

DEVELOPMENT ECONOMICS AND THE RUSSIAN REVOLUTION: THE SOVIET INDUSTRIALISATION DEBATE

DIEGO AZQUETA

Universidad de Alcalá de Henares^a

ABSTRACT

After the triumph of the October Revolution in Russia the issue of how to develop a backward economy towards a socialist society took pre-eminence. The relationship between agriculture and industry was one of the key issues. In this respect, the Left Opposition argued in favour of a Big Push for industrialisation financed through the exploitation of the peasantry, while the Right Deviation defended adjusting industrial growth to the development of the agricultural surplus. The First 5-Year Plan meant the complete victory of one of these positions. Unfortunately, all discussions were banned subsequently, the leading figures of these two factions were expelled from the Party and many of them executed. Yet, this problem was of the utmost importance for underdeveloped countries, as Development Economics was to discover 25 years later. This new branch of Economics would have benefitted greatly from the lessons of the Soviet experience regarding industrialisation, as well as from the theoretical discussions surrounding it.

Keywords: Fel'dman-Mahalanobis model, agrarian question, development economics

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^a Department of Economics. diego.azqueta@uah.es

RESUMEN

Tras el triunfo de la Revolución de Octubre en Rusia el reto de cómo construir el socialismo en una economía atrasada pasó a ocupar el primer plano. Uno de los principales problemas en este sentido era el de las relaciones entre agricultura e industria. La Oposición de Izquierdas abogaba por una industrialización acelerada financiada mediante la explotación del sector agrícola. La Desviación de Derechas argumentaba la necesidad de ajustar el desarrollo industrial al agrícola. El Primer Plan Quinquenal supuso el triunfo absoluto de una de ellas. Desgraciadamente toda discusión fue suprimida después de su aprobación, y los principales protagonistas expulsados del Partido y muchos de ellos ejecutados. Sin embargo, los problemas discutidos eran de la mayor importancia para los países subdesarrollados, como descubriría 25 años después la Economía del Desarrollo. Esta nueva rama de la economía se habría beneficiado enormemente del conocimiento de la experiencia de la industrialización soviética, y de las discusiones teóricas que la acompañaron.

Palabras clave: Modelo Fel'dman-Mahalanobis, Cuestión Agraria, Economía del Desarrollo

1. INTRODUCTION

2017 marks the 100th anniversary of the triumph of the October Revolution in Tsarist Russia; a perfect time to reflect on the significance of this moment in human history. There will surely be an impressive amount of high-quality scholarly work devoted to reviewing this historical landmark and it is certainly not our intention to attempt something similar here. The purpose of this paper is to focus on a particular aspect of the legacy of the October Revolution and the ensuing process that took place in what was to become, in 1922, the Soviet Union: the importance of the Soviet Industrialization Debate for Development Economics¹. In this respect we would like to argue that not only the major problems which Development Economics needed to address after World War II, but also the theoretical models utilised to study them, were to a great extent present in the debates that made the 1920s in the USSR an intellectually exciting period. As Alec Nove pointed out many years ago: «Development economics could be said to have been born here» (1972, p. 129). With this purpose in mind, the paper is structured as follows. After this brief Introduction, section 2 presents the

¹ The Soviet Union was formed in December 1922 by the union of Russia, Ukraine, Byelorussia and Transcaucasian republics.

«agrarian question» as it appeared in the Soviet Union after the triumph of the Revolution, as well as the theoretical alternatives available to deal with it. Section 3 analyses the way this problem was solved in the USSR after 1921 within the new economic policy (NEP) framework and the «scissor crisis». Section 4 reviews the beginnings of the planning effort and the abrupt change of course that took place in 1928, which was perfectly illustrated by the Fel'dman model of growth and the First 5-Year Plan. Section 5 connects these debates about growth and industrialisation strategies with the new branch of economic theory that was born after World War II: Development Economics. Many of the issues, as well as the models present in the debates that took place in the USSR in the 1920s, were of paramount importance for Development Economics. This section pays special attention to the extreme dependency of the accumulation process on the possibilities of the agricultural sector to provide the required surplus, illustrated by the experience of the People's Republic of China. It also addresses a closely related issue: the problem of the Choice of Techniques. The paper ends with a Postscript that recalls the fate of the leading participants in these debates².

2. THE BUILDING OF SOCIALISM AND THE AGRICULTURAL QUESTION

The first problem that the Bolsheviks had to face after seizing power in 1917, and not a minor one indeed, was to manage an economy the size of Russia on its way towards socialism. Was Russia ready for a socialist revolution or, due to its backwardness, did it need to complete the capitalist stage first? Did the particular situation of Russian agriculture present special challenges and opportunities, as the *Narodnik* movement and the Social Revolutionary Party defended? What was to be the role of the market and the economic categories associated with a capitalist economy (money, prices, credit, profits, etc.), in the new situation?

A few months after the triumph of the October Revolution the civil war erupted, and the urgencies of the moment made it impossible to pay too much attention to these issues. Under these circumstances, all efforts were directed towards defeating the White Army. «War Communism» was declared in June 1918 and exceptional measures were adopted³. These measures were particularly relevant regarding the agricultural sector and the need to provide food and raw materials for the Red Army. In November 1917,

² This paper relies heavily for the information on historical events on the essential work of Edward H. Carr (1972, 1974), Alec Nove (1972), Charles Bettelheim (1976, 1978), Maurice Dobb (1966) and many others. Based on their work, Azqueta (1983) summarises this period of Soviet history.

³ Lenin would later regret having named this strategy War Communism because of the illusion this name created regarding the idea that the movement towards communism was already feasible.

the Revolutionary Government nationalised the land still in the hands of the main landowners and gave it to the local community (*mir*) to be distributed among the peasants⁴. To solve the procurement problem under War Communism, a system of compulsory deliveries was established; forced sales to the State of agricultural products at minimum prices (*prodrazverstka*). Once the war was over, however, this system confronted an increasing resistance and was gradually abandoned⁵. A tax (*prodnalog*), first as a tax in kind and in monetary terms shortly afterwards, substituted forced deliveries, while at the same time the amount extracted from the peasantry was also significantly reduced.

The system changed and the pressure on the agricultural sector was eased, but the fundamental problem remained: if the Soviet Union was to develop along a socialist path, industrialisation would be required, and this entailed the need to finance industry and feed the cities.

In 1922, when the war was finally over, the issue of how to develop a socialist economy in a rural and backward country came to the forefront. The main question was whether Russia had already reached the capitalist stage of socioeconomic development, or whether it was still a feudal country needing to go through a bourgeois democratic revolution first. Furthermore, was there any relevant difference regarding the level of socioeconomic development achieved between the urban and rural sectors? What implications, if any, did the communal characteristics of agriculture in Russia have with respect to the course to follow?

Different alternatives were contemplated.

The first possibility had been dealt with by Marx himself in his correspondence with Vera Zasulich. The Russian Marxist, famous for her attempt to assassinate the governor of St Petersburg in 1878 and co-founder of the *Emancipation of Labour* Group, wrote a letter to Marx in 1881 from her exile in Switzerland. In this letter she asked his opinion about the possibility of building the revolution in Russia based on «peasant socialism»; that is, considering the potential of the communal structure of Russian agriculture. In this way, the peasants would take the place of the industrial proletariat in pushing forward the change to a socialist system, and there would no longer be the need to go through a capitalist stage. It took a considerable amount of time and research

⁴ In 1861 Alexander II decreed the emancipation of serfs and the redemption of land from the great landowners after the payment of a compensation rent well above market value. The now free but impoverished peasants depended even more on the «village community» (*mir*). The *mir*, which was in charge of redistributing land among the different families periodically, saw its administrative powers reinforced. This formed the basis of a communal agriculture. As mentioned, the new government respected this communal structure when it nationalised and redistributed the land: Decree on Land ratified the 26 October 1917 at the II Congress of the Russian Soviets. The majority of the members of the Congress belonged to the Socialist Revolutionary Party, by far the most influential in the countryside.

⁵ The more important ones being the uprisings of Tambov in February 1921, of Nestor Makhmo in Ukraine, and the Kronstadt mutiny in March.

for Marx to prepare an answer (no fewer than four drafts are known) but it seems that he was sympathetic to this vision⁶. The original position of Marx and Engels was clear: the industrial proletariat should lead the socialist revolution. The Erfurt Programme, however, adopted by the Second International in 1891, deviated from this position, opening the way for a policy of a joint front of workers and peasants. This stance was fiercely opposed by, among others, Karl Kautsky, and defeated in 1895 at Breslau. As the answer to Zasulich shows, however, Marx was apparently willing to qualify his previous position in the case of Russia and the village commune (*mir*). Furthermore, in the preface to the Russian edition of the «Communist Manifesto», in 1882, Marx and Engels were inclined to accept the possibility of the communal ownership of land forming the basis of a further communist development⁷. Later on, some highly respected Russian agrarian economists who worked with the Bolsheviks in positions of high responsibility, such as Aleksandr Chayánov, a former *narodnik*, and Nikolai Kondrátiev, also shared this view. This possibility, however, was discarded almost from the very beginning. Lenin had argued in 1899 in his book «The development of capitalism in Russia» written against the *Narodnik* movement, that Russia had already developed a capitalist economy. Therefore, even if Russia were still a backward and agrarian economy, the urban and industrial workers would be the leaders of the socialist revolution. Nevertheless, Lenin was careful enough in 1905 to speak of «the democratic dictatorship of the proletariat and the peasantry» (Nove 1972, p. 36). Lenin, as he was to show on numerous occasions, had a position regarding this issue that changed according to the political necessities of the moment. He criticised Kautsky and defended the role of the middle and poor peasants who had had access to land in 1861. He thought that their small plots would not be viable, and they would be more easily persuaded into pooling their lands and farming co-operatively (Coulson 2014)⁸. In fact, he was apparently convinced of the necessity to combine both, a socialist revolution in the urban and industrial sector, together with a democratic revolution in the countryside. This, in conjunction with the fact that the Bolsheviks had almost no presence in the countryside, as opposed to the Socialist Revolutionary Party, may explain why

⁶ Although it seems clear that it was known well before that date, the answer was only published by David Riazánov in 1924. This delay shows the uneasiness of Soviet authorities at the time with Marx's position. David Riazanov had founded the Marx-Engels Institute in January 1921. In early 1931 Riazanov was purged together with 127 staff members (out of 244). The Institute merged with the Lenin Institute in 1931 and became a simple tool of propaganda (Boldyrev and Kragh 2015).

⁷ «If the Russian revolution should become the signal for a workers' revolution in the West, so that the two would complement each other, then the present Russian system of communal ownership could serve as the starting point for a Communist development». Cited in Coulson (2014, p. 410).

⁸ It has also been argued that putting the land under state ownership and then dividing it among the peasants through the *mir* helped to win the civil war because many White soldiers deserted to claim their plot (Coulson 2014).

the new government gave the land back to the peasants in November 1917 through the *mir*, rather than fully collectivising it⁹.

Once the «peasant socialism» strategy was abandoned, the second possibility was to build socialism by pushing the development of industry under a centrally planned economy and relying on agriculture to provide the necessary labour force, food and raw materials. There would be no problem regarding labour; there was a widespread consensus about the existence of surplus labour in the rural sector (workers with a marginal productivity equal to 0). As for the food and raw materials required, it was perfectly possible to continue with the «War Communism» strategy and force the peasants to provide it. This would reinforce the socialist sector of the economy (considered to be the state industry) and the industrial proletariat. Yevgueni Preobrazhensky was the main proponent of this position together with Leon Trotsky, Grigory Zinoviev and the members of the «Platform of the 46»¹⁰. They introduced, however, a slight deviation from the War Communism strategy; instead of forced deliveries, it would be more efficient to extract the agricultural surplus through a worsening of the terms of trade. Together with this, and to avoid facing peasant opposition and ease tensions in the countryside, these authors also recommended strengthening the collective character of Russian agriculture by trying to convince the peasantry of the benefits of collectivisation. In this way, the major categories of a capitalist economy (market, profit, credit, money, etc.) would be gradually abandoned in favour of a centrally planned, state-owned industrialisation process relying on a collectivised agriculture. Under these circumstances the role of the Law of Value was also to be abandoned; there would be no exchange of equivalents (equal value) between agriculture and industry. Preobrazhensky proposed instead the «Law of Primitive Socialist Accumulation» in his lectures at the Communist Academy in 1924. This law, parallel to the Marxist Law of Primitive Accumulation, implied the exploitation of the peasantry, as its proponents were well aware. Nevertheless, it was argued that the strengthening of the socialist sector needed to be financed and that this could not be done exclusively by channelling the surplus generated in the industrial (socialist) sector itself, which was taken for granted. It would also be necessary to rely on the non-socialist part of the economy (agriculture).

The third alternative was to advance towards a socialist society without compromising the favour of the peasantry. Industrialisation would proceed

⁹ Whereas in October 1917 the main objective of the Bolsheviks in the countryside was to promote the socialist revolution, the aim of the peasants supporting the Socialist Revolutionary Party was land reform; to occupy and distribute the land through the *mir*. To counter the influence of the Socialist Revolutionaries, the Bolsheviks favoured the development of *agrarian committees* in rural areas formed by agricultural workers and poor farmers (Decree of 11 June 1918). This policy, however, did not succeed and was abandoned at the end of 1918. The Party VIII Congress (March 1919) put the emphasis on the necessity to win the support of middle peasant, which implied fostering the democratic revolution in the countryside.

¹⁰ Authors of a secret document presented at the Central Committee of the Communist Party in October 1923 (among them Trotsky and Zinoviev).

at the slow pace dictated by the possibilities of obtaining the required food and raw materials from the peasantry through market channels and the exchange of industrial goods of equivalent value. Therefore, not only the Law of Value but also the previously mentioned capitalist categories, as well as the role of the markets in this exchange of equivalents would have a central place in the transition period. Nikolai Bukharin, who had been a Left Communist in 1917-1920, and thus opposed to Lenin on the issue of discipline and economic incentives, moved gradually towards more conservative positions and was the main figure behind this strategy, together with Stanislav Strumilin (deputy chairman of the State Planning Board, GOSPLAN) and Mikhaíl Tomsy (president of the Central Council of Trade Unions). Bukharin's main argument was that socialism could not be built against the will of the vast majority of the population. Accepting this fact implied, in his opinion, that industry should obtain the necessary food and raw materials from the agricultural sector through a market exchange of equivalents: «riding into socialism on a peasant nag» (Nove 1972, p. 124). If the growth of industry had to rely on the agricultural surplus, then it was necessary to provide the peasant with the appropriate incentives to increase production and productivity. Thus, not only markets and middlemen (*nepmen*), but also the private property of land and the hiring of labour should be re-established¹¹. It is in this context that his unfortunate advice of April 1925 to the rich peasants (*kulaks*), «get rich», should be interpreted.

3. THE AGRARIAN QUESTION IN PRACTICE: THE NEP

Once the civil war was over, and the strategy of War Communism was ended, a new stage opened: the NEP. NEP was officially launched in March 1921 at the X Congress of the Communist Party. It represented the triumph of the third alternative mentioned above; industrialisation would have to accommodate its pace to agricultural development. The key word now was «*smychka*» (union) between city and village, between peasants and proletarians. Industrial growth would depend on the agricultural surplus available, and the markets, private property and the lease of land would be allowed to increase it, together with the hiring of labour (Agrarian Code of 15 November 1922). The agricultural surplus would be transferred to the industrial sector through the market exchange of equivalents (under the rule of the Law of Value) and priority would be given to light industry producing the kind of consumer goods that peasants demanded. Furthermore, state enterprises should abide by the rules of profitability (*khozraschyot*: the rules of commercial accounting approved by the *Sovnarkom* in 1921). At the same time, Grigory Sokolnikov, the head of the Finance

¹¹ The main reason behind the recommendation to privatise the ownership of land, namely, that this would increase productivity when compared with communal agriculture, seems not to be warranted in the case of Russia in that period (Kopsidis *et al.* 2015).

Commissariat, was finally able to restore monetary stability in 1924 with the introduction of a new currency in 1922 (the *chervónets*), which was necessary for the new policy to work¹².

In the winter of 1923-1924, however, the crisis erupted. For different reasons, the ratio of the price of industrial goods to the price of agricultural goods deviated sharply in favour of the former. As a result, the supply of agricultural goods to the cities was severely threatened: «the scissors crisis»¹³. Although all political parties, as well as factional organisations within the Communist Party, had been banned since the beginning of the NEP, this did not prevent a heated debate at the highest level inside the Party about the best way to cope with the crisis. NEP was seen by many members of the Party as a temporary withdrawal on the way to socialism that entailed a reinforcement of those social classes more likely to oppose the Revolution: the middle and well-to-do peasants (*kulaks*). According to Preobrazhensky, Zinoviev and Trotsky, it was time to change and prioritise industrialisation, reducing the role of the markets, and moving towards a collective agriculture by trying to convince the peasantry of its advantages. Opposing this idea, the Bukharinists wanted to reinforce the NEP strategy: lower industrial prices and increase market incentives for the peasants.

Two other very different issues emerged at the time alongside this dispute.

On the one hand, the possibility of building socialism in the Soviet Union without the help of social revolutions in the most advanced European countries. For many early-hour Russian revolutionaries, the triumph of the October Revolution was almost an accident, and the USSR should follow a policy of buying time and helping these revolutionary movements to succeed. Only after their triumph would it be possible to consolidate the socialist revolution in a backward country such as the USSR. The events of 1919 in Germany and Hungary, following the crushing of the Spartacist uprising and the fall of Béla Kun's Hungarian Soviet Republic, were soon to show that this strategy was but a blind alley. Bukharin and Stalin subsequently began to defend the necessity of building «Socialism in one Country», while Trotsky still considered it entirely unorthodox¹⁴.

¹² The fact that Leonid Yurovsky, a well-known neoclassical economist, whose ideas clashed with Marxism, was employed to mastermind the 1922-1924 monetary reform (Barnett 2006) is a good example of the atmosphere prevailing at the time. Unfortunately, this permissiveness did not last long. He was arrested in 1930 and executed in the Great Purge.

¹³ Allen (1997) mentions four reasons to explain this procurement crisis:

- a. The elimination of (more efficient) large states and kulak farms in November 1917.
- b. The fact that peasants utilised grain surpluses to feed livestock, more profitable.
- c. The fall in real taxes and rent payments that reduced the need to sell grain and increased household consumption.
- d. The deterioration of the agricultural terms of trade.

¹⁴ See, in this respect, the article published by Stalin in *Pravda* on 20 December 1924 on «October and the theory of comrade Trotsky on the permanent revolution».

On the other hand, and in a completely different arena, these two factions were also competing for Lenin's succession. Lenin died in January 1924 after falling seriously ill in 1922 and being incapacitated in 1923.

Under these circumstances, the solution adopted to solve the «scissor crisis» was no other than to strengthen the NEP by lowering industrial prices, increasing procurement prices for agricultural goods, etc. At the same time, the faction of Preobrazhensky and Trotsky («The Left Opposition») was officially condemned shortly afterwards at the XV Congress of the Party (December 1927)¹⁵. The USSR thus was ready to continue on its way towards socialism in one country «at a snail's pace».

The winter of 1927-1928, however, put an end to this process. Again, a procurement crisis jeopardised urban and industrial development: the amount of grain in the hands of the State was reduced¹⁶. At that point, and contrary to all expectations, a completely new approach to solving the crisis was adopted. The NEP was abandoned, and an entirely different strategy was introduced. A «Big Push» policy of industrialisation with special emphasis on heavy industry was adopted, together with the rapid and forced collectivisation of agriculture. This was accompanied by the return to the measures adopted during the War Communism period to extract the required agricultural surplus, which would eventually be known as the «Ural-Siberian Method». In addition, the campaign to «eliminate the *kulaks* as a class» was launched. As was only to be expected, this sharp turn was welcomed by Preobrazhensky, and fiercely opposed by Bukharin¹⁷. The situation regarding dissent was at that moment completely different, however, and there was very little room for such opposition. Bukharin and his followers were denounced as «deviationists» (the «Right Deviation») in November 1928, and officially condemned a year later. The Soviet Union was thus embarking on a new and entirely different path.

4. THE FOUNDATIONS OF A PLANNED ECONOMY

After 1917 it was increasingly clear that the Russian economy would require a strong planning effort: first to reorganise an economy devastated by World War I, subsequently to win the civil war and, finally, to move towards a socialist society.

¹⁵ Trotsky and Zinoviev were expelled from the Party in November 1927.

¹⁶ The reasons for this reduction in state procurements and the size of the reduction itself were both hotly debated issues. It seems that Stalin overstated the fall in order to reinforce his change of strategy.

¹⁷ It is worth mentioning, in any case, that throughout this period the different positions were very fluid. Preobrazhensky, for instance, opposed the expropriation of petty property and argued in favour of voluntary collectivisation in 1918. Trotsky, on the other hand, maintained his opposition to forced collectivisation. He had also been the first to accept, in 1920, the necessity to abandon forced deliveries and move towards a tax system alleviating the pressure on the peasantry, while Lenin was still defending *prodrazverstka* up to February 1921.

This is not the moment to review the construction of the planning structure that took place in the USSR during the 1920s; a short account of some of the major building blocks of this process will be more than enough for our purposes.

Two main institutions were in charge of the planning effort. These were the *Supreme Council of National Economy* (VSNKh), which was created in December 1917 as the main economic authority, and the *State Planning Board* (GOSPLAN), which replaced the GOELRO (electrification commission) on 22 February 1921 and was put in charge of planning the economy. Additionally, some originally independent institutions were also to provide crucial support to the management of the economy by procuring the necessary data.

Alexander Chayanov organised an *Institute for Agricultural Economy* in 1919 within which Nikolai Kondratiev established the Department of Agriculture Conjuncture. Based on this Department he created the *Conjuncture Institute* in October 1920: «one of the most reliable sources of information on economic indicators, use of which was a key element in all the debates which occurred over industrialization» (Barnett 1995, p. 437)¹⁸. By the end of 1918 the first set of Material Balances had appeared in the orbit of the Commission of Utilization, and the *Soviet Central Statistical Administration*, under the direction of P.I. Popov, published in 1926, the «Balance of the National Economy for 1923/24», following instructions from the Council of Labour and Defence of 21 July 1924¹⁹.

In 1925, and transcending the different sector plans, GOSPLAN produced the first set of *Control Figures* and then, in March 1926, it was decided that its plans should include the entire economy. Two different commissions were established to draw up the theoretical foundations of medium and long-term development plans. The first Commission, headed by Strumilin, would have to present a 5-Year Plan²⁰. The second, under the leadership of Osadchi, would have to propose a long-term framework within which the successive 5-Year Plans would be integrated.

Two different schools fought their way in these commissions. On the one hand, a «teleological» approach, close to the Left Opposition, focussed on the final objectives, to be attained at any cost. Plans should be conceived to reach these objectives, and the different economic institutions should provide the means required; an approach heavily based on voluntarism. On the other hand, the «genetic» school, favoured by the Right Deviation, emphasised the

¹⁸ Kondratiev was dismissed in May 1928 (he had been labelled a «bourgeois liberal») and the Institute was closed soon after. In June 1930 he was arrested as a leader of the «Working Peasants Party» (Toiling Peasant Party) together with Chayanov, L. N. Yurovsky and L. N. Litoshenko. Condemned to 8 years imprisonment, he was executed on 17 September 1938.

¹⁹ As a signal of the changing situation, Popov was sacked in December 1925 because of his refusal to follow Party recommendations regarding agricultural output data. He was replaced by Nikolai Osinskii who did not enjoy a better fate; he was forced to resign in early 1928 for the same reasons, and arrested and shot in 1936 (Wheatcroft 2009).

²⁰ Because of the ongoing disputes within the Party about the course of the economy, this task was also undertaken by VSNKh.

structural conditions of the economy as the fundamental basis and starting point of any plan. For its supporters (Bazarov, Groman and Kondratief), planning should rely on the knowledge of economic laws obtained from the study of the statistical data concerning the past. The role of planners, therefore, would be mostly passive²¹.

Grigorii A. Fel'dman was an economist belonging to the second Commission (headed by Osadchi) who worked on a model that, it could be said, eventually provided the theoretical framework required to integrate in a coherent manner the successive 5-Year Plans. He published his findings in November and December 1928 in the GOSPLAN monthly review (*Planovoe Khosiaistvo*). In his model, the economy was divided into two sectors: Sector 1, producing capital goods (I); and Sector 2, producing consumer goods (C).

Taking into account the existence of surplus labour, he assumed that an increase in the production of either of these two sectors would depend only on the amount of investment (I : the production of Sector 1) allocated to Sector 1, and the efficiency with which these capital goods were used (v : the output-capital ratio).

Being:

$$Y_t = I_t + C_t \quad (1)$$

And:

$$I_1 = \gamma I \quad (2)$$

$$\frac{dI}{dt} = \frac{I_1}{v_1} \quad (3)$$

by solving this differential equation system, Fel'dman arrived at the following expression:

$$Y_t = Y_0 + \left[\frac{(1-\gamma)v_1}{\gamma v_2} + 1 \right] \left(e^{\left(\frac{\gamma}{v_1}\right)t} \right) - 1 \quad (4)$$

where Y is national income and, as mentioned, I the investment (the production of Sector 1, capital goods), γ the proportion of investment allocated to Sector 1 (machines to make machines) and v the marginal output-capital ratio.

The policy recommendation that followed from this model was straightforward: to maximise national income at some future date (Y_t) it was

²¹ «According to the teleologists (Krzizhanovsky, Kuibyshev, and Strumilin), the role of planners is more heroic and consists in transforming the economy rather than in coordinating and adapting to 'economic laws' (...) planners have the power to intervene in the future economy in a more active way, irrespective of their knowledge about the previous economic experience. Such planning should be associated with the planners' strong (and justified) confidence in abilities for creating structural changes in the economy, future production possibilities, tough planning disciplines, etc.» (Charemza and Kiraly 1990, p. 563).

necessary to maximise γ : that is, the production of capital goods devoted to the production of more capital goods. In other words, to invest in the production of machines to make machines, even at the cost of neglecting the production of consumer goods.

The approval of the First 5-Year Plan was far from smooth. There were nine different drafts before the one finally sanctioned, which had two versions: minimum and maximum. The latter was adopted, but this maximum version was still amended several times shortly after its release, becoming more ambitious with each revision. In the end it was brought forward several months so the final objectives had to be attained in little more than 4.5 years. It is clear, then, that the «teleological» approach to planning had won the day vs. the more down-to-earth «genetic» vision. It is also evident that the First 5-Year Plan was perfectly in tune with the model designed by Fel'dman²².

The developments that followed the approval of the First 5-Year Plan are well known. The Soviet Union experienced a dramatic Big Push for industrialisation with all the emphasis put on heavy industry. This was financed by expropriating the surplus of the rural sector from an agriculture forcibly collectivised with the help of the Ural-Siberian method. As a result, the growth of the industrial sector was impressive, but so was the amount of human suffering. Had they been known, the lessons learned from this experience would have been of the utmost importance for Development Economics.

5. THE SOVIET INDUSTRIALISATION DEBATE AND DEVELOPMENT ECONOMICS

Development Economics can be said to have been born after World War II. During what was considered its Formative Stage different authors provided a set of Magna Theories which were a mixture of theoretical models and policy prescriptions²³.

Every underdeveloped country wanted to develop, and Development Economics was to provide the guidelines on how to do so. There was widespread agreement at the time on three main points:

- a. Economic development meant industrialisation. Developed countries were industrialised countries.
- b. Due to the lack of well-functioning markets, or of markets at all, as well as the absence of a well-developed entrepreneurial class, the state would have to play an essential role in the process. Development was to be planned.

²² It would probably be unfair to say that the model developed by Fel'dman provided the theoretical basis for a strategy of rapid industrialisation that had already been decided, but it was certainly completely in tune with it.

²³ High Development Theory according to Krugman (1993).

- c. Economic development was an objective that could be attained in the medium or even the short term.

The influence of the USSR experience on this approach cannot be overlooked. As Carr (1969) mentions, if one wishes to ascertain the influence of the Russian Revolution, the three key words would be productivity, industrialisation and planning (page 38 of the Spanish edition). That the process could be a relatively easy one had to do with the existence of an almost idle production factor which, if fully utilised, would increase national income at practically no cost: *disguised unemployment*. The seminal work in this sense was Arthur Lewis's article published in the *Manchester School* and for which he would be awarded the Nobel Prize 25 years later (Lewis 1954).

As Arthur Lewis pointed out, the theoretical roots of Development Economics were to be found not in Neoclassical or Keynesian economics, but in the Classical School, namely, in the work of David Ricardo. According to Lewis, unlike developed economies, underdeveloped countries were *dual economies*. In these countries, the existence of a traditional sector, characterised by widespread *disguised unemployment*, fixed the industrial wage at the subsistence level. Within this framework, a series of development strategies were recommended that relied on putting this idle factor (rural workers in disguised unemployment) to work where they would have a positive marginal productivity: the modern (industrial) sector. As mentioned, due to severe market imperfections (including the absence of markets in critical sectors), and the weakness of the private sector, the state was to have a central role in this industrialisation process, both by planning it and, in many cases, by leading the process with the help of public firms as well.

Development Plans were indeed industrialisation plans. It is probably fair to say that Development Economics provided at that stage a blueprint for a centrally planned industrialisation process lead by the state. The rural (agricultural) sector was considered to be backward, non-rational and inefficient. The result was a set of supply-oriented economic models, focussed on solving the bottlenecks that prevented the rapid growth of national income, and characterised by an urban-industrial and anti-rural bias. The appeal of the USSR example relied on the fact that the results of its industrialisation strategy were quite clear, while the price paid was hard to assess in the context of not only the secrecy of Soviet authorities regarding the experience of the 1930s, but also of Cold War propaganda²⁴.

The problem was, of course, that industrialisation had to be financed.

²⁴ The Soviet Union continued to have very good data during that period. «In most cases the data themselves were not distorted, it was only the political conclusions from these data that were distorted, and that is precisely why the detailed data was declared secret and not allowed to be published» (Wheatcroft 2009, p. 27).

The Harrod-Domar model, together with the *Two Gap Analysis* of Hollis Chenery and Michael Bruno, were used to calculate the amount of financing required, including foreign aid. Quite another problem, of course, was to identify the sources of finance, beyond external assistance. This difficulty had to do with the agrarian question.

As mentioned, the Lewis model opened the possibility of a development process «with an unlimited supply of labour». In other words, an industrialisation process with free labour because of the existence of disguised unemployment in the rural (traditional) sector: that is, workers with a marginal productivity which was very low or even 0. The existence of this surplus labour in agriculture is simply what Strumilin and other Soviet economists were taking for granted in the 1920s. What Lewis did not mention, however, but Gustav Ranis and John Fei subsequently pointed out, was that, more important still than the existence of surplus labour in the traditional sector, was the existence of an *agricultural surplus* that had to be transferred to the modern sector in order for the Lewis model to function (Ranis and Fei 1961). And, as is only too well known, this transfer can be accomplished through the market, or through compulsory means. Before dealing with this issue, however, it is worth analysing how the ideas that crystallised in the Fel'dman model appeared at that time, spontaneously, in a very different context.

5.1. The Mahalanobis Model

Prasanta Chandra Mahalanobis, one of the founders of the *Indian Statistical Institute*, wrote an article in the Institute's Review that provided the basis for the Indian Second 5-Year Plan (Mahalanobis 1953). Although Mahalanobis was a (foreign) member of the USSR Academy of Sciences, it is widely accepted that he was unaware of the work of Fel'dman. The model he published in his article was, however, basically the same as the one presented 25 years before by his Soviet colleague²⁵.

Dividing the economy into two sectors, one producing capital goods (*I*) and the other consumer goods (*C*), the final equation of the Mahalanobis model was the following:

$$Y_t = Y_0 \left\{ 1 + s_0 \left[(1 + \gamma / v_1)^t - 1 \right] \left(\frac{\gamma / v_1 + (1 - \gamma) / v_2}{\gamma / v_1} \right) \right\} \quad (5)$$

The only difference between this model and that of Fel'dman is that Mahalanobis worked with a linear first-order ordinary difference equation

²⁵ Evsey Domar (1957) seems to have been the first to mention the existence of the Fel'dman model. It was finally reproduced in Spulber (1964).

system instead of a differential equation one²⁶. The main conclusion of both models is the same: when trying to maximise national income in the long run, the strategy should be to prioritise investment in the capital goods sector (γ). This becomes evident when analysing the condition under which $\partial Y_t / \partial \gamma$ will be positive:

$$\frac{\partial Y_t}{\partial \gamma} = Y_0 s_0 \left\{ t v_1 \left(\frac{v_1 - v_2}{v_1} + \frac{v_2}{v_1 \gamma} \right)^{t-1} + [(1 + \gamma v_1)^t - 1] \left(\frac{-v_2}{v_1 \gamma^2} \right) \right\} > 0 \quad (6)$$

if, and only if Azqueta (2003):

$$t \geq t^* = \frac{v_2(1 + v_1 \gamma)}{v_1 \gamma [v_2(1 - \gamma) + v_1 \gamma]} \quad (7)$$

The implication of this latter point is quite straightforward: the strategy of investing in the capital goods sector maximises the rate of growth, but not national income in the short run. Therefore, to accept this strategy, which implies sacrificing present consumption, the planning horizon must be long enough ($t > t^*$). This is why Amartya Sen appropriately called t^* the *recovery period*. Both the Fel'dman and the Mahalanobis models fulfilled this condition taking into account the fact that they were solving the problem of investment allocation for the very long run²⁷.

It should be no surprise then that the savings rate seems to play no role in either of these two models. Does this mean, for instance, that were the savings rate to double this would have no impact on future income and the rate of growth? This would be exactly the opposite to what the Harrod-Domar model of growth implied. The answer is, of course, negative. The savings rate seems to play no role in these two models because it was assumed that the amount of savings required to finance the accumulation process would be available in any case from the conspicuously absent

²⁶ Equation [5] has been presented following Fel'dman's notation to facilitate comparison. The original Mahalanobis expression is:

$$Y_t = \left\{ 1 + s_0 [(1 + \beta_k \lambda_k)^t - 1] \left(\frac{\beta_k \lambda_k + \beta_c \lambda_c}{\beta_k \lambda_k} \right) \right\}$$

where k stands for Sector 1 and c for Sector 2; β the output-capital ratio; and λ the percentage of the production of Sector K allocated to each Sector ($\lambda_k = \gamma$).

²⁷ Allen (1997) applies a multi-sector simulation model to find out what would have happened in the USSR in the 1930s under different scenarios. He concludes that under the NEP strategy (i.e. continuing the NEP policy) agricultural output would have been higher than that actually experienced, but after 1932 the rate of growth of the economy would have been lower. Using a similar framework, he also concluded that the main source of economic growth at that time was investment in heavy industry, together with the «soft budget constraint». This was the policy of facilitating credit liberally to the industrial firms to reach the planned output targets. According to his simulation model, collectivisation played a very minor role (Allen 1998). The same conclusion is reached by Cheremukhin *et al.* (2017) applying the «wedge accounting» methodology, although the authors do not consider the period 1914-1927 because of unreliable data. It is, however, doubtful whether the transfer of the agricultural surplus to the extent required would have been possible under the NEP strategy (Azqueta 2003).

agricultural sector. In other words, it was assumed that the required agricultural surplus would be extracted by any necessary means with no compensation whatsoever (Sah and Stiglitz 1984). It is difficult to find a better example of the teleological approach to planning.

Ronald Findlay, many years later, proved that the Fel'dman-Mahalanobis strategy was incompatible with the transfer of the agricultural surplus through the market and the exchange of equivalents (Findlay 1962). His argument was simple enough. If the investment effort is biased in favour of the production of capital goods, then few consumer goods would be available to exchange for agricultural products. With this amount of grain available, only a limited number of workers would be hired at the ruling wage in the industrial sector: a number insufficient to operate all the machines being produced. Within the context of a market exchange of equivalent value between agriculture and industry there would be no room for a strategy of rapid industrialisation. The value of γ will be given by the necessity of reaching an economic equilibrium between the amount of machines produced and the need to feed the number of industrial workers required to operate them. According to Findlay, the only way to solve this dilemma would be to deteriorate the terms of trade against agriculture, to lower industrial wages, and to adopt capital-intensive technologies. Except for the last one, these were precisely the same measures that accompanied the First 5-Year Plan in the USSR. Sah and Stiglitz (1987) showed that, in this sense, Preobrazhensky was right in that turning the terms of trade against agriculture was an efficient way to extract the surplus, although the Russian economist was wrong in assuming that the welfare of urban workers would increase in the process.

It could be argued that investing in building the heavy industry sector is only appropriate in the context of a closed economy, in which there is no possibility of importing the required capital goods. In this sense, while Preobrazhensky argued in favour of utilising the agricultural surplus directly in the urban sector to feed industrial workers, Trotsky considered it more efficient to export this surplus to import machinery. Raj and Sen (1962) would prove, however, many years later that even in the context of an open economy, with no trade restrictions, the strategy of making γ as high as possible is the appropriate one when trying to maximise income in the long run. Therefore, it is not the degree of openness of the economy which conditions the adoption of the Fel'dman-Mahalanobis strategy, but the capacity of the agricultural sector to provide the necessary surplus. This capacity and, not to be overlooked, the willingness of the ruling class to impose upon the population a growth process during which neither the peasants nor the urban workers would see their standard of living improve.

Mahalanobis, as well as Fel'dman, were thus promoting an industrialisation process which would rely on the agricultural sector as the source of finance. Agricultural development would be sacrificed in favour of

industrialisation. This assumes that the agricultural sector is working above subsistence level and thus has a surplus to transfer, because in real terms no investment to increase productivity would be allocated to it. The fate of the Indian planning effort as well as the experience of the People's Republic of China showed that this was a very dangerous assumption indeed. In 1956 India approved the second 5-Year Plan following the prescriptions of Mahalanobis closely. However, and due to increasing difficulties, the Plan was severely modified in 1958 and finally abandoned²⁸.

5.2. The Development Strategy of the People's Republic of China

The experience of the People's Republic of China is even more enlightening. On the 1 January 1953, after the «reconstruction period» (1949-1952) ended, the First 5-Year Plan began. The Plan was a copy of the Soviet First 5-Year Plan, and the strategy was the same: an accelerated industrialisation process with an emphasis on heavy industry together with the gradual collectivisation of agriculture. The Soviets provided not only the model but also the technology, the technicians and the machinery (in some cases the entire plants). Nevertheless, the situation of Chinese agriculture was even worse than that of the USSR in the 1920s, and the problem of transferring the surplus appeared under a much more dramatic light (Riskin in Perkins 1975). Some voices questioning the whole strategy began to be heard. The VIII Congress of the Communist Party (1956-1958) witnessed the emergence of growing opposition to the complete neglect of agriculture resulting from the strategy adopted in the Plan. Some measures were taken to ease the situation in the rural sector allowing the limited functioning of some markets and increasing the size of private plots within the cooperatives. However, in the second session of this same VIII Congress, the «Great Leap Forward» campaign was launched (January 1958). This was the reaction of Mao Zedong against the increasing resistance inside the Party to the Soviet model of accumulation and industrialisation adopted. The push towards industrialisation was reinforced, and so was agricultural collectivisation.

From an economic point of view, the Great Leap Forward strategy was an attempt to solve the agrarian question without sacrificing industrial growth. It was based on two basic ideas. The first one was to mobilise the peasants and put them to work on any kind of task that could increase agricultural production directly or indirectly: the opening of new roads, the clearing and

²⁸ As mentioned above, it is probably fair to say that both Fel'dman and Mahalanobis were more interested in their theoretical work than in being involved in political disputes. It is true that their model gave a theoretical foundation to a development strategy that was in any case already sanctioned by Stalin and the Communist Party in the USSR, and by Prime Minister Nehru in India. After the failure of the Plan, Mahalanobis returned to his main academic field; statistics. Fel'dman was condemned in the Great Purge and sent to a Gulag prison camp where he seems to have died in 1958.

levelling of land, irrigation projects, etc. Such tasks were to be carried out practically with their bare hands because no capital goods from urban industry would be forthcoming. It was, then, a way to transform disguised unemployment into investment without the help of capital goods. There was one exception: the second pillar of the strategy was the so-called policy of «Walking on Two Legs». This consisted of the following: besides the priority given to heavy industry, a new industrial sector would be developed in the countryside, but, in this case, it would be entirely self-sufficient, with no investment coming from the outside. This rural industry would therefore be very basic, small-scale and use simple technology, and would care for the needs of the rural sector: the production of chemical fertilisers, elementary tools, some consumer goods, etc.²⁹. This was clearly an attempt to increase agricultural productivity without sacrificing any investment in the heavy industry sector to solve the agrarian question. The strategy, however, did not succeed. It was followed by the «Three Black Years» (1959-1961), a period during which a series of poor harvests due to drought and flooding in different parts of the country, aggravated in many cases by the ill-conceived projects of the previous years, caused a great famine and the collapse of the entire strategy³⁰. It was now the turn of the Bukharinist faction, headed most notably by Liu Shaoqi (President of the Republic) and Zhou Enlai (Prime Minister) to try to redress the situation. Among its members appeared the man who was to become China's leader a few years after Mao's death: Deng Xiaoping. Once in charge again, they abandoned the strategy followed by Mao and introduced all the measures that Bukharin had been promoting in the Soviet Union (the *San zi yi bao* strategy). This new path, nevertheless, would only be consolidated after the failure of the second attempt of

²⁹ This is sometimes identified with the campaign of «building steel furnaces in the backyard». However, the latter was launched several months before the «Walking on Two Legs» policy, and abandoned shortly afterwards because of the poor quality of its products.

³⁰ «Depending on the underlying assumptions and methodologies employed, the excess deaths of this famine are estimated to range from a minimum of 16.5 million to as many as 30 million» (Kung and Lin 2003, p. 51). «Commune authorities were so preoccupied with iron and steel manufacturing in the autumn of 1958 that they neglected to harvest the crops, which were simply left to rot in the fields. This diversion of resources is estimated to account for 28.6% of the overall grain output collapse. The Leap had created an incentive structure of encouraging cadres to over report grain output, which led to the illusion that China had already produced a huge grain surplus. It was this erroneous assumption that formed the basis of Mao's decision to reduce the acreage sown to grain by a substantial 9.6% in 1959» (Kung and Lin 2003, p. 56). «Between 1953 and 1957, the growth of China's agricultural production coincided with the collectivization movement. The premise seemed to have been resoundingly reaffirmed when thousands of local cadres outdid one another in making wild claims about grain yields in 1958, the first year of the GLF» (Li and Yang 2005, p. 841). Li and Yang estimated that 61 per cent of the decline in output was attributable to the policies of resource diversion and excessive procurement. Furthermore, fearing communalisation without fair compensation, peasants reduced their stock of draft animals (the most important piece of capital in Chinese agriculture in the 1950s) by 10 million heads between 1956 and 1958 (Li and Yang 2005).

Mao Zedong to return to the original position (The Cultural Revolution: 1966-1971) and the condemnation of the Gang of Four (1976)³¹.

This is, of course, a very simplistic account of the events taking place in the People's Republic of China at a very fascinating period of its history and certainly warrants more in-depth study. A more detailed account of these events, together with the corresponding references appears in Azqueta (1983). Nevertheless, it should be added that besides economic issues, these two tendencies were also opposed on political grounds. On one side the «rightists» emphasised the importance that know-how and technicians, as well as economic incentives, had for the development of the country. Mao, on the contrary, argued that politics should always come first, over and above economics, and that revolutionary fervour should be prioritised over technical proficiency. In his opinion, peasants and manual workers were more trustworthy than «intellectuals»³². On top of this, China had broken relations with the Soviet Union in 1959, and was, once again, building «socialism in one country».

5.3. The Choice of Techniques Debate

It is time now to turn our attention towards an issue that summarises many of the dilemmas analysed so far and appeared in this Formative Stage of Development Economics: The Choice of Techniques debate. In other words, the question of whether labour-abundant underdeveloped countries should adopt labour-intensive technologies. This was the position adopted, among others, by Hollis Chenery and Richard Kahn when proposing the *Social Marginal Productivity Criterion* to solve this problem. On the opposite side, Walter Galenson and Harvey Leibenstein, as well as Jacques Polak and James Buchanan, argued in favour of relatively capital-intensive techniques (the *Rate of Turnover Criterion*), which was contrary to conventional wisdom and the Comparative Advantage theory of international trade. Amartya Sen (1960), in his PhD thesis, and following Maurice Dobb, provided the theoretical framework that included these two extreme positions and explained the apparent contradiction. In Sen's model, the appropriate technology

³¹ Decollectivisation started spontaneously in some villages in 1978. In August 1981 it was officially sanctioned, and it was further boosted by the State Council in January 1982. By early 1984, 99 per cent of households had opted for individual farming (Bai and Kung 2014). It is interesting to note in this respect that «provinces having suffered more from the great Leap Famine tended to decollectivize faster», «... the more successfully a province had developed its irrigation facilities under collective agriculture the more ready it was to abandon it» (Bai and Kung 2014, p. 22). On the other hand, «... in sharp contrast to the dire poor provinces, those who enjoyed higher levels of output and income, thanks to (rural) industrialisation and (farm) mechanisation, etc., were reluctant to make immediate switch (to private agriculture) » (Bai and Kung 2014, p. 7).

³² The reader will find here an echo of the discussion that opposed Lenin and the Left Communists (Bukharin among them at the time) regarding the role of specialists.

depends not only on the relative factor abundance of the country but, much more importantly, on the desired social objective. If present consumption is to be maximised, then the Social Marginal Productivity Criterion should be applied, and labour-intensive techniques should be adopted. On the other hand, if the social objective is to maximise the rate of growth (consumption in the long run), then the hiring of workers has a social cost even if their marginal productivity in their original sector is 0. This is so because of the increase in consumption that the new employment implies; to maximise the rate of growth the investible surplus needs to be maximised, and this means that any increase in consumption is a social cost. Therefore, relatively capital-intensive techniques should be adopted. The whole issue was immediately present in the then newly born field of Social Project Appraisal: more precisely, in the discussion about the appropriate value of the Shadow Wage Rate of unqualified workers and, closely related to it, the value of the Social Rate of Discount. Not surprisingly, Amartya Sen would become the author, together with Partha Dasgupta and Stephen Marglin, of one of the best-known manuals on Social Project Appraisal (Sen *et al.* 1972).

The same problem emerged in the Soviet Union in the period before the First 5-Year Plan (Azqueta 1983, pp. 39–47). Once the resistance to industrialisation had been overcome, two distinct approaches appeared. On the one hand, the so-called «British» advocated for the adoption of relatively small-scale, labour-intensive techniques, while the «Americans» argued in favour of large, modern, capital-intensive industrial plants. In an excellent example of his way of intervening in the debates, Stalin criticised this latter position in April 1926 by comparing the Americans to a peasant who buys a gramophone instead of repairing his plough. By 1928, he was sanctioning the «American» way as the official policy. It could not have been otherwise as it is the only one compatible with the Fel'dman-Mahalanobis strategy of rapid accumulation³³.

The Choice of Techniques issue has severe implications for the evolution of income distribution throughout the development process. The adoption of a strategy of rapid growth and relatively capital-intensive technology means the sacrifice of any improvement in the living standards of both industrial workers and peasants. In all probability it will also entail a worsening of income distribution and an increase in inequality. This, together with the Kuznet's curve, may explain why the problem of poverty and income distribution played such a minor role in the early phase of Development Economics. It was accepted that a rapid rate of growth would imply a worsening of income distribution and the non-improvement of living

³³ The Choice of Techniques issue was also discussed among the founders of the Structuralist School in Latin America, at CEPAL-ECLA. It has been argued that the Brazilian «Targets Plan», based on a study prepared by Celso Furtado, closely followed the Mahalanobis strategy, even though there is evidence suggesting that Mahalanobis did not have any contact with the Brazilian planners (Boianovsky 2013).

standards in the early phase of development, until, later on, the benefits of growth would «spill over» into the entire population.

The above examples are but a few of the many which show the importance that the discussions which took place in the Soviet Industrialisation Debate could have had for Development Economics: the problem of how to finance the development process; the apparent inconsistency between a rapid rate of growth and improving living standards in the short run; the equity issue involved in the inter-generational distribution of the costs and benefits of the development process; the neglect of agriculture and of aggregate demand in a supply economy focussed on solving production bottlenecks; balanced vs. unbalanced growth, etc. all these issues were at the forefront of Development Economics. Had the Soviet experience regarding the discussions about the industrialisation strategy been known, as well as the costs associated with the First 5-Year Plan and the collectivisation of agriculture, the industrial bias and the neglect of agriculture that characterised Development Economics at its foundation stage would probably have been much more qualified³⁴. Unfortunately «the best products of this period (...) came to be regarded as landmarks in the post-World War II literature, after these works were translated into English» (Bardhan 1993, p. 130). As a good example of this neglect, it could be mentioned that in Meier's (1970, pp. 735-736) path-breaking work of more than 750 pages the Fel'dman-Mahalanobis model only receives attention in two short paragraphs³⁵.

6. POSTSCRIPT

The 1920s witnessed a crucial debate in the Soviet Union, not only about the way to build a socialist society, but also regarding the problems of promoting economic development in a backward and rural economy. Different strategies were tried with different results. The problems faced in the development process, as well as the social cost entailed by the process itself, were clearly identified, and so was the social group that would have to pay the bill under each different strategy. As shown in the previous pages, these debates would have been of great importance for those underdeveloped countries that attempted to improve their situation after World War II, had they been known. Unfortunately, there was practically no trace left of them;

³⁴ This loss is even more noticeable taking into account the fact that «among the main precursors of development economics, a remarkable large number had personal ties with Russia or things Russian. Simon Kuznets, Paul Baran, and Alexander Gerschenkron were born in Russia. W.W. Rostow was the son of Russian émigrés. Ragnar Nurske was born in an Estonian territory under Russian dominion, and attended a Russian-speaking primary school» (Adamovsky 2011, p.530).

³⁵ In Meier (2001) there is no mention of either Fel'dman or Mahalanobis among the 138 references collected. Another example: when discussing balanced vs. unbalanced growth and the Big Push. Theory (exemplified by the polemic between Lauchin Currie and Albert Hirschman on the Paz del Río Steel Project in Colombia) Alacevich (2011) mentions the Soviet Union as a model of planned industrialisation and India's Second 5-Year plan without mentioning either Fel'dman or Mahalanobis.

they all seemed to have vanished. The reason is quite straightforward and well known; not only were all debates banned in the USSR in the 1930s, but almost all the leading figures of the previous decade and their works had disappeared from official records, and many of them had also met a tragic end indeed. As Barnett puts it: «The 1920s were the heterodox decade *par excellence* in the USSR (...) but dissent itself in economic theory was dealt with so harshly by execution or imprisonment that it ceased to exist beyond 1930» (2006, p. 113). The fate of some has already been pointed out. As for many of the rest, theirs was quite similar. Bukharin, Preobrazhensky, Chayanov, Kondratiev, Zinoviev and Riazanov, among those mentioned in this paper, were all tried and executed in the Great Purge of 1936-1938. Tomsy committed suicide in April 1936 when he was going to be arrested by the NKVD. Sokolnikov was detained in 1936 and assassinated in prison by other inmates in 1939. Litoshenko was also arrested in 1930 and died in a prison camp in 1943. Trotsky was assassinated by a Stalinist agent in Mexico in 1940. Fel'dman, as previously mentioned, was also condemned and sent to the Gulag, where he disappeared. Ironically, he was accused of «deriving long-term tendencies from abstract models». Bazarov and Groman appeared in court in 1931 in the Menshevik Trial and condemned to prison. Bazarov died in 1939 and Groman in 1940. «Planners and producers were involved in intricate games, potentially matters of life and death, or at least imprisonment and exile» (Hunter 1998, p. 1027). Strumilin and Slutsky were among the few able to survive the Great Purge³⁶.

The silencing of the debates and events of the 1930s in the USSR were not only an enormous human tragedy, but also meant a very significant loss for the advance of economic thought in the newly born field of Development Economics.

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³⁶ This is probably because they concentrated on statistics rather than on economics. The difference between the demands at that time on social sciences and on pure sciences had a clear expression in the proximity of their members to the Party: «A survey of 25,286 scientific workers in 1930 found that only 8% of the researchers in the exact sciences were members of the communist party, the membership rate within the social sciences had already reached a full 68.7%» (Boldyrev and Kragh 2015, p. 382).

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