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MACROECONOMIC IMPACT OF TRANSPORT INVESTMENT IN ROMANIA DURING THE SOCIALIST PERIOD (1950–1989)

Abstract: In this study we investigate the relationships between the investments allocated to transport systems and the economic development of Romania in the socialist era (1950–1989). The objective of our analysis aims at the quantitative evaluation of the correlation between the two mentioned components, in order to quantify the developmental potential of investments in transport during the analyzed period. For this purpose, we consider as variables transport investment, fixed capital in transport and the contribution of transport investment to the design of national income, for which we use the data available in the official statistical bases. For the proposed evaluation, we quantified the impact of transport investment on the gross national income (GNI) using the econometric model of correlation and determination coefficients. At the same time, we have measured the lucrativeness of transport investment by referring to the contribution of transport to GNI. The comparative-chronological evaluation of the obtained results suggests a differential impact over time of transport investment on GNI, as well as a differential evolution of the economic lucrativeness of these investments. Our findings show that the return on transport investments had a linear upward evolution especially after 1970, while the developmental impact of these investments described a symmetric-historical trajectory with the most robust effect on national income in the middle of the communist period (1961–1980), but with little impact at the beginning and end of the socialist era. Quantitative radiography of the impact of transport investment on GNI in the socialist era paints a less-discussed facet of recent economic history useful for understanding the roadmap of statist economies in Central and Eastern Europe.

Keywords: transport investment, fixed capital in transport, Gross National Income (GNI), economic lucrativeness, the socialist period in Romania

INTRODUCTION

The communist regimes installed after the World War II in the countries of Central-Eastern Europe proclaimed the development of transport as an economic priority alongside the industrial branches and agriculture, starting both from the objective need for the development of the economy, and from the Marxist premise according to which the development of networks of transport determines the specialization of other branches (Botez et al., 1977: 13–14), thus multiplying the social division of labor and production on the internal level, respectively the international division of labor on the external level (Marx, 2023: 1364) as key concepts of Marxist ideology. Therefore, the allocation of investments for the transport systems in the socialist countries of the East was based on a double foundation – economic and ideological – which determined a centralized and integrated design of the transport systems, based on a common management of infrastructures and transport operators (Ruiter, 2005: 287; Ottosson, 1997: 187). Such an approach was possible against the backdrop of the ideologically determined monopoly of state ownership over both infrastructures and transport agents, a context in which there was no question of the balance between the market and government intervention or the accommodation of public and private interest (Hasselgren, 2013: 33; Medema, 2009: 137), but only the exercise of total government control over transport systems, considered strategic from an economic and security point of view.

This paradigm included the development of transport in Romania during the socialist period, where, in the first stage, the direction of investments for transport aimed at restoring the transport networks damaged during World War II (*Istoria Căilor…*, 2014: 22; Loghin and Morăraşu, 1971: 266), and then the consolidation and expansion of these networks both for functional-economic reasons (Ilieş and Crişan, 2010: 76; Dobrinescu, 1975: 197), and as elements of legitimizing the communist government in front of society (Stănescu, 2014). Indeed, the good or poor functioning of the transport systems was the most sensitive to the public of all the socio-economic systems of the country (Turnock, 2005: 33). Therefore, the investment efforts focused on the development of transports had to ensure the proper functioning of the statist society and economy (Murgescu, 2010: 381), in order to demonstrate the justice of the socialist development policy practiced by the political regime. In this political-

economic framework, the budget allocations intended for transport systems supported a dual stake, serving both as an economic objective and as an ideological objective.

At the same time, the industrial development designed by the communist government generated the need for the consecutive expansion of transport networks during the socialist period (Naşcu, 2000: 213). The development of transport that accompanied industrialization was itself a factor for economic growth. Against this historical background, our research inquiry is centered on the role played by transport investment (TI) and fixed capital resulting from transport (FCT) for the development of the economy in the socialist era. In this context, the objectives of the analysis aim at evaluating the economic lucrativeness of TI and FCT and respectively quantifying the impact of TI and FCT on Romania's gross national income (GNI) in the reference period.

Our investigation aims at the statistical-mathematical quantification of the relationship between the investments allocated to transport and their impact on the national income during the socialist period in a methodological manner specific to *the new economic history*, but less popular in Europe and unused until now in Romanian historiography, which argues the usefulness and the innovative dimension of our approach. The current research is an econometric history analysis, in which, in order to evaluate the lucrativeness of TI, we performed a quantitative comparison of the contribution of transport to GNI with the volume of TI, respectively with the value of fixed capital from transport put into operation annually (FCT/year). To analyze the impact of TI on GNI, we evaluate the econometric correlation between the mentioned indicators. Based on the processing of the available statistical data, we found the model of the differential evolution over time of the ratios between TI, FCT and GNI during the analyzed period. At the same time, we identified the time intervals with different characteristics of the relationship between the considered indicators, based on which we designed a periodization of the socialist era from the point of view of the TI impact on the development of the national economy; these findings represent the relevant added value that our research delivers in the field of recent economic historiography.

SCHOLAR BACKGROUND AND RESEARCH HYPOTHESIS

Starting from the urgent need to rehabilitate the transport network after World War II, and then to consolidate the national economy, the communist governments after 1945 allocated the stipends necessary to support the transport systems within the five-year economic development plans specific to socialist economies. Practically, the budget allocations for transport are a barometer of the communist regime's intentions regarding the role and place of this branch in the command economy system, and the financial outputs delivered by the transport industry to the national income represent the extent to which these intentions have succeeded.

While in Western Europe the development of transport systems was favored by a post-war institutional framework circumscribed by Keynesian, liberal, neoclassical or co-evolutionary economic doctrines (Myszczyszyn, 2021: 201), the transport development in the socialist countries of the East was confined to the grid of the doctrine Marxist that dogmatically privileged the directly productive sectors (Murgescu, 2010: 380) and in which the investment option for transport always remained subordinate to other ideologically determined funding priorities (Kornai, 1992: 185). In this functional framework, Turnock (1986: 223) shows that the modest financing of transport and the tertiary sector in general was a characteristic of the socialist world in the East from which Romania was no exception and which, in the assessments of Tomka (2020: 214, 247) and Kornai (1992: 186), determined a permanent overload and congestion of transport systems, contributing to systemic dysfunctions and the emaciation of the quality of life in socialist societies. Thus, the transport financing situation in socialist Romania seems somewhat similar to the one in socialist Poland described by Keller (2021: 240), where the allocated investments ensured only a certain part of the necessity of the modernization process (for example, electrification in the case of railways) ignoring other modernizing aspects such as technological renewal, motorization, development of secondary infrastructures, etc. Convergent conclusions are formulated by the analyzes of Ellman (2014), Kaser (1986) and Horvat (1982), but without identifying the concrete purposes for which the communist regimes underfunded transport, although they declared it a priority. Continuing the assumptions of the cited researchers, we believe that, in addition to the limited possibilities of the socialist economies, the decision-makers in the East deprived the transport systems and services of a more consistent financ-

ing in order to prevent the emulation of an enlarged individual autonomy generated by an easy and flexible operation of these tertiary branches.

However, according to official statistical data, budgetary allocations for transport have generated significant financial dividends throughout the duration of Romanian socialism, being an activ contributor to the national income. In such conditions, our hypothesis claims that during the socialist period the transport systems delivered outputs (even if precarious) despite the fact that they didn't receive enough resources, a thesis that we argue in this study by quantifying the transport yield in the communist planned economy.

A certain insufficiency also appears on the dimension of academic analyzes regarding investments in transport and their contribution to economic development. During the socialist period, the studies undertaken included several themes constantly debated in the era: the theme of restoring networks after World War II (Dobrinescu, 1975; Loghin and Morărașu, 1971), the theme of the subsequent modernization of transport networks (Botez et al., 1977), the propaganda theme concerning the class struggle of railway workers (Stoika, 1956) even though it was unrelated to the development of transport. In the post-communist period, the problem was addressed scientifically in several categories of research, either focused exclusively on the area of transport (monographs of transport modal subsystems, specific studies), or development and economic research that sequentially evokes the contribution of transport to good overall development, but without insisting in a diachronic manner on the investments that developed them or their yield. A category of valuable research is represented by studies published in the form of thematic chapters within broader economic history treatises (Nașcu, 2000) or academic projects focused on economic dynamics in the European political-economic context (Grigorescu, 1991; Teclean, 2021) and on the gaps in development of the Romanian space in relation to the western epicenter (Murgescu, 2010; Turnock, 1986: 64), works that provide an understanding of the general background in which the autochthonous transport networks evolved.

However, all these studies published so far do not contain quantitative chrono-econometric analyzes regarding the dynamics and feasibility of transport investments and their macroeconomic impact during the communist period. Against the background of these sectoral gaps, we propose an introspection on the link between the subsidies allocated to transport and their contribution to the national income in socialist Romania, based on an investigative methodology that we present below.

METHODOLOGICAL APPROACHES AND SOURCES

We have used four main variables in the analysis, namely transport investment (TI), fixed capital in transport put into operation annually (FCT/ year), accumulated fixed capital in transport (FCT) and gross national income (GNI). The data series cover the period 1950–1989[1] and were taken from the official sources presented in Table 1.

Table 1: Description of variables

Variable	Description
TI (Transport Investment)	Net annual investments in transport infrastructures; they are based on local constant currency (million lei). Source: Anuarul Statistic al României (1960: 286–287; 1965: 344–345; 1970: 458–459; 1980: 376–377; 1990: 526–527); Anuarul Statistic al investiţiilor şi... (1987: 58–59); Investiţii-Construcţii în... (1966: 66–67; 1969: 44–45; 1976: 32–33; 1981: 50–51).
FCT/ Year (Fixed Capital in Transport/ Year)	Fixed capital in transport (fixed assets) put into operation every year; they are based on local constant currency (million lei). Source: Anuarul Statistic al investiţiilor şi... (1987: 270–271); Investiţii-Construcţii în... (1966: 163; 1969: 162–163; 1976: 168–169; 1981: 204–205).
FCT (Fixed Capital in Transport)	Fixed capital in transport (fixed assets) accounted for at the end of a year as accumulations from the entire previous period; based on local constant currency (million lei). Source: Anuarul Statistic al României (1960: 107; 1970: 115; 1975: 58; 1980: 102; 1990: 248); Investiţii-Construcţii în... (1966: 405; 1969: 199–200; 1976: 6; 1981: 7).
Transport contribution to GNI (Transport sector contribution to Gross National Income)	The contribution of transport to the formation of the Gross National Income (GNI); expressed in local currency (million lei). Source: Axenciuc, 2012: 198; Anghelache et al., 2018: 179; Anuarul Statistic al României (1982: 196; 1983: 192; 1984: 194–195; 1985: 205; 1990: 230–232).

Source: Author's concept.

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[1] Although the process of installing communism in Romania began in 1945, and in 1947 the Romanian People's Republic was proclaimed, the difficulties of the first post-war years determined the partial and selective collection of statistical data, so that only since 1950 have there been rigorous statistical data series.

The dynamics of transport stipends registered a wide amplitude of size during the socialist period, which determined a similar variation of their contribution to the national income. The intensity and hierarchy of the relationships between the mentioned parameters is highlighted by the values of the Pearson coefficients presented in the correlation matrix of the variables (Table 2).

Table 2: Summary statistics and correlation matrix

	TI	FCT/Year	FCT	Transport contribution to GNI
Mean	10,628.87	9,473.12	136,840.35	16,745.17
Median	7,439.50	7,388.00	71,951.00	11,082.00
Standard Deviation	9,204.51	9,010.65	131,343.10	14,777.63
Minimum	913.00	862.00	27,730.00	1,087.00
Maximum	28,189.00	43,212.00	441,300.00	44,100.00
Observations (years)	40	40	40	40
Correlation Matrix between main variables				
TI	1	–	–	–
FCT/Year	0.904	1	–	–
FCT	0.919	0.834	1	–
Transport contribution to GNI	0.976	0.867	0.961	1

Source: Author's proceedings based on the sources described in Table 1.

It is observed that, in the transport subsidies – national income binomial, the most robust relationship was established between TI and transport contribution to GNI (Pearson coefficient = 0.976), as well as between TI and FCT (0.961), and the most attenuated relationship was between FCT/year and transport contribution to GNI (0.834). On this basis, we evaluated the lucrativeness of subsidies allocated to transport through the annual added value delivered by them to the national income expressed in two ways: as the difference between transport contribution to GNI and TI, respectively FCT/year. However, such a correlation matrix only provides a

sequential radiography of the data package, so we approach additional investigative procedures to understand the relationship between the variables. Thus, to explain the impact of transport expenses on GNI, we chose TI and total FCT as correlation variables on the grounds that they are the most robust variables related to GNI, according to the values of the Pearson coefficient in the correlation matrix. Next, in order to quantify the contribution of TI and FCT to the composition of the GNI in five-year stages, we used the determination factors as a tool to quantify the impact (calculated with EViews 10 Standard Edition software), taking the five-year periods as a reference under the argument of compliance with investment plans practiced by the communist regime.

## DYNAMICS AND ECONOMIC LUCRATIVENESS OF TRANSPORT INVESTMENT IN COMMUNIST ROMANIA

The evolution of TI and FCT/year was uniformly upward until 1980 imposing this dynamic and transport contribution to GNI. The increase of TI and FCT/year was a consequence of the political commands of the communist regime along the lines of the modernization of transport infrastructures. Systematic investments began at the beginning of the first cycle of Romanian socialism – that of the Romanian People's Republic (RPR) within the first five-year plan 1951–1955 aimed at consolidating transport networks (*Rezoluții și hotărâri…*, 1951: 8; 1954: 343). Investments then increased considerably at the beginning of the second cycle of Romanian socialism – that of the Socialist Republic of Romania (RSR), now targeting the expansion and modernization of transport infrastructures; this second wave of the TI was catalyzed as a result of the political decisions proposed by Nicolae Ceaușescu at the working session of the active party in the Ministry of Transport on February 10, 1967 (Ceaușescu, 1967: 12), at the 10th Congress of the Romanian Communist Party (PCR) in 1969 and at the National Conference of the PCR in 1972 (*Conferința Națională a PCR…*, 1972: 24–25).

After 1980, however, with the onset of the systemic crisis of the last socialist decade, combined with the unstable global context after the second oil crisis of 1979, the dynamics of investments and that of the contribution of transport to GNI took a divergent path. Indeed, according to Iancu and Pavelescu (2018: 10), the context of the 1980s was one in which

the fluctuations in the rate of accumulation [i.e. the decrease in the efficiency of accumulation], the increase in material and energy expenses against the background of the enormous increase in the prices of oil and mineral raw materials on the world market, the different cycles of the renewal of fixed capital and of the policy regarding the sizing of depreciation rates by branches and sectors of activity, as well as the dramatic decrease in the growth rate of national income in the 80s were factors that determined an important decrease in the share of investments in all branches of the Romanian economy in the last communist decade.

This phenomenon did not manage the transport sector either where, after 1980, TI and FCT/year registered an oscillating dynamic, while the transport contribution to GNI continued its upward course (Figure 1), proving that transport did its duty with stoicism towards the national wealth, constantly contributing to the GNI even in the terrible underfunding conditions of the 1980s, which statistically argues the overload to which the Romanian transport system was subjected after 1980.
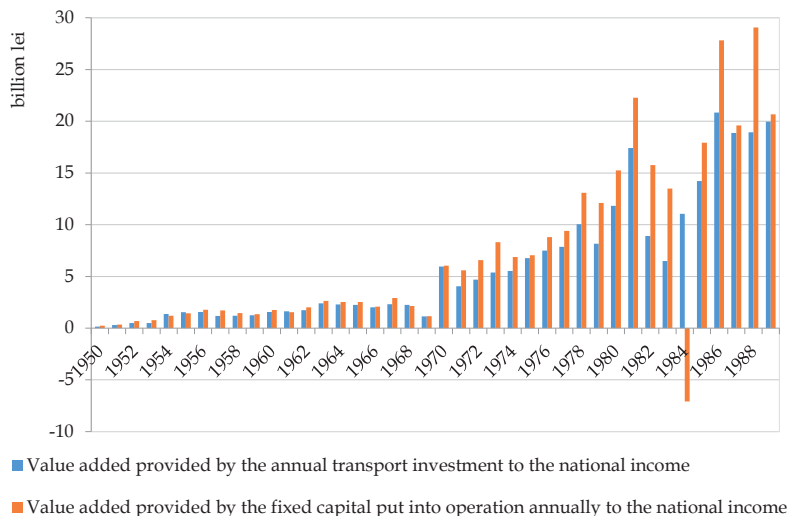
Figure 1: Dynamics of investment and fixed capital in transport correlated with their contribution to Romania's national income (1950–1989)
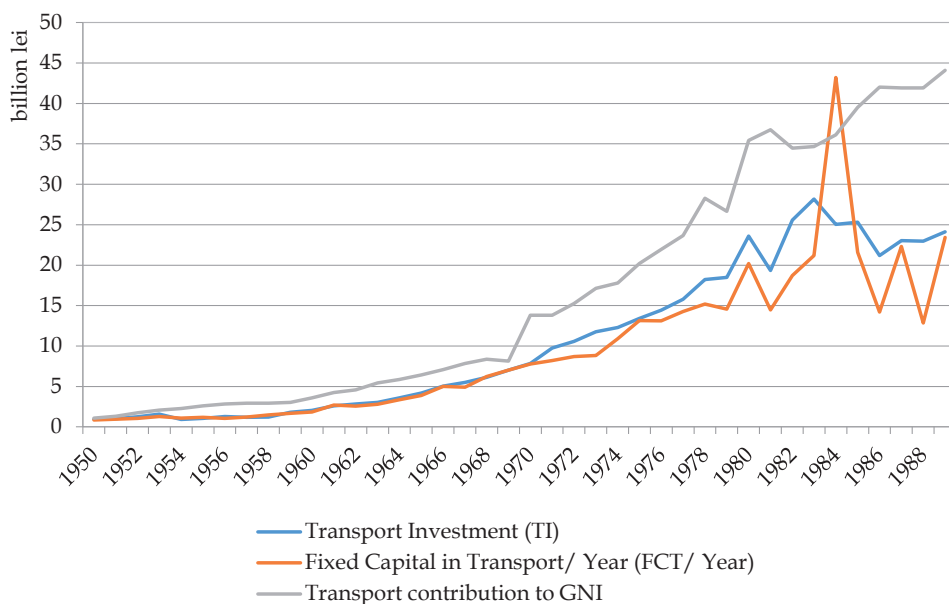
Source: Author's proceedings.

A similar evolution had the economic yield of the funds allocated to transport, which will experience an increase starting from 1970 with the wave of growth of TI initiated by the political-economic commands of the time. It should be noted that the yield of TI was lower than the yield of FCT/year in almost all years of socialism, except for the years 1954, 1955, 1961, 1968 and 1984 in which the yield of FCT/year exceeded that of TI. Anyway, throughout the socialist era, the return on funds allocated to transport was positive, with the exception of the striking situation of 1984 – the only year in the socialist period when FCT/year registered a negative return in which the value of the fixed capital put into operation in transport was 7.096 billion lei higher than the contribution of transport to GNI (Figure 2). The situation is due to the putting into operation of the Danube – Black Sea canal in 1984, a particularly expensive project that accumulated large investments made in many previous years and which thus surpassed the entire added value delivered by transport to GNI that year. However, the value of FCT/year in 1984 did not determine a significant impact on the total FCT in transport at the end of 1984, since the huge value of FCT/year in that year (43,212 billion lei) was statistically faded/compensated by the exits from system (the value of decommissioned assets), so that the total FCT growth did not take over the statistical shock from the FCT/year dynamics.

Figure 2: Transport investment yield expressed by the value added provided to the national income (1950–1989)

Value added provided by the annual transport investment to the national income

Value added provided by the fixed capital put into operation annually to the national income

Source: Author's proceedings.

However, despite the existing systemic difficulties, the 1980s record the highest yields of TI and FCT/year in terms of contribution to GNI, with the exception shown for 1984. The situation is due to the further increase of the contribution of transport to the national income against the background of the capping of investment funds, i.e. through overexploitation of an already worn and outdated infrastructure.

IMPACT OF TRANSPORT INVESTMENT ON NATIONAL INCOME: A VOLATILE DYNAMICS THAT REFLECTS THE AVATARS OF THE SOCIALIST ECONOMY

Extending the previously presented analytical reasoning, we demonstrate that the effects/impact of TI and FCT on GNI had an equally inconsistent course as their dynamics and lucrativeness, reflecting the limits of the planned economy. At a first evaluation, the analysis for the entire socialist period seems to reveal a benign situation: the correlation between the indicators used is very strong (given by the Pearson coefficient > 0.9), and the impact of budget allocations in transport on the national income is a substantial one (given by determination factor R^2 = 0.953 for TI and 0.924 for FCT). The deepening of the investigation at the level of five-year sub-periods, however, shows a completely different turn of the situation, as shown in Table 3.

At the beginning and at the end of the socialist era, despite the investment efforts made, the relationship between TI and transport contribution to GNI was very weak, as was the impact of TI on the contribution to GNI. Thus, in the first socialist five-year period 1951–1955 and then in the five-year period 1981–1985, the "sawtooth" evolution of TI contrasted strongly with the constantly upward evolution of transport contribution to GNI, which explains the negative correlation between the variables and the very weak impact of TI (Figure 3).

Table 3: Pearson correlation coefficients (R) and determination factors (R^2) of the relationship between main variables by five-year plans
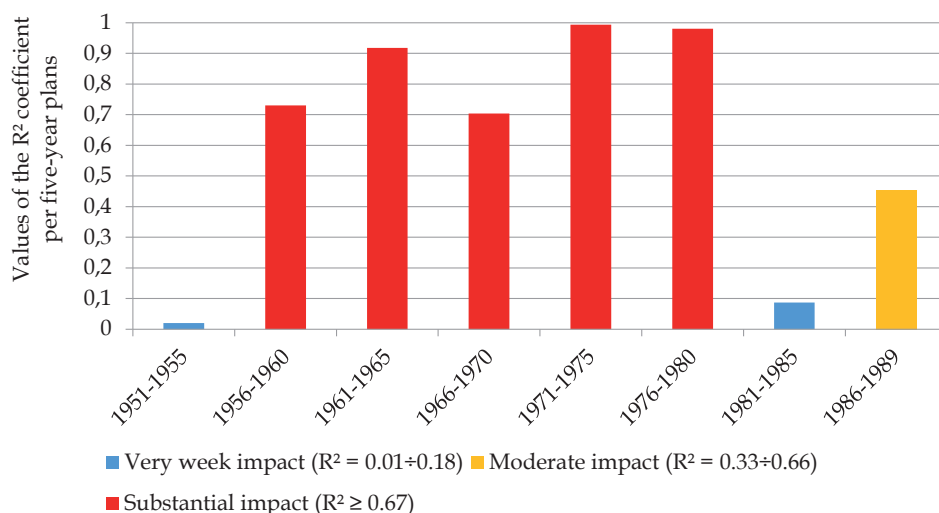
Period	Transport contribution to GNI & TI		Transport contribution to GNI & FCT	
	R	R^2	R	R^2
1951–1955	-0.048 (0.930)	0.002 (0.930)	0.979*** (0.003)	0.959*** (0.003)
1956–1960	0.854* (0.064)	0.730* (0.064)	0.477 (0.416)	0.228 (0.416)
1961–1965	0.958** (0.010)	0.918** (0.010)	0.990*** (0.001)	0.981*** (0.001)
1966–1970	0.839* (0.075)	0.704* (0.075)	0.823* (0.086)	0.677* (0.086)
1971–1975	0.997*** (0.000)	0.994*** (0.000)	0.983*** (0.002)	0.967*** (0.002)
1976–1980	0.990*** (0.000)	0.980*** (0.000)	0.960*** (0.009)	0.921*** (0.009)
1981–1985	-0.295 (0.620)	0.087 (0.620)	0.614 (0.270)	0.377 (0.270)
1986–1989	0.673 (0.320)	0.453 (0.320)	0.774 (0.225)	0.600 (0.225)
1950–1989	0.976*** (0.000)	0.953*** (0.000)	0.961*** (0.000)	0.924*** (0.000)

Note: p-values are in brackets. ***, **, * – Significance level is 1%, 5%, 10% respectively.
Source: Outputs from EViews 10 Standard Edition based on the sources shown in Table 1.

If in 1951–1955 the communist regime was just starting the investment effort, the 1981–1985 five-year period marks the beginning of the regime's financial difficulties, and in 1981 Romania was on the verge of insolvency (Jackson, 1986: 490, 501). And in the last communist five-year period 1986–1989, TI had a modest impact on the contribution to the GNI ($R^2 = 0.453$) in the conditions of stagnation of investments, but the increase of transport contribution to the national income through their overexploitation. In the middle of the socialist period (1956–1980) TI maintained a strong impact on transport contribution to GNI against the background of the convergent direction of evolution of both indicators.

Figure 3: The impact of transport investment (TI) on the national income (GNI) expressed by the values of the R^2 coefficient per five-year plans
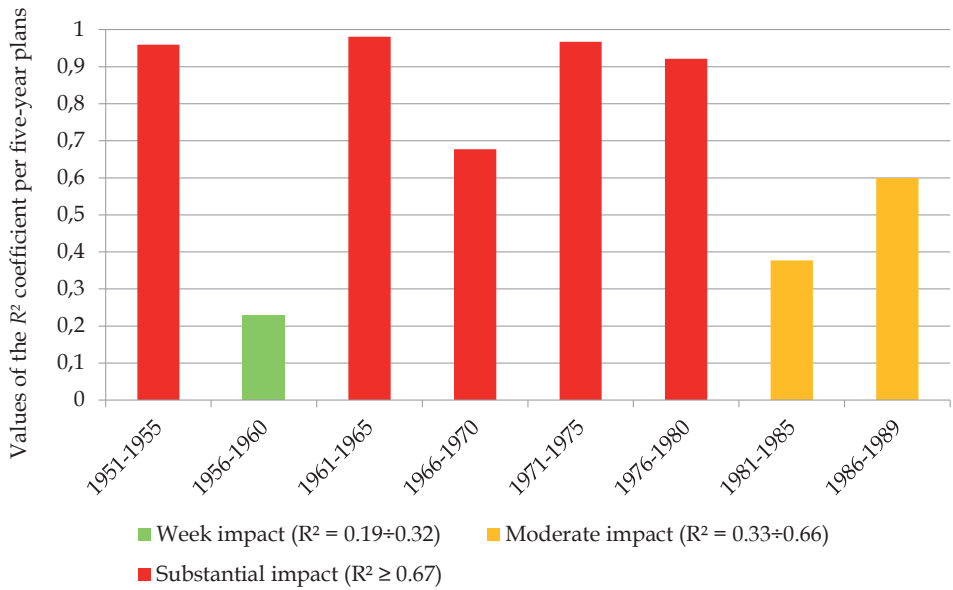

Note: The R^2 coefficient value ranges are considered according to Chin (1998).
Source: Author's proceedings.

The relationship between FCT and transport contribution to GNI proved to be more robust and with a certain inertial remanence over time visible in the five-year analysis. Thus, the still low investments from the first five-year period 1951–1955 were reflected in an insufficient volume of fixed capital constituted in transport, which showed its weak impact on the national income only in the following five-year period 1956–1960 (Figure 4). Somewhat paradoxically, in the last socialist decade, despite relatively high yields of TI and FCT/year, the impact of FCT on transport contribution to GNI was modest (R^2 = 0.377 in the five-year period 1981–1985 and 0.600 in 1986–1989), as a result of the very volatile ("sawtooth") dynamics of TI and FCT/year in the decade of the 1980s.

Practically, the decades of the 1960s and 1970s are characterized by a strong impact of TI and FCT on GNI, while the decades of the 1950s and 1980s recorded weak or at most moderate relationships between transport outputs to the national income and the stipends allocated to them, in the context the insufficiency of the latter (the 1950s) or their capping against the background of the generalized crisis of the last socialist decade in Romania (the 1980s).

Figure 4: The impact of fixed capital in transport (FCT) on the national income (GNI) expressed by the values of the R^2 coefficient per five-year plans

Note: The R^2 coefficient value ranges are considered according to Chin (1998).
Source: Author's proceedings.

CONCLUSIONS

In post-communist Romania, the problem of the underdevelopment of the transport infrastructure inherited from the communist regime, but also of the economy in general, is acutely felt, in a context in which the topic "why the communist regime did not pay more attention to transport, like industry" is very publicly debated and which it was their contribution to the economic (under)development of the country. However, the subject has not been "weighted" enough in the academic circles from a historical-econometric perspective, that's why in this paper we explored the contribution of transport investment and related fixed capital to the composition of the national income in socialist Romania.

In the first part of the research, we examined the dynamics and economic lucrativeness of budget allocations for transport, and in the empirical analysis of the second part, we measured, with the help of correlation and determination coefficients, the impact of these investments on the

national income in the period 1950–1989. Our findings suggest that in socialist Romania transport systems benefited from moderate investments in the 1950s and 1960s that increased rapidly after 1970, but capped off amid the systemic crisis of the 1980s. The same evolutionary pattern was recorded by the feasibility of investments and fixed capital in transport, whose return paradoxically increased after 1980 (except for 1984) due to the increase in contribution to the national income, although investments had been capped, revealing the overexploitation of a precarious infrastructural heritage, obsolete and deficient.

At the same time, our results reveal a historical-evolutionary symmetry of the impact of investments and fixed capital from transports in the configuration of the national income for the evaluated period. Thus, the beginning and the end of the socialist period (the 1950s and 1980s) represent stages with a weak impact of transport on the creation of national wealth, while the middle stage of the analyzed period (1961–1980) brought a robust impact of budget subsidies from transport on the formation of the national income. The relevant thesis of this study highlights that in the socialist planned economy, despite the deficit financing, the transports managed to "do their duty" and deliver contributions to the national income with a lucrativeness and a chronologically differentiated impact according to the model described previously.

However, the feasibility of the transport contribution to the national income (even for the interval of the best contributions from the 1960s and 1970s) must also be evaluated in light of the almost total disregard by the communist power of the environmental norms in transport (even those valid at that time) and therefore, of not allocating the additional investments necessary for this imperative that is so important nowadays. If the desired norms had also been taken into account (and expenses would have been allocated for them as well) it is difficult to assess counterfactually how feasible the contributions of transport to the national income would have been.

This historical-econometric investigation, although it provided results with a scientific precision superior to the classical qualitative approaches, is still burdened by several operational limits caused by the inaccessibility of extensive sets of statistical and documentary data, but which also represent some pending academic opportunities: (a) not positioning the analysis in the broader regional framework of socialist countries for a relevant comparative assessment and (b) not breaking down the investigation into transport modal subsystems that would allow for a multimodal comparative approach.

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