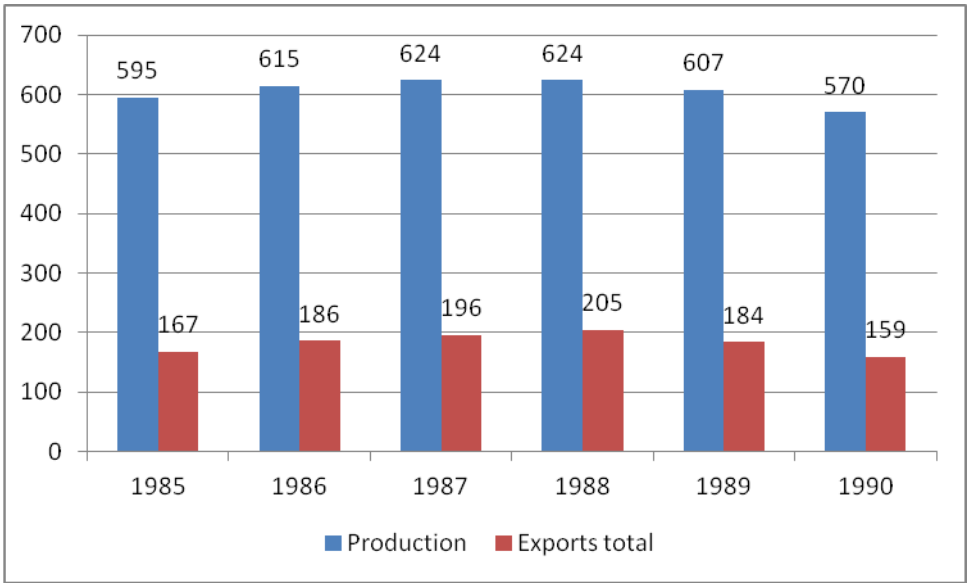
The structural external vulnerability described in Section IV worsened during the Perestroika. World oil prices fell sharply in 1986 and remained very low so that Soviet current balance of payment deteriorated during the Perestroika (see table 4). The situation became all the more unsustainable that the Soviet oil production began to fall in 1989 (see figure 12) because of the overuse of the most productive deposits (GAIDAR, 2007, p. 166). As a consequence, official[22] oil exports dropped[23] (see figure 12), increasing the problems with hard currency. The deficit in the current account of the balance of payments also worsened because of the increasing domestic needs for consumer and agricultural goods due to the shortages. Finally, the exports dropped by 33% and the exports fell by 44% in value in 1991 compared to 1990 figures (SMITH, 1993, p. 174).

Figure 12: Soviet oil production and foreign trade 1985–90 (million tonnes)

[21] Typically, the bigger was the share of production for which the enterprise was free to set the prices (i.e. the smaller was price-controlled production), the higher were profits and wage rises.

[22] Major quantities of oil, embezzled from the State enterprises by cooperatives, were negotiated abroad from 1988. These operations were generally illegal and did not appear in official records since hard currency payments were usually kept abroad.

[23] Official oil exports fell by almost 50% from 1989 to 1991 (NOVE, 1992, p. 413).



Source: SMITH (1993, p. 141).

Moreover, the end of communism in Central and Eastern Europe marked the end of the Comecon, which had a very negative impact on Soviet foreign trade.

A consequence of the deterioration of the current balance of payments and of the internal economic difficulties was the fast degradation of the conditions of foreign financing. Thus, the terms of Western banks loan worsened with rising rates and shorter deadlines. As a result, foreign net debt rose from 14,9 billion dollars in 1985 to 45,4 billion dollars in 1991 (SMITH, 1993, p. 159). The USSR had to use its gold and hard currency reserves but they were insufficient to finance the long-term deficit of the balance of payments. Western private banks totally cut credit lines at the beginning of 1991. The USSR tried unsuccessfully to obtain loans from foreign governments from 1989 to 1991, promising political and diplomatic compromises in order to get them. The Soviet gold and hard currency reserves finally exhausted at the end of 1991 (ELLMAN & KONTOROVICH, 1992; GAIDAR, 2007).

Thus, in 1991, the USSR was in a dramatic economic situation. Unable to attend domestic needs for consumer and agricultural goods, central Soviet institutions had no more authority on the economic and political system. GDP per capita, which fell by 3,1% in 1990, dropped by 6,8% in 1991 (see figure 1). Inflation could not be kept under control. The price system was totally disorganized. The birth of a capitalist market had enabled the accumulation of a huge wealth by privileged groups of State managers. The Soviet distribution system had become very unequal. The aim of most of the political leaders was to realize the ‘transition to a market economy’. The Perestroika had

destroyed the Soviet system because "Gorbachev never had a coherent reform program. Perestroika was reactive and fragmented, each reform responding to pressures created by the previous stage of reform" (CLARKE, 2007, p.15).

Because of secessionist movements and the affirmation of local political leaders in the Republics, like Eltsin in Russia, the USSR had become increasingly ungovernable. The partial paralysis of inter-republican trade deteriorated even more the economic situation, multiplying the bottlenecks. The fast process of political and economical disintegration ended in 25 December of 1991 when the USSR officially disappeared.

VI. Conclusion

The economic trajectory of the USSR from 1950 to 1991 was very contrasting. The success of the Soviet extensive growth model in the 1950s and 1960s was undeniable. But, the depletion of the large reserves of underemployed rural work force and low cost natural resources were responsible for the exhaustion of this model. A phase of economic stagnation began in the 1970s. The attempt to move to a new regime of intensive accumulation with high productivity growth to overcome these new constraints failed. The deterioration of labor discipline, the militarization of the economy both in what regards large expenditures because of the cold war and the problems the industrial structure and diffusion of technical progress and the great difficulties with cold weather agriculture were all partly responsible. Given these difficulties the strategy was changed to a pattern of external trade based on commodities exports and the dependence on basic goods imports which created a situation of great external economic (and political) vulnerability. The attempt of Perestroika to build a 'market socialism' totally failed. Gorbachev's reforms disrupted the system of planning and distribution and provoked a large increase both in the chronic excess of domestic demand and in the needs for imports. The interaction of economic collapse and political crisis led to the end of the USSR.

It is interesting to observe how structural characteristics of the USSR economy influenced post-Soviet Russia. Thus, the predatory practices which begun thanks to the Perestroika reforms, became generalized during the period of 'transition' to capitalism

in the 1990s. The wealth acquired by Soviet State managers during the Perestroika allowed them to take advantage of the Shock Therapy reforms in the 1990s. They are now known as Russian oligarchs. The current Russia is also characterized by a low productivity agriculture, growing dependence on raw materials and energy exports, a structural external vulnerability inherited from the Soviet times, to which virtually free short term capital mobility has been added.

Bibliography:

ALLEN, R. C. (2003) *Farm to Factory. A Reinterpretation of the Soviet Industrial Revolution.* Princeton: Princeton University Press.

AMANN, R. & COOPER, J. (Orgs.) (1982) *Industrial Innovation in the Soviet Union.* New Haven: Yale University Press.

BELLINGER, E.G. & DRONIN, M (2005) *Dependence and Food Problems in Russia 1900–1990. The Interaction of Climate and Agricultural Policy and Their Effect on Food Problems.* Budapest: Central European University Press.

BROWN, A ; KASER, M. e SMITH, G. S. (Eds.) (1994) *Cambridge Encyclopedia of Russia and the Soviet Union*. Cambridge: Cambridge University Press.

CIA (1986) Soviet intensive economic development in perspective. Langley.

CLARKE, S. (2007) *The Development of Capitalism in Russia.* London & New York: Routledge.

COOK, E.C. (1992) *Agriculture's Role in the Soviet Economic Crisis.* In: ELLMAN, M. & KONTOROVICH (eds) (1992) The Disintegration of the Soviet Economic System. London: Routledge.

COOK, L.J. (1992) *'Brezhnev's "social contract" and Gorbachev's reforms'.* Soviet Studies, vol. 44: 1: p. 37–56.

DI LEO, R. (1991) The Soviet Union 1985-1990: After Comunist Rule the Deluge? *Soviet Studies*, Glasgow, vol. 43, n°3.

DOBB, M. (1978) *Soviet Economic Development since 1917.* London: Routledge.

ELLMAN, M. (1979) *Socialist Planning.* Cambridge, Eng.: Cambridge University Press.

ELLMAN, M. (1990) *A note on the distribution of income in the USSR under Gorbachev.* Soviet Studies, vol. 42:1, p. 147-148.

ELLMAN, M. & KONTOROVICH (eds) (1992) *The Disintegration of the Soviet Economic System.* London: Routledge.

FEJTÖ, F. (2000) *Histoire des Démocraties Populaires. Vol. 1 : L'Ère de Staline.* Paris : Editions du Seuil.

FEL'DMAN, G.A. (1928) [1964] On the Theory of Growth Rates of National Income. In: SPULBER, N. *Foundations of Soviet Strategy for Economic Growth.* Bloomington: Indiana University Press, pp. 174-202 & pp. 304-331.

FERNANDES, L. (1992) *URSS, Ascensão e Queda. A Economia Política das Relações da União Soviética com o Mundo Capitalista.* São Paulo: Editora Anita Garibaldi.

GADDY, C.G. & HILL, F. (2003) Siberian Curse. *How Communist Planners Left Russia Out in the Cold.* Washington D.C.: Brookings Institution Press.

GADDY, C. & ICKES, B. W. (2006) Addiction and Withdrawal: Resource Rents and the Colapse of the Soviet Economy. Draft. Pennsylvania State University.

GAIDAR, Y. (2003) *The Soviet Collapse : Grain and Oil.* Washington: American Enterprise for Public Policy Research.

GAIDAR, Y. (2007) Collapse of an Empire. Lessons for Modern Russia. Waschington D.C. : Brookings Institution Press.

GERSCHENKRON, A. (1962), *Economic backwardness in historical perspective, a book of essays*. Cambridge, Massachusetts: Belknap Press of Harvard University Press.

GOLDMAN, M. I. (1992) *What Went Wrong with Perestroika?* New York : Norton & Company.

GROSSMAN, G. (1987) Command Economy. In: Eatwell J.; Milgate M. and Newman P. (eds) *The New Palgrave Dictionary of Economics*. London: Macmillan. Vol. I, pp; 494-495.

GUSTAFSON, T. (1999) *Capitalism Russian-Style*. Cambridge, Eng.: Cambridge University Press.

HANSON, P. (1981) *Trade and Technology in Soviet - Western Relations.* New York, NY: Columbia University Press.

JOINT ECONOMIC COMMITTEE, US CONGRESS. (1979) *Issues in East-West Economic Relations: A Compendium of Papers.* 95th Congress, 2nd session. Washington, DC: Government Printing Office.

JOINT ECONOMIC COMMITTEE - CONGRESS OF THE UNITED STATES (1982) *USSR: Measures of Economic Growth and Development, 1950-1980.* Washington: US Government Printing Office.

JOINT ECONOMIC COMMITTEE. CONGRESS OF THE UNITED STATES. (1987) *Gorbatchev's Economic Plans.* Washington : U.S. Government Printing Office.

JONES, A & MOSKOFF, W. (1989) *New Cooperatives in the USSR.* Problems of Communism, Vol. 38, n°6, pp. 27-39.

KALECKI, M. (1943) [1990] *Political Aspects of Full Employment.* In: Kalecki, M. Collected Works of Michal Kalecki. Vol. I Oxford: Clarendon Press.

KALECKI, M. (1958) [1992] *Central Price Determination*. In: Kalecki, M. Collected Works of Michal Kalecki. Vol. III Oxford: Clarendon Press.

KALECKI, M. (1966) [1993] *Introduction to the Theory of Growth in a Socialist Economy*. In: Kalecki, M. Collected Works of Michal Kalecki. Vol. III Oxford: Clarendon Press.

KALECKI, M. (1970) [1993] *Theories of Growth in Different Social Systems.* In: Kalecki, M. Collected Works of Michal Kalecki. Vol. III Oxford: Clarendon Press.

KORNAI, J. (1979) Resource-Constrained versus Demand-Constrained Systems. Econometrica, Vol. 47, No. 4 (Jul., 1979), pp. 801-819.

KOWALIK, T. (1987) Central Planning. In: Eatwell J.; Milgate M. and Newman P. (eds) *The New Palgrave Dictionary of Economics*. London: Macmillan. Vol. I, pp; 389-392.

KOTZ, D. M. & WEIR, F. (2007) *Revolution from above, the Demise of the Soviet System.* London : Routledge.

LAVIGNE, M. (1979) *Les Economies Socialistes Soviétiques et Européennes.* Paris : Armand Colin.

LEWIN, M. (1985) "Taking Grain": Soviet Policies of Agricultural Procurements before the War. In: LEWIN, M. *The Making of the Soviet System: Essays in the Social History of Interwar Russia.* London: Routledge.

MARCHAND, P. (2008) *Géopolitique de la Russie.* Paris : Ellipses.

MEDEIROS, C.A. (2004) O desenvolvimento tecnológico americano no pós-guerra como um empreendimento militar. In: FIORI, J.L. (Org.) *O poder americano.* Petrópolis: Editora Vozes.

MEDEIROS, C.A. (2008) Desenvolvimento econômico e ascenção nacional: rupturas e transições na Rússia e na China. In: Fiori, J.L. ; Medeiros, C. ; Serrano, F. *O Mito do Colapso do Poder Americano.* Rio de Janeiro: Editora Record.

NELL, E. J. (1997) Understanding Effective Demand: Capitalism versus Socialism. In *Essays in honour of Geoff Harcourt*, Vol. 2. *Markets, unemployment and economic policy.* London and New York: Routledge, pp. 178-94.

NOVE, A. (1970) [1970] Economic Reforms in USSR and Hungary, a Study in Contrasts. In: Nove, A. ; Nuti, D. M. (eds) *Socialist Economics.* Harmondsworth, England : Penguin Books.

NOVE, A. (1977) *The Soviet Economic System*. London : George Allen & Unwin Ltd.

NOVE, A. (1992) *An Economic History of the USSR, 1917-1991*. Harmondsworth, England : Penguin Books.

NUTI, D. M. (1989) *The New Soviet Cooperatives: Advances and Limitations.* Economic and Industrial Democracy, 10.

NUTI, D. M. (1990) Stabilisation and Reform Sequencing in the Soviet. Recherches Économiques de Louvain / Louvain Economic Review, Vol. 56, No. 2.

OFER, G. (1987) *Soviet Economic Growth: 1928-1985.* Journal of Economic Literature, Vol. 25, No. 4 (Dec., 1987), pp. 1767-1833.

Popov V. (2010) *Life cycle of the centrally planned economy: why soviet growth rates peaked in the 1950's.* CEFIR / NES Working Paper series. Working Paper No 152. Available in:

http://www.cefir.ru/papers/WP152.pdf

PREOBRAZHENSKY, E. (1926) [1964] On Primary Socialist Accumulation. In: SPULBER, N. *Foundations of Soviet Strategy for Economic Growth.* Bloomington: Indiana University Press, pp. 174-202 & pp. 230-257.

SAGERS, M. J. & TRETYAKOVA, A. (1986) Constraints in Gas for Oil Substitution in the USSR : the Oil Refining Industry and Gas Storage. *Soviet Economy*, Silver Spring, Maryland, vol. 2, n°1.

SCHWEIZER, P. (1994) Victory. The Reagan's Administration Secret Strategy that Hastened the Collapse of the Soviet Union. New York: The Atlantic Monthly Press.

SPULBER, N. (1964) *Foundations of Soviet Strategy for Economic Growth.* Bloomington : Indiana University Press.

SPULBER, N. (2003) *Russia's Economic Transition: From Late Tsarism to the New Millennium.* New York : Cambridge University Press.

STALIN, J. (1951) [1972] *Economic Problems of Socialism in the USSR*. Peking: Foreign Languages Press.

VOLIN, L. (1970) *A Century of Russian Agriculture. From Alexander II to Kruschev.* Cambridge, Massachusetts: Harvard University Press.

ZALESKI, E. (1980) *Stalinist Planning for Economic Growth, 1932-1952*. Chapel Hill: The University of North Carolina Press.

Statistics sources:

FAO (Food an Agricultural Organization of the United Nations) (2012) *FAOSTAT*. Geneva: Statistic Division of the FAO.

FEDERAL STATE STATISTICS SERVICE (2012) *Russia in Figures.* Moscow. Available in :

<http://www.gks.ru>

MADDISON, A. (1998) *Measuring the Performance of Communist Command Economy: an Assessment of the CIA Estimates for the USSR.* Review of Income and Wealth.

MADDISON, A. (2006) *The World Economy. Volume 2: Historical Statistics.* Paris: Development Centre Studies – OECD.

SLAVIC RESEARCH CENTER (2012) *Soviet Economic Statistical Series.* Hokkaido: University of Hokkaido. Available in :

<http://src-h.slav.hokudai.ac.jp/database/SESS.html#USSR-S7>

UNSTAT-UNITED NATIONS STATISTICS DIVISION (2012) *National Accounts Main Aggregates Database.* New York. Available in :

<http://unstats.un.org/unsd/snaama/selbasicFast.asp>