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Chapter 1

To Command or to Understand?

Planning Concepts and Economic Research in Communist Bulgaria

Roumen Avramov, Kaloyan Ganev, and Stefan Petranov

Economic science in Bulgaria during communism commonly is perceived as a pale, grim copy of the corresponding Soviet landscape. Although this assessment captures the broad picture, scrutiny reveals subtle trends in the history of economic ideas. Such an exercise does not discover (nonexistent) spectacular Bulgarian innovations but elaborates on the gestation of concepts shaped by an interplay of complex influences.

The chapter investigates the craft of planning from the perspective of "adjacent" economic research. Our focus is on the impact exerted on the planning paradigm by the gradual and partial mathematization of traditional economic science and by the emergence of new approaches to its conventional topics. We briefly review prewar legacies and the core canon. Then the ambiguous process of formalization is discussed. Finally, we comment in more detail on the notions of *optimal planning* and *economic growth* as well as the incipient neoclassical turn embedded in a critical revisit to the latter.

BEGINNINGS

Proto-ideas

As elsewhere, the ideas that led to the establishment of all-embracing communist planning in Bulgaria originated in the late nineteenth century

propagation of Marxism and other radical reformist movements. They can be traced to the intellectual impact of the Bolshevik revolution and the eventual spread of collectivist, interventionist, or totalitarian theories. Between the two world wars planning became an acceptable idea, a tempting social experiment, and a respectable academic and political mainstream (Avramov 2018; Penchev 2018).

Typical for the periphery, economic thought in Bulgaria at the turn of the twentieth century evolved in the shadow of dominant paradigms. Political economy was understood as a blend of epigonic transfers from classical, Austrian, and historical schools; an overview of the general history of economic ideas; and a sequence of occasional glimpses on local particularities (Avramov 2007, Vol. 3; Nenovsky and Penchev 2018). Anglo-Saxon authors were of secondary importance. Ambitions for original contributions to high theory were a priori dismissed, aversion to the avant-garde was dominant, and mathematical approaches were ignored or deliberately rejected. Political economy was deemed to be a secluded domain of abstract reasoning. When shifting to the down-to-earth world of politics, university professors forgot the liberal precepts they were teaching their students.

During the interwar period, ideas related, in one way or another, to planning permeated academia. New curricula endorsed equidistant theoretical positions between totalitarian and liberal *economic systems* and promoted a synthesis of *individualistic* and socialist order. The "planned economy" was classified as an extreme but plausible model. The far-left and the far-right converged in its exaltation and in programs for modernization through nationalization and the elimination of free competition.

Attempts to institutionalize this ideology began in the early 1920s. A *Higher Economic Council* was instituted in October 1923 by a government that had emerged from a recent coup, headed by professor of Political Economy Alexander Tzankov. The council was an advisory body at the Ministry of Finance and composed of five members selected from professional associations and appointed/dismissed by the government. The naïvely rationalistic idea was to try to coordinate diverging interests ex-ante and thus avert economic policy errors. It was assumed that in this way competence prevails over political affiliation, long-term views, and stability over short-term political considerations, the public over the corporativist interest. The expected outcomes were a "general economic and financial plan" and the elaboration of draft laws and expert opinions concerning the most pressing economic issues. For over twenty years, the council functioned as a forum and maintained the ambivalence of its representative and technocratic profiles. Its existence, however, affirmed and legitimized the concept of "planned economy." Indeed, different government institutions produced elaborate sectoral blueprints like the five-year Plan for the Rationalization of Industry (1934), the General Plan for Electrification (1941), and the detailed five-year Plan for Agricultural Economy (1941) (Penchev 2018).

A trend which pointed in the same direction was the progress of positivist economic thinking. It was fostered by a growing number of Bulgarian doctoral students abroad, but the decisive step was made in 1935 when the Statistical Institute for Economic Research (SIER) at Sofia University, directed by the Russian émigré Oskar Anderson,[1] was established with the help of the Rockefeller Foundation (Avramov 2007; 2018). Without resorting to econometrics or mathematical economics, SIER published a series of high-quality empirical studies, namely, the first estimates of Bulgarian national income and a thorough study of the business cycle. Several of the institute's members were granted fellowships at American and British universities. Together with Assen Christophoroff (SIER fellow and former LSE student), they enhanced the influence of Anglo-Saxon economic thinking and provided the foundation for targeted, selective, and informed state interventions in the economy.

Planning concepts penetrated mainstream economic thought through economic policy as well. The stabilization of the national currency in the 1920s carried out under the conditionality of the Inter-Allied Commission and the League of Nations[2] was a complex endeavor of financial planning requiring coordinated steps, consistent prospective vision, and extensive statistical data. Efforts on an even larger scale were needed to cope with the Great Depression. Some of those activities (namely, clearing policies, foreign exchange and capital controls) anticipated almost literally the functions of a future communist monobank. As early as in 1933, the League of Nations and foreign observers complained publicly that the Bulgarian government de facto follows a policy of "planned economy." By the end of the decade and during the war, the running of an even more etatized, overly regulated economy—and of an overwhelmingly state-managed banking system—involved the application of a great deal of hard planning instruments, including price setting. It was discussed whether this trajectory leads unavoidably to full-fledged planning, and where the boundaries separating it from the capitalist economy lay (Bochev 1935; Christophoroff 1943). Christophoroff delineated several stages which regrettably but logically culminate in "wartime capitalistic socialism." Although in prewar Bulgarian scholarly literature no direct reference was made to the "Socialist Calculation Debate" of the 1930s, the above-mentioned discussions implicitly touched upon the same problems.

More telling than the experts' debates was the public mood. In 1935, Stoyan Bochev[3] commented on how the First World War and the ensuing developments had molded a generalized perception that the transformation of comprehensive state interventionism from *temporary* into *permanent* order

(and further into a collectivized economy) is a natural, conceivable, and even desirable trend (Bochev 1935). A few years later, Christophoroff lucidly foresaw and lamented that one of the most important consequences of the war would be the attractiveness "of the seemingly limitless possibilities of the central political authority" to shape the economy, the institutions, and the political system (Christophoroff 1943, 360). The most liberal Bulgarian politicians were convinced that the new system born from the war would confirm the compatibility of democracy with a *dirigiste*, managed economy. Hence, it is no coincidence that when the freshly installed communist-dominated regime founded the prototype of a future planning body in May 1945, the institution borrowed the name of the *Higher Economic Council*: behind the continuum in the brand stood a continuum of ideas.

The Communist Canon

In the interlude preceding the full seizure of power by the Communist Party in 1947, a couple of one-and two-year plans addressed the material and financial effects of the war. In December 1947, the industrial and financial systems were nationalized and a Planning Commission was established which took over the management of the entire economy, while the Bulgarian National Bank was transformed into a monobank. The first five-year plan was adopted for 1949–1953. In the following decade the economy achieved an impressive increase of output in key industries, which coexisted with serious mismatches and disequilibria. Both a high degree of inefficiency and many limits to resources affected virtually all production factors.

A prompt and uncompromising implementation of the Soviet model came together with the imposition of the corresponding canon. Not unlike new institutionalism today, which builds a theoretical system around the concept of *private* property, this canon considered central planning the emanation of *state* ownership and the ultimate incarnation of collective property rights. At the same time, as an instrumental field subordinated to the reigning ideology, its theoretical content was deemed of inferior status and its domain in the textbooks of political economy was of secondary importance (Avramov 2018).

The actual weight of planning, however, was higher. Since it embedded the holistic view of communism regarding the intrinsic governability of the economy according to "objective," "scientific" laws, every analytical or theoretical result of economic research reflected on the concepts of planning. Due to its key importance in economic life, it gave birth to a distinct research field, teaching departments, and careers. Planning built tangible institutional realities, social and power networks. It was the transmission belt of political goal-setting, and major decisions concerning economic structure, growth, and/or priorities were implemented with the available planning tools. The same was true of the macro/micro interface and the related motivations/incentives of economic actors. Thus, in the post-Stalinist landscape, planning became part and parcel of the ongoing controversies among political economists on (de)centralization and "commodity-market relations" and *implicitly* entered the province of "high theory."

Notwithstanding the series of market-oriented reforms, the planning canon in Bulgaria remained fossilized. The primitive Stalinist model boiled down to a system of imperative orders: addressed to the branches (and down to the enterprises) about quantity, quality, and timing of their output; concerning labor force; and indicating the location of investments. The declared objective was to avoid "disproportions," and if they still appeared, to have contingency resources available (Lazarov 1949). This simplistic philosophy remained the backbone of the planning canon even when its original wording was abandoned and seemingly more sophisticated schemes emerged. The curricula taught at Bulgaria's leading economic university (the Karl Marx Higher Institute of Economy in Sofia—HIE)[4] did not undergo substantial change during the lifetime of the communist regime. Since the outset, the general frame was given by exogenous political objectives, translated and broken down into indicators and resources-output flows of the main branches in the "material sphere" of the economy. The key "material balances" were supposed to provide coherence for the whole, whereas the surrounding satellite plans/balances set the corresponding financial flows, prices and territorial breakdown of investment, labor, personal consumption, and services. The system was bound together by Input-Output (I-O) tables,[5] a few additional models and the planning of the national income (gross product). This 1965 version was replicated nearly verbatim until 1987–1988 (HIE 1963–1989). The related research output was published in a specialized review (*Planovo Stopanstvo*) but was of mediocre quality, the bulk of the articles being devoted to minor issues, to planning procedures, or to the management of branches and enterprises.

The conservatism in planning of economic structure and growth contrasted with chaotic regulations organizing the relations between the "center" and enterprises. Epitomized by the notion of *economic mechanism*, those rules reflected the oscillating degree of autonomy granted by the regime. Political, social, institutional, and conceptual barriers aborted the first reform experiment of 1965–1968, and only a fraction of the intended measures was implemented in an incoherent way (Petrov 1969; 2016). The subsequent reforms moved the pendulum to more centralized planning in the 1970s and back to decentralization in the late 1980s (Ivanov 2008; Marcheva 2016; Avramov 2018). A quick survey recounts five key compulsory parameters/instructions in 1966, 25 in 1975, an average of 10 in 1982–1987, and five in 1989 (Ivanov 2008, 130–32). The decrease, however, is misleading. Although at the end of

its existence the regime proclaimed the implementation of a market-oriented economic system, the result was extremely inconsistent. The directive character of planning was never truly abandoned[6]; the newly established institutions (like a few "commercial banks") were not autonomous entities and plagued by contradictory regulations. In 1987 the Ministry of Finance was integrated into the mega Ministry of Economy and Planning, while the perimeter for private economic initiative and independence of state enterprises remained severely restricted. Moreover, political circumstances in the summer of 1989 strengthened compulsory planning and state intervention in the economy.[7]

Economic reforms in communist Bulgaria never were initiated by the planning establishment. On the contrary, it was a stern adherer to the canon and an obstacle to any attempt to increase the autonomy of the economy. As a rule, the proposals were instigated, digested, and filtered by party ideologues in coordination with the community of political economists. It was only after (or in parallel with) this round of purification that planning bodies were entrusted to give flesh to the decisions. An uninterrupted cycle of trial and error gave to these recurring exercises the appearance of perpetual *political* transformations. The attitudes to planning, however, were tacitly exposed to intangible intellectual influences stemming from the evolution of empirical and theoretical economic research.

A FORMALISTIC TOUCH

As a universal language of science, mathematics was the most powerful medium of novel perspectives and a natural vehicle for innovative concepts. It also had a—feared or coveted—subversive potential to undermine ideological barriers.

Always attentive to developments in Soviet economic thought, Bulgarian economists did not miss the birth of the mathematical school in the USSR at the end of the 1960s. The encounter of mathematics with conventional planning discourse, however, was not frictionless. New methods faced disdain, opposition, or hostility, and their relevance was questioned in endless scholastic debates. Mathematics and political economy remained two mutually isolated worlds; the neat separation between "mathematical" economists (mathematicians and a few economists developing/applying formal or quantitative methods) and the massive body of "verbal" economists was a fact until the very end of the regime.

Casting Mathematical Economists

During the 1950s the only potential platform for educating "mathematical" economists was offered by statistics, and statistics graduates were insufficient in number and quality. Moreover, statistics was considered mere support to more prestigious and important planning activities. Mathematics entered the economic curricula on a broader scale from 1962 onward. A general course of mathematics and courses of linear algebra and mathematical programming became obligatory for all HIE students, while tools that already had been standard in graduate economics education in the West (such as differential and difference equations, discrete and continuous dynamic optimization, and so on) were absent. In the mid-1960s the planning curriculum incorporated rudimentary mathematical methods centered on I-O models adapted to the system of national balances. A project to launch (starting in 1966) "Mathematical Economics" as a major for 20 students in the HIE was not implemented, but from the turn of the 1970s onwards cybernetics, optimization, and forecasting became tolerated (even fashionable) notions in the research agenda of the planning chair. It was only in 1980 that a curriculum of "Economic-Mathematical Methods in Forecasting and Planning of the Economy" was introduced; symptomatically, in 1989 a course on "Automated Systems for Planning Computations" was rebranded "Economic-Mathematical Models in Planning" (HIE 1963–1989).

The corresponding reading lists typically included the textbooks by Evgeni Mateev, other mainstream Bulgarian professors, and books by Soviet authors. A telling move (albeit with completely marginal impact) was the introduction of a course on "Modeling of Economic Processes" for students of political economy in 1967.[8] It briefly presented production functions, models of labor dynamics, commodities and money, distribution, "economic reproduction," and the global economy. The "bourgeois" models were taught as a separate lesson (out of a total of nine) introducing different, often inaccurately interpreted theories.[9] The references combined quarantined résumés of Soviet professional "critiques of bourgeois political economy" with a few Russian translations of Western authors. Not a single original path-breaking text was on the list. Discarding any heretic allusion to universalism in economic science, the curriculum was almost entirely dedicated to models of socialist economy. The theoretical background was fully in line with Marxist concepts and with the spirit of the Soviet economic-mathematical school. The general approach to modeling boiled down to the "cybernetic ideology" of the 1960s, including reference to Lange's *Introduction* (Lange 1965). By the mid-1980s the "socialist" and "politico-economical" orientations of the program were enhanced, the chapter on the "bourgeois models" was reduced, and further simplification of the lectures was requested.

Overall, by the early 1970s the teaching of mathematics had become routine. A technocratic blueprint for the development of the IHE (Davidov 1973) presented the economist of the future as a leader of social changes who tames the nature-like economic laws revealed by Marxism. He was supposed to be the produce of three integrated streams: economic science, management, and *mathematics/statistics*. The source of each stream was a corresponding general theory (political economy, systems and information theory, mathematics) blended into mezzo-level macro-management theories and, further down, into managerial models of branches and enterprises.

Institutions

The gradual institutionalization of mathematical methods was expected to provide decision-makers with new ideas and instruments. The emblematic move was the establishment of a specialized research unit at the Institute of Economy of the Bulgarian Academy of Sciences (IE BAS) in 1963. It was called the *Economico-Mathematical Laboratory (EML),*[10] and its first chair was Ivan Stefanov. The same year the institute's journal *Ikonomicheska misal (Economic Thought)* opened a regular section on "Economics and Mathematics."[11] The laboratory's range of research and prestige made it a leading center in the field. Its mission was formulated as the "application of mathematical and statistical methods in economic research" because, until the 1970s, "mathematical economics" and "econometrics" were considered schools of "bourgeois" political economy. While its tasks included the "enlightening" of economists, it remained pragmatic. It was supposed that the EML would contribute to the improvement of planning, and the laboratory's agenda reflected the sinuous relations between economic science and planning concepts.

During its first years (1963–1970), the EML was focused entirely on linear programming and the I-O system, with only occasional econometric publications (estimations of sector production functions and consumer functions). Linear programming already had a well-known algorithm to solve linear optimization problems, which was considered a perfect solution for optimization on the microeconomic level. Publications analyzed optimal production plans on the micro level, optimal distribution of resources and materials, or transportation schedules. I-O models were perceived as a suitable instrument for macroeconomic planning capable of replacing traditional, simplistic methods. The research tried to clarify the possibilities of the respective models, the methods used to build them, and the precision of estimations. Opportunities for finding the optimal I-O balance were researched, but such attempts later collided with the fundamental difficulty to optimize on the macroeconomic level. Research was conducted on the relationship between centralization

and decentralization, and some hopes (purely theoretical at this point) were placed on economic cybernetics.

In the next stage (1971–1976), EML's research focused on theoretical and methodological aspects of building a system for optimal planning and management of the national economy. The understanding was that it ought to be possible to create an integrated system for optimal planning and management based on uniform socioeconomic data processed through computer configurations. It was presumed that designing the necessary planning and optimization methodology was a sufficient condition to calculate optimal plans. Due to the unrealistic expectations, however, the results were unable to meet the requirements of such a super-task. Yet, the interest in these research topics was preserved and expanded further. Linear optimization was applied to a broader scope of subjects, and macro-modeling was spreading quickly as a tool to find solutions to complex tasks by using I-O models. Optimization research was extended with the help of nonlinear and dynamic programming models as well as by examining the problems of automated management systems. Micro-level research (rationalizing decision-making in production tasks, supply and warehouse planning, inventory, transportation plans, regional distribution, and so on) developed much better than macro-modeling. It turned out that building an automated planning and management system at the macro-level was not possible.

During the following years (1976–1984), EML's research was directed towards the theory and methodology of economic modeling, namely, I-O and econometric models of the national economy, and measurement of economic processes. Although this direction was much more realistic than before, the interface between economic-mathematical models and real-life planning continued to be missing. The economists-mathematicians claimed that planners were unwilling to apply their results, thus failing to utilize the options for plan improvements and optimization, whereas those who worked with traditional methods (planners included) claimed that mathematical methods were unrealistic, abstract, and impracticable. At the end of the 1970s, the adequacy of the available economic-mathematical apparatus was questioned. This was both due to the theoretical experience acquired in the meantime and to indications that the econometric models did not function properly (e.g., they proved incapable of anticipating a slowdown in growth during the second half of the 1970s). The major problem was that available tools did not account for individual behavior. Applied econometric models presupposed that economic activity develops on the grounds of one-way causality and behavior remains unchanged, while job satisfaction and other human aspects were unaccounted for. Therefore, forecasting entirely based on econometric models could deviate significantly from reality. The same applied to other classes of models using linear programming, game theory, or other optimization procedures.

Attention thus was drawn to the need to develop knowledge about individual and collective behavior which required clarifying income distribution or coordination of social interests. Other shortcomings of the developed econometric models were that they did not take into account the changes in economic structure and policy, innovation, or the impacts of external economic environment. Finally, credible data were scarce because of poorly developed statistical information and/or ideological concerns and state secrets.

As everywhere in the communist world, the idea of optimal planning and management of the economy was being compromised, EML's research turned to simulation modeling and systems analysis. A set of models for medium-and long-term economic forecasting was created which allowed for the application of a scenario approach. Among other topical fields were micro-and mezzo-level optimization, I-O models for international comparisons, identification of the key sectors of the economy, calculation of full labor and foreign currency costs, or capital intensity. Research refocused towards the Bulgarian economy; modeling was already considered an apparatus of applied research, and not as a topic in its own. In the last years of the regime the intellectual and social environment drastically changed due to the impact of the Soviet *perestroika*. The need to reform both the economy and economic science was urgent and publicly debated.

During the 1980s, the laboratory worked at its maximum capacity and had 30 employees (including 10 technical assistants). The scholarly community using mathematical methods, however, had grown beyond the EML. A number of narrowly focused units had been created at economic universities and ministries' research departments. Top-down campaigns to implement mathematical methods in the largest enterprises were organized to comply with the growing trend that became fashionable. As expected, they failed due to a lack of motivation, experience, and knowledge. Finally, a generously staffed research center at the Planning Commission dealt with models related to its activities, without challenging in any way the traditional conceptual frame of planning. As a result, the formal indicators of scientific production expanded sizably. Between 1981 and 1986, a noticeable 7.2 percent of economic research publications were in the economic-mathematical field with the same share as "Planning and Management of the National Economy" (Stoeva 1987).[12]

Among the newborn structures, most of which proved irrelevant in terms of economic theory, the only noteworthy initiative was the creation of the Research Institute for Forecasting of the socioeconomic Development of Bulgaria at the HIE in 1985. The institute was monitored by the old guard of the planning establishment (Evgeni Mateev and Ivan Iliev), and nothing in its configuration promised unconventional ideas. This unit, however, hired some of the most unorthodox young economists: it became the host institution of

Ventsislav Antonov and co-opted Ivan Kostov and Lubomir Hristov who were at the forefront in the application of quantitative and mathematical methods. Within the very conservative environment, the contributions of these scholars remained exotic. They did not influence at all the customary planning mindset and stayed secluded from the actual economic governance. The situation was in stark contrast to reformist Hungary or Poland, where many of the most prominent nonconformist economists had occupied, at some moment of their careers, leading executive positions in the planning agencies.

Personalia and Intellectual Roots

To apply quantitative methods in economic research during communism supposed a priori or ex-post departures from the profile of the standard theoretician, personified by the "verbal" political economist. Although every character in the mathematization story had his own biographical and/or intellectual motives to deviate from the mainstream, some typical features appeared throughout the years.

Ivan Stefanov (1899–1980) was an archetype of the few pre-communist economists who had enough credentials to survive in the new order. He was a diverse personality, a well-read scholar, and a political figure. In 1924 Stefanov earned a PhD in social and political studies at Humboldt University in Berlin under the supervision of Ladislaus Bortkiewicz. During the 1920s he worked in Germany and France and was a member of the Bulgarian, German, and French communist parties. After his return to Bulgaria, he was employed by the Statistical Office, cooperated with the SIER, and was a professor at the Higher School of Economics in Svishtov. As an established scholar in the aftermath of the Second World War and the seizure of power by the communists, Stefanov was appointed governor of the Bulgarian National Bank and later became minister of finance. In 1949, he was sentenced to life in a show trial against a group of prominent Party functionaries. His main "guilt" was his "wrong" position in trade negotiations with the USSR. In 1956, he was released from prison, acquitted, and permitted to continue his academic career. Stefanov took a neutral empirical approach, and in his last years he used to say in private that he followed the Austrian school and Böhm-Bawerk in particular.

The most prominent promoter of central planning based on I-O techniques was Evgeni Mateev (1920–1997). He attended a high school educating orthodox clergy and eventually graduated from the Law Department of Sofia University in 1943. A convinced Marxist, Mateev entered academia with a combative volume against the "subjective school in political economy" (1947) and was active in the closure of the venerable Bulgarian Economic Society (1895–1949). Writing on planning since the late 1940s, he had a

spectacular ascension both in the university and the planning institutions, holding the positions of head of the Planning Agency (1950–1951; deputy 1959–1962) and of the Statistical Office (1953–1959). Minister without portfolio in 1963–1966 – during the climax of debates on economic reforms—he fiercely defended centralization. Mateev taught Economic Planning at the HIE and was (with short interruptions) head of the eponymous chair from 1952 to 1985. In 1968 he spent two months in the United States as a fellow of the Ford Foundation with a focus on corporate governance. By the beginning of the 1970s he occupied high-level positions in the United Nations (UN) Economic Commission for Europe and was a member of the UN Commission on Transnational Corporations. In an "Eastern version" of the convergence theory, Mateev firmly believed that corporate planning in the West was an irrefutable consecration of the planning idea. He was aware of general trends in Western economics but had a condescending, and quite dogmatic opinion about it. He treated "bourgeois" theories of value as "positivistic and formalistic." Not so far from today's illiberalism, his partial and unsystematic references to capitalist economies sought to show that "free markets" do not exist any more and that, correspondingly, "neoliberal" advocacy of free competition under socialism cannot serve as a reform model.

The reformist current of the 1960s in Bulgaria was triggered and most emphatically promoted by conventionally trained economists. The then popular adage that "in the West (under the hegemonic Keynesian paradigm) economists talk about the glories of planning, while Eastern economists talk about the virtues of the free market" was worded in the Marxist meta-language. The reformist champion Georgi Petrov (b. 1929), expressed his views on planning in the tongue and concepts of traditional political economy, and conveyed his messages by observing the lengthy demonstration patterns proper to Marxism (Petrov 1969; 2016). This language excluded any interface with mainstream economics.

From the 1960s onward, the end of the reformist effervescence coincided with the spreading of quantitative approaches that were contingent on some opening to the outside world. The EML's personnel, for instance, consisted of researchers whose qualifications were developed locally, but a significant number of them specialized in the USSR. The contacts of Bulgarian scholars in the field with their counterparts in the key Soviet academic centers (Moscow, Leningrad, and Novosibirsk) were institutionalized smoothly. On a smaller scale, relations with other communist countries also were taking shape, often in the framework of multilateral projects organized by the national academies of sciences. Practically no systematic communication was established with the West. In sharp contrast with other countries, there were no Bulgarian graduates or doctoral students at Western universities; just one scholar from the EML was sent to the United States to do research; and limited cooperation existed with the International Institute for Applied Systems Analysis (IIASA) in Vienna.[13]

The inaccessibility of Western economic ideas, however, should be qualified. Despite the barriers for personal contacts with colleagues from behind the Iron Curtain, Bulgarian economists had access to leading scholarly journals and monographs in academic libraries (especially after the 1960s). Besides, Western titles on mathematical economics translated into Russian were numerous and easily available.[14] Although the dominant influence in the development of mathematical methods came from the Soviet Union, the impact of the West grew. Nearly one third of the sources cited by Bulgarian mathematical economists originated there, half of which had been published in Russian language. The intensity of quoting Western literature in this field was much higher than in other areas of economic studies.

The autodidactic option was thus present and tangible. Whether to choose it was a personal decision that had to be taken under stringent social constraints. The deliberate or unconscious determination to move away from the ideological domain and to dedicate oneself to genuine research implied an explicit break with the political economy of socialism, additional learning efforts, and narrowing (if not foreclosure) of the scholarly career paths. Three escapist patterns were left: (1) to adopt a coherent positivist/empiricist standpoint towards domestic economic issues; (2) to shift to a rigorous formal mathematical reasoning; and (3) to perform a neutral or quantitative research on capitalist economies. Ultimately, the true problem was the absorption of these kinds of knowledge. It could not be socialized due to ideological and political restrictions: the intimate intellectual encounter could be privatized (by those who were interested and made the corresponding effort) but barely transformed into social capital. Capitalization of this investment came only after the fall of the regime.

The entering into the scene in the early 1980s of a small informal group[15] of young economists whose most uncompromising figure was Ventsislav Antonov (1955–2014), and the changing political context in the second half of the decade altered the landscape (Avramov 2007; 2008). They overtly acknowledged the application of neoclassical instruments, without trying to twist or truncate their underlying theoretical content and assumed the policy implications of the research results. To different extent, those economists continued to use some Marxist concepts, but Marx's aura of exclusiveness was mitigated as he was put in context and in perspective.

Apprehending problems in terms of neoclassical language and using mathematical apparatus and concepts was not a superficial shift. It allowed to tackle issues that otherwise were not visible or to deal with the observable ones from uncommon perspectives. The diagnosis and the proposed therapies gained in boldness and consistency; they were far better targeted

and calibrated than official views on the country's most urgent economic difficulties.

The sources of inspiration contributed to cohesion but also introduced nuances of interpretation within the group. A crucial cleavage was rooted in differences of conceptualization of the Western mainstream and of mastering of mathematical tools.[16] Antonov had a deep knowledge in mathematical economics and econometrics. He presented the overall general equilibrium setting as a theoretical continuum which starts from the "abstract theory of socialism" (Aleksandr Bogdanov; Grigorii Feldman); continues with its "brilliant defense against the Austrians by Lange in the 1930s" (a hint to the "Socialist Calculation Debate"); reappears in the optimal planning theory formulated in the wake of the reform debates from the 1960s; and still constitutes an adequate analytical frame of reference in dealing with the economic tensions of the 1980s (Antonov 1988b). Antonov's publications relied on an extensive critical reading of neoclassical works on noncompetitive equilibrium, structural disequilibrium, dynamic inefficiency, and comparative advantages. He elaborated on different types of production functions, on contemporary developments in I-O analysis, and on studies of structural change. Hristov, Kostov, and the mathematician Vassil Vesselinov, in turn, obtained important results by applying Tsukuy's turnpike theorem. The point of view adopted by Avramov highlighted implications for the socialist economies of the capitalist business cycle theories and empirics.

Economists from Eastern Europe, in their successive cohorts, offered other exciting opportunities to muse. Personal (re)discoveries of Soviet authors in the 1920s[17] were illuminating. The next Soviet component comprised the postwar mathematical school with its optimal planning wing and some more traditional growth theories. Strong interest was devoted to the findings and methods of Czech, Hungarian, and Polish economists (accessible in English or in Russian) applied to the analysis of local issues. Antonov was an attentive commentator of János Kornai's works,[18] as well as of studies made in other communist countries on investment cycles and on suppressed inflation.

Thanks to the originality of its publications, to its internal dynamics, and the impetus for self-assertion, the group gradually gained the status of an informal proponent of alternative visions of the country's most serious economic shortcomings. In that sense it inevitably became a challenger to planning's fundamentals. The claim for otherness was formulated clearly by Antonov at a November 1988 conference where he pointed out the irony:

> economists who ardently plead for the establishment of whatever markets still ignore the sad absence of 'market' for their own product and thus perpetuate the reigning monopsony in this field. If we have to be consistent, we have to acknowledge that the creation of such a market is the first – and intellectually most important – step towards a true transformation of economic life. (1988b)

Finally, like the reformers in the 1960s, these economists did not demonstrate interest in the outside views on the Bulgarian economy. This was partly due to a sense of epistemic superiority, that is, a belief that outsiders' knowledge is inferior by default to local knowledge because it is impossible to understand the essence of a communist economy without an intimate insight in the data, the context of their production, and the background of their interpretation. Although there were good reasons for such an attitude, it also reproduced parochialism: judgments and generalizations were formulated in isolation, and they sometimes repeated conclusions reached abroad.

TOPICAL CONCEPTS

The ideas that inspired the planning canon in Bulgaria were shaped by intellectual transfers originating in both East and West. In what follows, we discuss problems of their *interiorization*. On the one hand, the reception entailed risks of tacit or open interpretational biases. On the other, the dubious rigor (related to confusion, ignorance, illiteracy, or misunderstanding) in the use of imported concepts and analytical instruments led to ambiguous readings, quid-pro-quos, incorrect statistical inferences, and inaccuracies that corrupted the implementation and/or critique of the borrowed concepts.

Optimal Planning

The most well-known case was the entangled couple of the I-O technique and the optimal planning paradigm. It is particularly complicated due to the fact that the transfer concerned a loop of ideas generated in the East which bounced back after having been processed by modern economics in the West.

Optimal planning pretended to capture the features of the economic system through analytical tools, then model those features with formal methods, and finally manage them by changing key parameters through policy action. In Bulgaria, optimal planning is usually personified by Mateev, although he accepted the Soviet forerunners only partially and often disagreed with them. He never (even implicitly) contradicted Marxism; viewed the economy as a strictly integrated vertical structure; considered state ownership the most advanced platform for streamlining information flows and implementing the best possible coordination and management of production processes. A hierarchical design was regarded as the perfect prerequisite to the establishment of centralized decision-making, where decisions at lower levels are taken

in stages, in a domino-like, algorithmic way. In this respect Mateev went to extremes that bore all the signs of utopianism. In tune with some trends in the USSR, he put forward the idea that science and practical policy should aim to build a fully automated system for the management of the national economy (Mateev 1974; 1987). That presupposed the possibility to construct and implement complex algorithms that could perform any necessary actions depending on the parameters of a given economic situation. He also proposed to design algorithms that would automatize the completion of central plans, thus making human input necessary only at the programming stage. Mateev was unconcerned with evidence that such an approach never could work perfectly or maybe never work at all. Despite references to the "free and creative" impetus of the enterprises, his approach was founded firmly on the assumption of full determinism. It discounted the complexity of the economy, dismissed the randomness of the processes, and the fact that the available information was incomplete and imperfect, while optimal planning required just the opposite.

From the end of the 1970s, this paradigm found some acceptance at the party leadership level, and some of its elements were implemented superficially in practical planning. At the same time, there was no clear idea how to harness its potential and channel it to the resolution of economic bottlenecks. It required a critical mass of well-read economists and engineers whereas the number of such specialists was far below the minimum required. As a result, theoretical and practical issues were not well understood, and therefore massive amounts of "noise" were introduced in the implementation. Optimal planning was clustered around the belief that investment was the most important factor driving economic growth, and consequently increasing social welfare. Curiously, investment planning itself followed no optimality criteria. Its volume was subject to arbitrary decisions, to the erroneous conviction that there was enough knowledge on how much and where to invest, and to the omission of efficiency-based considerations. Optimal planning relied on the notion of a constant identity between labor demand and supply at a full-employment level. The role of technological progress in sparing labor resources was well known, but still that led to no conceptual changes in theory. Labor was treated broadly as an exogenous constraint with little dynamics over time, and its intrinsic heterogeneity and human capital properties went unrecognized. The developments in labor sociology and labor economy from the early 1970s on were of little help since they were not integrated in the optimal planning paradigm. Due to interdisciplinary barriers, their results were used as analytical, descriptive, or forecasting materials in sectoral planning and had a limited impact on the setting of key macroeconomic parameters.

Optimal planning applications relied on Wassily Leontief's I-O framework as their conceptual basis, on the one hand, and on linear programming as their computational tool, on the other.[9] Efficiency was not part of analysis. Instead it was assumed through the imposed values of technical coefficients. Insofar as market clearing could not be used as a criterion for price determination, "optimal"-like prices were recorded from the solution of the dual problem. Throughout the years, this approach did not experience any significant development despite some modifications.

The fact that Mateev's "anti-market" line was based entirely on the I-O paradigm was not accidental. Leontief conceived the model in physical units which suited the non-monetized Marxist mindset of socialist planners. Even with priced coefficients, the I-O table could be reduced to a simple descriptive scheme of the flows of goods that were the focal point for planning institutions. The image of an economy insensitive to the fluctuations of supply and demand and where agents are not treated as choice-making actors was tempting.

Theoretical constraints further facilitated the model's reception. In 1955, Carl Christ observed that I-O is not a truly equilibrium system because "it cannot rank . . . the function of the preference scale of those whose decisions control the economy—. . . individual consumers, and firms and government agencies" (Christ 1955, 138, 143). Circumventing the notion of equilibrium was an advantage for planners who found familiar the underlying assumption that input proportions are rigid and not affected by fluctuations of free relative prices. Western economists, in turn, agreed that Walrasian equilibrium cannot be attained by collectivist in-kind planning. John Montias noted that "the method of material balances is not inherently wasteful or theoretically unsound; it may lead to full consistency if the iteration process is carried on long enough and if the technical coefficients are accurate" (Montias 1959, 974). At the same time, he pointed out that this statement holds true under unattainable conditions. Despite possible incremental improvements, the estimation of meaningful technical coefficients is precluded by inexorable behavioral, organizational, and informational biases. More importantly, efficient allocation of resources is outside the scope of the in-kind I-O machinery and needs a consistent system of prices able to detect surplus or deficit. The conclusion was candid and irrefutable: "efficiency is not the be-all and end-all of the art of planning. The Soviet system with all its compulsion and waste is a vehicle for high rates of growth" (982). The eventual sophistication of the conceptual apparatus of Soviet optimal planning did not overcome this intrinsic dichotomy between efficiency and central planning.

The pervasive appeal of the I-O model in the communist East was rooted in the duality of Leontief's approach. Although his device was inspired by the concept of Walrasian general equilibrium, which was alien to Marxism,

he deliberately accepted simplifications in order to transform the I-O system into an empirical analytical instrument (Miller and Blair 2009, 730). His pragmatic priority and concerns were comprehensible in a sociopolitical environment akin, in some respect, to the extreme conditions prevailing under central planning. Indeed, the I-O methodology and its applications were intensely developed by U.S. government agencies for the management of wartime resource allocation in an economy near full employment (731–32). The civil use of the scholarly apparatus during the Cold War was essentially for the building and checking of national accounts carried out by numerous institutions devoted to indicative planning.

Intellectual transfers are never innocent theoretically. The ideological ambiguity of I-O models was realized rapidly. By considering I-O just a matrix of products, planners ignored the neoclassical premises and implications of the model. They transformed the device and re-formatted it purposes. Its applications by planning technocrats and political officials had nothing to do with public choice and actually superseded the sovereign decisions of *free* economic agents assumed by the original model. As early as the 1950s conservative voices expressed concerns about its possible (mis)use for direct control over the economy. While acknowledging some analytical potential in the paradigm, Milton Friedman (1955, 174) was skeptical about "the grandiose dreams of predicting by I-O analysis the detailed consequences of major changes in the economic environment." Friedman declared his preference "to rely primarily on the price system, rather than the detailed physical planning for organizing the use of our resources, whether for peacetime purposes, defense mobilization, or total war." The generalized trust in the virtues of (central) planning was a facet of the global, Enlightenment-inspired, new wave of faith in rationality, fostered by the spectacular progress of mathematics, quantitative methods, and computing capacity.

The Calculation Problem

How to grasp supply and demand fluctuations in price setting and how to shape the rate of profit were core questions during the reforms in 1960s and the experiments with optimal planning. These topics led to another important case of biased intellectual transfer.

Nowhere in the Bulgarian economic literature of that period was the *Socialist Calculation Debate* mentioned, but its shadow fell in different forms. In his fervent defense of economic reforms, Petrov unconsciously espoused many of Lange's positions (or anticipated Kornai's criticism of the soft budget constraints). He pleaded for rationing through prices, arguing in Marx's spirit that value is not tangible and cannot be determined otherwise than via approximation. Petrov was skeptical about the possibilities of computer-aided price computations. His perception of the market was more "social," and in that view he was closer to Misesian (and Hayekian) non-neoclassical interpretations (Coyne, Leeson, and Boettke 2005) of the market as a lively and competitive community of economic players.

The writings of the Soviet optimal planning school, however, could not be ignored. Petrov subscribed to them intuitively, while the methodology of the quoted authors hardly was understood by him. Mateev, in turn, considered them as technically and conceptually inappropriate to serve socialist planning. He accepted possible price/wage fluctuations without identifying the process with Walrasian *tâtonnements* and without thinking in terms of equilibrium prices. Mateev focused on the I-O technical coefficients, the choice of investment projects, and the best accounting of production costs. He treated I-O as an excellent analytical frame for adequate cost calculation (i.e., price-setting), leaving the rate of profit as the only exogenous parameter. Thus, following the Marxist view, prices appeared as the sum of "objective" inputs (estimated through the I-O model) and a wisely adopted rate of return (reflecting "society's needs"). This was another departure from the theoretical fundamentals underpinning Leontief's model where real-life relative prices are supposed to reflect supply and demand, and, in line with the general equilibrium theory, the rate of profit and prices are determined simultaneously, not sequentially. Mateev opposed Kantorovich's "optimal" (in fact marginal) plan prices as supposedly static and equilibrating growth (the consumption/accumulation ratio) and efficiency only by chance. He thus rejected two basic corollaries: the "production price" model based on the average rate of profit and on marginal costs accounting for supply and demand; the idea that profit should be the key indicator of efficiency.

Twenty years later, in the late 1980s, Antonov tackled the calculation problem implicitly, in a very different form, wording, and setting.[20] He reassessed the reforms of the 1960s and questioned the very rationale of "mechanisms' games." Antonov pointed out that the appropriate incentives cannot be artificially engineered in a demonetized realm: from a neoclassical economics' perspective, they were part of a universal grid of price parameters proper to any economy. Moreover, the persistently disregarded inconsistency between the macroeconomic policy's priority (maximizing growth) and the economic mechanism was put at the forefront. Antonov underscored the need for homogeneity between the two, claiming that their inconsistency had disruptive consequences and debased the communist economy rather than reformed it. He observed that "every mechanism, differing from the traditional, needs a higher degree of freedom than provided by the central planning system" (Antonov 1988b). Only the traditional planning system was coherent and thus viable, controllable, more or less predictable, and (within its own framework)

efficient. The new types of incentives corrupted the model that was not prone to reforms and every modification resulted in "abnormal" constructs.

This approach came after the disenchantment with attempts to build automatized systems for the management of the economy. Although computers had entered planning on a larger scale, their enhanced capacity was now regarded as an analytical asset, no more as a mighty proxy of the social machine. A great many economic deadlocks were still existent, and the fascination of the 1970s was over. Alongside, in Bulgaria and elsewhere in the East a gradual shift was under way in the set of applied research tools. I-O analysis attained its explanatory and descriptive limits without producing spectacular pragmatic or theoretical results. In turn, Western-inspired general equilibrium models started to gain importance. Their conceptual foundations were neoclassical, emanating an essentialist market philosophy. Thus, they served as implicit vehicles of decentralized economic options as opposed to the strong centralist bias fostered by the traditional I-O planning apparatus.

Economic Growth

Although the I-O framework was the centerpiece of theoretical and empirical research, other methodologies and topics related to planning were present in Bulgarian economic thought. Economic growth was prominent among them.

For a long time, macroeconomic production functions were the strongest contenders to Leontief's method in theoretical and empirical analysis of growth. Initially, in the second half of the 1960s, publications focused on reviewing well-established Western practices related to specification and parameter calibration. In addition, they offered some advice and warnings with regard to econometric estimation, which could be extremely valuable in applied and empirical work. Most of these were neglected: the urge to escape the caveats of oversimplification and to utilize more advanced estimation methods (such as generalized linear models), whenever data required them, was not taken to heart by most researchers. Instead, the ordinary least squares (OLS) technique became the routine, while its underlying assumptions often were downplayed or even forgotten. The technique encountered severe resistance: on the orthodox ground that it was borrowed directly from the "bourgeois" neoclassical school; and out of eagerness to defend the local mainstream gravitating to the I-O framework. The opposition eventually turned out to be futile and the production functions never lost the attention of researchers. The quasi-monopoly of the input-output method, which its followers vehemently defended, ended before they realized.

The proliferation of macroeconomic production functions was an achievement in applied research, although often at the cost of quality. In many publications time series data were used to estimate function parameters. Various functional specifications were tried (e.g., linear, parabolic, CES, and so on), though the unquestionable favorite was the Cobb-Douglas function. Besides simplicity, its good fit to the data was often put forward as an argument justifying this choice. However, as a rule, the usage of the Cobb-Douglas form lacked sufficient substantiation. The unit elasticity of substitution between factors of production was simply assumed; technological progress was just a standard mechanistic addition to the model and rarely was tackled differently than in the standard Hicks-neutral specification case; and negligence with respect to terminology was recurrent. Almost all specifications featured closed economies; the open-economy case received no tangible share of research efforts.

While authors often claimed to be using dynamic specifications of the estimated equations, in fact in most cases they included deterministic trends to an otherwise static relationship. At the same time, they ignored methodologies such as the one offered by distributed-lag models, which were already part of standard econometric work in the West. As a rule, publications were based on small samples but, once again, blind faith was put in the asymptotic properties of estimators. Those same small samples were used to derive the estimates of parameters (e.g., production elasticities), and as a result elasticities of scale often were just empirical artifacts.

The choice of different functional forms in specifying regression equations for econometric estimation seemed rather arbitrary. This left the impression that the existing knowledge on production structures was neglected, while attempts were made to infer those structures from the data. In some instances additional variables were inappropriately added to otherwise well-established theoretical constructs, which practically led to the destruction of the initial theoretical specification for the sake of getting a higher goodness-of-fit measure. Hardly ever was the issue of non-stationarity mentioned or explicitly tackled. The over-reliance on OLS was the usual (false) panacea.[21] In particular, there was full neglect of the endogeneity bias. Logically, reverse causation was rarely (if ever) studied in multiple-equation estimation frameworks. The overall conclusion is that the level of econometric knowledge among the majority of Bulgarian authors was notably unsatisfactory, far below the contemporary standards of the West, and even lower than that of most of their Eastern-bloc colleagues.

Until the early 1980s, an insignificant number of publications using the research results of Western authors produced original models that were properly constructed in terms of assumptions, specification, solution, and derivation of stability properties (cf. Milev and Assa 1977). Importantly, despite their relevance for planning, such theoretical exercises were neither meant for real-life applications nor ever found such by chance. They drew from neoclassical assumptions in model building that could not be endorsed by

Marxist theory, and their prior empirical substantiation or posterior validation was highly dubious or even infeasible. A methodological novelty in the 1980s was the interest in complete multi-equation models which contrasted with the previous single-equation growth models (besides the ones directly related to Leontief's framework). The main purpose was to take the model from other (either capitalist or socialist) countries and try to reconcile it with the available Bulgarian data. In many instances parameter calibration was deemed acceptable, while it was clearly not, given the systematic under-or over-fits; rudimentary system solution methods were applied; non-linearities were avoided at all cost. Original contributions in this area were very rare.[22]

In other publications new insights touched upon partial aspects of planning. For instance, the lagged effects of investment (in a Kaleckian fashion) were investigated (Stoykov 1983); the lifespan and average age of fixed capital were explored (Petranov 1989); and financial flows modeled (Minassian 1989).

A specific approach developed during the 1980s was to implicitly assume that no theory was directly applicable, and thus to rely only on what the data said. In terms of research techniques, the corresponding publications used cluster or principal-components factor analysis. These allowed for deriving valuable insight in the economic phenomena from large datasets. They also had the advantage of offering dimensionality reduction, that is, detecting and then using only the meaningful relationships in the form of generalized factors in the models. Such a data-driven approach was not unknown in the West, and its epistemological flaws had already been commented in the early 1950s in the famous criticism by Tjalling Koopmans of Wesley Mitchell's "measurement without theory" (Koopmans 1947).

NEOCLASSICAL TURN: GROWTH VERSUS EQUILIBRIUM, CYCLICITY, AND STABILIZATION

From the mid-1970s, dynamic forces in the Bulgarian economy were fading, the traditional work incentives were exhausted, and the vulnerability of external balances increased. The scale of structural disequilibria, foreign debt burden, and limited adjustment capacity did not bear comparison with anything before. Hard macroeconomic measures were unavoidable and a "readiness for radicalism" was in the air, although its interpretation differed widely among intellectual groups, power stakeholders, and social actors (Avramov 2008). The response of the planning establishment was trapped in the official canon. Its explanation of the growth slowdown did not allow for identifying Marxism-compatible endogenous causes. In turn, the a-theoretical I-O framework lacked suitable conceptual instruments. Consequently, no adequate policy responses were proposed or implemented. At the same time, novel approaches started to appear in the scholarly community. A series of new instruments were developed, and previously ignored or "closed" research topics became researchable. In most cases, the outcomes of this research challenged the established planning practices and enforced critical rethinking of the dominant economic doctrine.

A still incoherent and marginal "neoclassical turn" began in the early 1980s with the problematization of the main mantra of central planners imbued with *growth fetishism*. This dogma reflected the subordination of optimality to the single objective function of high nominal growth rates. The problem also was sensed by the planning technocrats who started emphasizing "quality of growth"—a term that entered party documents.

Papers by Kostov, Hristov, and Antonov concluded that after the second oil shock, the acceleration of growth was not an option any more due, in particular, to the high import intensity of the economy and a corresponding sensitivity of growth to recurrent external imbalances (Kostov and Hristov 1981; Kostov 1984; Hristov 1986; Antonov 1986). Some of the results allowed for international comparison, especially within the Comecon countries. They pointed to the purposefully neglected fact that, despite being the most important growth factors, quantities, technology and investment were not the only ones. Such studies, subtly or openly, condemned the whole planning model for being founded on a "growth for the sake of growth" principle. They also were able to demonstrate (see Kostov and Veselinov 1982; Hristov 1986) that it was virtually impossible to optimize planning by means of the (dynamic) I-O model.

Academic economists applying conventional analytical methods also criticized the excessive focus on growth indicators. For instance, only one of the early growth models from the 1960s and 1970s adopted the maximization of national income as optimality criterion, while the others were oriented towards consumption-related criteria (Shapkarev 1975). In 1983, a study of the IE BAS explicitly concluded that "forcing economic growth usually generates negative unintended consequences"; that rising rates of the aggregate output do not necessarily lead to an increase in consumption; and that there is a need to replace the strategy of accelerated development with one of balanced and stable progress (*Problemi* 1983).[23] The interpretation of those statements, however, was conventional. To overcome the deceleration of growth was considered possible with the well-known measures aiming at input rationalization, technological change, restructuring, managerial and planning improvements, and reshaped incentives. The problem itself was conceived of as inertial and long-term, not requiring flexible adjustments of final demand, monetary flows, or price structure. The average annual growth forecasts until 2000 did not fall below 4 percent. A few years later, a new brainstorming in

the IE BAS (encouraged by the influx of *perestroika* discourse) repeated the above-mentioned concerns but still kept the upper range of the growth rates at 5 percent (*Diskusia* 1988, 1). The dilemma between growth and equilibrium was commented cautiously by Hristo Vladov, with the opportunistic and meaningless qualification that a compromise between the two would be the solution. At the same time the party's policy goals adopted for the second half of the 1980s foresaw an annual growth rate of 5.4 percent (against the average of 3.7 percent in the previous decade), and by 1989 envisaged a totally unrealistic 6.5 percent for the next five-year plan.

The novelty of the neoclassical approach was manifold. The estimate of feasible long-term growth was reduced and the crucial role of external equilibria was stressed. Most importantly, it was argued in an iconoclastic manner that a *deliberate* economic slowdown was unavoidable. Deceleration ceased to be considered a passive, undesirable trend to become an *active* stabilization strategy. This, of course, contradicted the ideological assumption that maximization of the current growth rate is equivalent with an increase in social welfare. By taking a general equilibrium approach—and in line with Kornai's and other Eastern European economists' insights—Antonov insisted that this could be true only under extremely implausible assumptions, otherwise it leads to the exacerbation of structural disequilibria. To transpose the full employment characteristic of the initial industrialization drive in Bulgaria into the completely different conditions of the 1980s would severely harm the economy. Additional arguments in this vein referred to the experience of developed capitalist economies. Avramov emphasized that, by pursuing stabilization, they intentionally implemented deflationary and restrictive policies from the end of the 1970s (Avramov 1989; 1990). Thus, he argued, research on business cycles constitutes a natural platform for forsaking the dominant Marxist political economy and integrating "Western" and "Eastern" economic sciences. Given the exogenous shocks that hit Bulgaria's economy, a pro-cyclical adjustment via contractionary policies, was a must. In short, neoclassical equilibrium theory suggested a rearrangement in the official hierarchy of economic policy priorities by downgrading the still immovable preeminence of fast growth. In a sense, this posture was a subliminal and distant echo of the paradigmatic shift initiated by the Club of Rome's intellectual provocation *The Limits to Growth* in 1972.

The cyclical properties of the Bulgarian economy started to be systematically explored in the 1980s. Although dynamic imbalances implied instability and fluctuations of output reminiscent of capitalist business cycles, and were clearly observable from the late 1940s until the early 1980s, such a topic was an ideological taboo as the planned economy was proclaimed to be immune to instability. When uneven growth was touched upon, it was confined to technical issues and mismanagement. Interpretations refrained from any conceptual generalization and did not mention the term "cyclicity." The only tolerated notion was that of "rhythmicity" (Gatev 1976).

Most of the modeling attempts related to cyclicity followed a positivist approach, without applying dominant postwar Western paradigms. While Keynesian business cycle models required complex mathematical treatment and, more importantly, were out of fashion, the Real Business Cycle theories had—in addition to their mathematical sophistication—an unacceptable ideological (neoconservative) connotation. Spectral analysis of Bulgarian data identified recurring patterns in the behavior of macroeconomic variables (Dimitrov 1980; Antonov 1987)[24] or determined relationships among them, revealing, in particular, lagged effects. The idea of "rhythmicity" also returned to the stage (Shapkarev 1983). Moving averages were utilized to restate the obvious fact that the economy did not develop smoothly, and that the "rhythmic" recurrence of economic phenomena was in fact not that rhythmic. In direct reference to planning, those studies put forward the idea of improved efficiency as the solution. A part of the results indicated the presence of eight-year investment cycles (similar in length to the Western business cycles). In addition, five-year cyclicity of output was found and five-year planning was marked as one of the potential causes. Well-established modeling frameworks also were utilized to study the effects of external shocks on key economic variables (Kostov 1989; Avramov 1990). They shed more light on the mechanics of developments after 1975 and on the special role played by the international environment in generating cycle-like dynamics in macroeconomic aggregates.

As a rule, there was a clear-cut division between the studies of the long run (growth) and those of the short run (cycles). Combining the methodological limitations encountered by both approaches could provide a partial explanation. Another part seems to be linked to the difficulties of economic theory in general, as integrated models of growth and cycles are quite uncommon even today. Yet, in the late 1980s Antonov (1989a; 1989b; 1990) constructed such a full-fledged model of the centrally planned Bulgarian economy.[25] It was based on an original theoretical development of Michael Bruno's ideas (Bruno 1968), and managed to explain the nature of the existing structural disequilibria and the ensuing accumulation of pressures in the economy. Special attention was paid to the distinction between external and internal disequilibria, the latter being treated as much more relevant from the policy perspective. One of the most valuable contributions was the proof that disequilibria (especially the disproportionately large labor share in total income and underinvestment) imposed severe limitations on growth potential. Based on the results, the official assessment that in 1960–1985 Bulgaria's economy had exhibited equilibrium dynamics was emphatically rejected. On the

contrary, real developments were characterized by constantly widening disequilibria. Expectedly, Antonov's studies remained marginalized and did not invoke qualitative shifts in the attitudes of planners and policymakers.

Antonov's approach implied the need for a consistent stabilization effort, which stemmed also from his conceptualization of inflation. The topic was completely missing from Bulgarian scholarly journals until the end of the 1980s[26] and was perceived in a primitive way by the planning authorities. Antonov legitimated the issue and unveiled the inflationary mechanisms inherent to a "reformed" Bulgarian economy with its numerous income leakages and commodity shortages. This was a system where, to a certain extent, "money mattered." His model presented a "monetized twin" of the economy and allowed to assess the inflationary potential, as well as the factors of production's equilibrium prices. It was concluded that the regeneration of shortages (i.e., suppressed inflation and structural disequilibria) is a built-in accelerator of growth and thus at the root of the traditional high growth mantra.

Those findings were in line with opinions attributed ex-post to other economists, or with conclusions reached after the opening of the communist archives (Gregory and Harrison 2005; Skidelsky 2007). But in Bulgaria in 1988 they constituted bold statements. Antonov expressed the grim future in a strict neoclassical language. Economic imbalances were unavoidable because the "disequilibrium growth" doctrine of the central planners ignored the fundamental marginalist principle of proportionality between marginal productivity and factor prices; the system is doomed because it eliminated the price of capital, maintained a negative discount rate (thus, generating a large inflationary potential), and eradicated the feedback proper to money and prices. The most important policy implication was that the fundamental cause of the system's non-viability is its *demonetization*. This reconfirmation of the impossibility of *socialist calculation* permitted Antonov to advance further and address the issues of inflation, domestic and foreign debt, and, finally, macroeconomic stabilization. He concluded that "the pressures for the monetization of the economy by the reform experiments . . . necessarily faced the resistance of the planning authorities because the 'revelation' of the real scope of shortages through prices reveals at the same time the failure of the existing organization of economic life" (Antonov 1990, 28). The incompatibility between plan and market was intuitively felt and formulated by reformers from the 1960s, but they packaged their suggestions in opaque wording and problematized only the "mechanism," not the macroeconomic objectives of the communist economy. The neoclassical approach covered both facets.

Despite their outspoken criticism, the conveyors of neoclassic ideas still were subject to subtle limitations. Even at the very end of the regime it was difficult to surmount the deeply infiltrated scent of eternity emanating from the communist institutional infrastructure. It implicitly censured the horizon, the addressee, and the scope of the proposals. The pathos reflected the urgency of a radical economic policy shift, but the absence of credible *political* alternatives and the rhetorical conventions compelled neoclassical-minded economists to direct their pleas to the existing authorities. Insofar as the core agenda imposed by the party was still dominated by the obsession of accelerating growth, the propositions took the appearance of calls for "large-scale, well-designed macroeconomic interventions." Akin to the planning mindset, economic policy still was conceived as a technocratic procedure based on *ex-ante* alternative model imitations. It was as if the regime's planning bodies could reformulate priorities as well as fine-tune and implement tools capable of reshaping and balancing the economic structure.

The move from analyzing economic growth and structure to a monetary approach brought to the fore the *problem of sequencing*. Antonov's attitude in this respect was, at first, seemingly anti-liberal. In 1988 his view was that the immediate priority is to balance the macroeconomic structure (Antonov 1988a). Decentralization was considered by him a counter-productive "democracy game" that only increases pressure on the macroeconomic variables. Accordingly, the proposed sequencing was eminently *dirigiste*: initially, let us fix (through concentrated, centralized effort) the structural imbalances, and only then start decentralizing the economy. Unleashing strongly distorted market forces only would provoke chaos.[27] This reasoning surprisingly coincided with the standpoint of economists loyal to the regime who claimed that such steps would result in stop-go policies attributed to "revisionist" Hungarian economists. The idea to temporary slow growth and reduce the standard of living in Hungary in order to facilitate structural adjustment was presented by the Bulgarian conservatives as an ideologically unacceptable failure (*Diskusia* 1988, 2). However, at a second reading and in his next publication (1988b) Antonov's attitude took a very different shape. There was no more doubt that "structural change" means imperative readjustment of relative (including factor) prices. In this context, *monetization* of the economy, that is, liberalization of prices and implementation of a comprehensive stabilization program became the immediate goals. Those policies had knocked on the door but were let in only after the fall of the regime and the closure of the Planning Commission in September 1990.[28]

At the end of the 1980s, a number of stabilization blueprints were prepared by government authorities. The most complete version was put forward by the Bulgarian National Bank (Avramov 2008). All of them stayed, however, piecemeal, hesitant, and inconsistent. Although the outlook was depicted more or less realistically and presented in an alarming tone, the proposed measures never addressed the roots of the problems. This was due to basic theoretical deficiencies, political constraints, and hierarchical or career

considerations. The planning technocrats neither were equipped to design an adequate stabilization program nor able to process a reform strategy conceived in terms of equilibrium theory.

The incipient neoclassical turn was of great importance for the post-1989 transformations. Much remained to be learnt and the main ideas were further developed. But the real challenges had been tackled, and Bulgarian economic thought started to converge on mainstream economics. Expectedly, after the collapse of the regime the instigators of the turn were the most vocal promoters of shock therapy and opponents of gradualism.[29] Those economists joined the government at different levels and participated in the major reform programs of the 1990s, that is, the elaboration of the initial stabilization package, the settlement of the Bulgarian foreign debt problem after the March 1990 default, and the establishment of the Currency Board in 1997. However, the cohesion of the group reached its limits. Changing socioeconomic goals and priorities, fluid (re)configurations of the technocratic elites, and political meanders slowly dispersed the community and redefined the positions of its participants in the academic and public arena.

CONCLUSION

The evolution of the planning concepts in communist Bulgaria illustrates the intellectual and social patterns that economic ideas followed under this regime.

Planning that was supposed to embody the quintessence of the new order and entrusted to build a distinct institutional realm showed intrinsic rigidity. Its nomenklatura was, ex-officio, the administrator of the communist creed, and hence an extremely conservative community shielded from subversive influences and immune to innovative outbursts. By its very function it was a policy-taker, not a policy-setter even if sometimes it shaped the mindset of the political sovereign. Moreover, in a society where the world of ideas was arranged meticulously and hierarchically, planning matters occupied a subaltern place vis-à-vis political economy as the supreme ideological custodian.

Still, planning concepts were subject to contaminating effects. Very much like the semi-monetized grey economy undermined and coexisted with the planned façade, alien ideas besieged the canon. To make things more complicated, those ideas followed intricate trajectories across diverse conceptual, doctrinal, and (geo)political milieus. The incoming messages were corrupted, amputated, or twisted, and the result was rejection, hybridity, or incoherence. Because ideas arriving from the Western mainstream lacked a common theoretical ground with communist planning, their encounter was either dysfunctional or subversive. In turn, the winds from the East circulated more freely and were relayed according to the local sociopolitical conditions.

Planning in Bulgaria remained under double isolation. On the one hand, it proved unable to creatively digest new developments in economic research, and its major innovation (the optimality paradigm) remained more of a high-theory exercise accessible to a few scholars than a widely-adopted foundation for economic governance. Such advances seldom reached the top echelons of the party-state, and their presentation to officials was more of an art than a science. On the other hand, Bulgaria's planning technocrats stood aside from the reformist ideas. While in the Soviet Union and in other communist countries the quest for optimality (with all its ambivalence) was, to a certain extent, a driver of reformist momentum in economic science and policymaking, in Bulgaria it epitomized the status quo. Mathematization served, as a rule, the centralist positions. After all, it was perceived as a tool for *improving/enhancing*, not for *narrowing the scope* of planning.

The main positive results of planning's interactions with economic research were that they legitimized mathematical methods and experiments, contributed to the identification of some qualitative characteristics of the economy, and appreciated quantitative outlooks. It was no surprise, however, that the embryonic neoclassical turn during the late 1980s was missed by the authorities. In addressing the incapacity of communist planning to solve major economic problems, the new approach ultimately implied the superfluousness of central planning per se.

NOTES

1. An assistant of Aleksandr Chuprov, Anderson (1887–1960) arrived in Bulgaria in 1921. As a leading scholar, he was well-connected to the international research community. A member of the first body of fellows of the Econometric Society, he had contacts with Ragnar Frisch's institute in Oslo, associated SIER to the Jan Tinbergen's and Gottfried Haberler's project on business cycles at the League of Nations, and arranged a lecture (1935) of Oskar Morgenstern in Sofia.

2. The Commission was instituted by the peace treaty with Bulgaria that was signed in Neuilly, France in November 1919. The 1926 and 1928 foreign loans were contracted under the aegis of the League.

3. Stoyan Bochev (1881–1968) was a self-made financier without a university degree. During the interwar period, he served as executive director of the Sofia Stock Exchange, was a member of the board of one of the leading commercial banks, and managed the most important domestic insurance company. He was head of the Union of the Private Shareholding Companies and an active fellow (president for one mandate) of the Bulgarian Economic Society. It is mainly in this last capacity that he published numerous essays dealing with Bulgaria's economic problems.

4. Most of the time, the department of "Economic Planning" was chaired by professors who were or had been also heads of the "Planning Agency."

5. The I-O tables were confectioned by the Statistical Office since 1960. They were not published officially, but some of their versions, as well as other macroeconomic indicators not included in the public *Statistical Yearbook*, were accessible to scholars for research purposes. Until 1989 Bulgaria employed the System of Material Products. In the late 1980s tentative experimental estimates of the country's GDP were performed. They were neither adopted nor published.

6. Of course, in real life the relations between the planning bodies and the enterprises always entailed bargaining. Compromises were vital for the survival of the regime. Initially, bargaining was a completely informal process, but later on the authorities tried to partially institutionalize it. The "alternative plan" (*nasreshten plan*) was introduced as a mandatory step in the planning procedure. It was supposed to embed the "innovative energy of the collectives," to disclose "hidden reserves," and, ultimately, to upgrade the primary requirements of the center. Notwithstanding such amendments, the chaotic, and aleatory elements never disappeared and recurrently generated leakages, unaccounted flows, and monetized "market" pockets in the economy.

7. The forced mass exodus of 320,000 Bulgarian Turks from June to August 1989 was the climax of the overwhelming assimilation campaign initiated in December 1984. The economic shocks triggered by the exodus contributed considerably to the implosion of the regime. The authorities had to manage a state of emergency and, paradoxically, while the government embarked on an allegedly most radical "market-oriented" reform plan, it concurrently adopted a series of measures proper to War Communism.

8. The course was only 75 hours per year, compared to 480 hours for Political Economy (HIE 1963–1989).

9. Cournot, Gossen, Jevons, Walras, Pareto, Keynes, Kahn, Harrod, Domar, Samuelson, Hicks, Goodwin, Kalecki, Leontief, von Neumann, the Club of Rome, the Forrester-Meadows and Mesarovic-Pestel models, and Leontief's report on the future of the world economy (available in Russian) were quoted.

10. It was an unequivocal replica of the Laboratory for Mathematical Methods in the Economy established by Vasilii Nemchinov in Moscow in 1958.

11. In 1964 *Planovo stopanstvo* started an analogous but intermittent section with the same pool of authors.

12. This figure included articles discussing the construction and application of mathematical models or analyzing economic problems with the help of a more or less sophisticated mathematical apparatus. The field was positioned after "Political Economy of Socialism, Problems of Economic Science, History of Economic Thought" (18.9 percent), "Sectoral Economics" (13.3 percent), "Economics of Capitalist and Developing Countries, Critique of Bourgeois and Revisionist Theories" (11.5 percent), and "Intensification and Effectiveness of the National Economy" (7.7 percent).

13. As an exception, in 1965–1967 three EML fellows attended a high-level Master's Program organized in Yugoslavia under the leadership of Branko Horvat. Among others, George Dantzig was teaching there.

14. A far from exhaustive list of outstanding Western econometricians and mathematical economists translated into Russian includes Michael Intriligator, Kelvin Lancaster, Edmond Malinvaud, Michio Morishima, Hukukane Nikaido, Lionel Stoleru, and Gerhard Tintner.

15. Namely Ivan Kostov, Lubomir Hristov, Ventsislav Antonov, Roumen Avramov, and in a slightly different vein Ventseslav Dimitrov. The cohesion of the group was based on a distinct generational identity and a critical stance vis-à-vis the academic establishment. The community coalesced on different grounds: common university studies, teacher-student ties and institutional affiliations; cross-influences and complementarity of interests; and a continuous intense and lively theoretical and methodological debate. The intellectual closeness was reflected in mutual references and a desire to formulate a *joint* research agenda, which did not preclude differences within the group in terms of political radicalism.

16. In the late 1970s, the Sofia University's Faculty of Mathematics and Mechanics opened its doors to professionals from other areas. Ventseslav Dimitrov (researching at the time Western foreign trade theories and quantitative models), Ivan Kostov and Ventsislav Antonov seized the opportunity to earn an additional university degree in mathematics.

17. Grigorii Feldman, Viktor Novozhilov (his early writings, especially his seminal 1926 paper *Nedostatok tovarov* (Commodity Shortage), which was ignored by the reformers of the 1960s), and Nikolai Kondratiev were the most influential authors.

18. In 1987 Antonov presented Kornai's *Economics of Shortage* at the EML's seminar by sharing some disagreements with the mathematics and models in the book. This review was the first systematic comment in Bulgaria on Kornai's work, which so far had been ignored, even by reformists like Georgi Petrov.

19. It was assumed that Leontief's framework is superior to any competing methodology presented in "bourgeois" literature.

20. Although well aware of the interwar controversy and of Hayek's position, he did not discuss them in his papers. From another angle, the debate was evoked explicitly for the first time by Hristo Vladov. He took the side of Mises by questioning the monopoly of state ownership and bureaucratic management and by claiming that the aborted optimal planning experiment demonstrated the irrelevance of the Lange-Taylor proposals to mimic the market (Vladov 1989).

21. One notable exception could be found in Antonov (1985) where a two-factor CES production function was estimated by means of a nonlinear least squares procedure.

22. Rumen Dobrinsky (1990) was a notable exception in this respect, despite some methodological drawbacks that were noticed by the author himself.

23. In a symptomatic coincidence (most probably due to chance), the same issue of the review published a translation of Tamás Bauer's paper "Tensions and Cyclicality in Capital Investment." The publication was accompanied with a disclaimer that many of the author's positions were controversial.

24. The results suggested periodical movements of 3–4 years in investment and national income, as well as in manufacturing.

25. Some of the results of Antonov appeared in early 1990 due to the publication delay. They reflected, however, work done (and publicly voiced) before the end of 1989.

26. A narrative account of hidden and open inflation and the corresponding experience in some socialist countries was proposed by Belcho Ilev in (Diskusia 1988, 1).

27. In early 1989 Kostov still worried that an overwhelming financial liberalization could generate chaos. Nevertheless, he was the one who (as Minister of Finance) liberalized prices and forex trade in February 1991.

28. The issue of sequencing was raised also in the context of the reforms in the 1960s. In purely verbal and intuitive terms Petrov shared the concern that a transition to flexible prices would provoke sizable structural effects and a *temporary* slowdown of growth (Petrov 1969, 262, 290, 438).

29. As early as December 1989 Antonov published the most lucid account of the desperate macroeconomic situation and the unavoidable dramatic adjustments (Antonov 1989c).

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