

1 Introduction – The argument in a nutshell

Two complex issues dominate the political economy of the twenty-first century, namely global organization of production, and international repartition of its fruits. They are different, requiring their special theories each, but they also hang together, conditioning each other. It is evident you cannot distribute a product without having produced it before, and it is also necessary, although said less often that a peaceful way of production cannot be organized without their participants being able to expect a reasonable reward from their effort. In that broad sense, efficiency, the goal of production, and equity, the goal of distribution, go hand in hand, in the economics of today. They always have, – what is new is the scale at which they now appear and must be reconciled. To Adam Smith, the founding father of economics, it was the “nation” that represented the natural organizational unit within which to place, and to discuss the concept of an economy. It replaced the “household” which had served that function since the times of the antique. Today’s businesses, and people think and act global. There is no national border that would allow defining a closed, and self-sustaining economy, in the world of today other than the whole world itself, and there is no single government that would be able to legislate a fair and equitable distribution of the resulting income, over the world.

These are fundamental changes in human history, having happened since the time the science of economics was born, and they raise some questions: Are the technical tools and mental concepts that have been formed for dealing with a national economy still adequate for dealing with its international offspring and mutation? Economics is a social science; can the world correctly be pictured as a single society with common norms and behavior? Economics is a mathematical science; can the same models be used for studying economic development independent of the global extension? Finally, economics is also an empirical science. Can the same ways and rules of data collection be used independently of the fact to which nation they are applied? In brief, does the dimensionality of classical economics developed and refined in the twentieth century stand up to the challenges of the twenty-first? I do not intend to answer these questions. I raise them in order to prepare the ground for a more feasible task, which is to look into the past and find out how well these ques-

tions were answered when they were dealt with in a well-defined national context where economic agents acted within an explicitly national and legal framework established under one unique and sovereign government. Such a critical review of the past may pave the way for a proper management of the future.

The method of economic investigation is the same as the method of all science. Economics studies facts, and seeks to arrange the facts in such ways as make it possible to draw conclusions from them. As always, it is the arrangement which is the delicate operation. Facts arranged in the right way speak for themselves; unarranged they are “as dead as mutton” (Hicks 1960, p. 3). One of the main things one must learn is how to arrange economic facts, properly. This is true for business, the elementary unit of economics, and it is true for the national economy as a whole. Business accounts and national accounts form the generally accepted framework within which to do this. The facts recorded in these books are transactions of economic value, consisting, besides an algebraic figure, of a currency denomination in which value is being measured, a date and an owner, or place to which the transaction belongs. Without an orderly and thorough accounting of this sort, no economic life, and no economics as a science would exist. Knowing how to measure economic value is, therefore, a premise for understanding economic activity. But measurement issues are not part of introductory textbooks, unfortunately. The tradition is to begin a course of economics with stating a paradox: to postulate the existence of a utility curve, or, more sophisticated, of a set of preferential orderings, stating at the same time that those theoretical variables are unobservable, and may be “revealed” indirectly, only, by means of studies on market behavior. You introduce assumptions instead of facts, on which to build your theoretical structure. What would an introduction to economics be like if you began with handing out your national statistical yearbook, instead? This book is an attempt to answer in that direction. It is to be read not in place of, but in connection with, a standard textbook of economics. It is introductory, because it addresses a fundamental part of economics, which is measurement and theory of economic value. And it is complementary in that it adds, to the microeconomic reasoning with which that theory is introduced, normally, the macroeconomic measurement perspective without which that theory would not be viable.

If the book, in argument and presentation, follows the format of a beginners’ study, it may yet be of interest to a wider readership more learned in economics, but still not akin to national accounting. While GDP is a central figure in economic political discourse the study of its methodology has taken an unhappy course of disinterest, within the economics profession; the more the compilation of national accounts has grown into a discipline specialising in its own right, the less it shows up in the curricula of economic studies of

universities. It so happens that growth of GDP is heralded by economists, and condemned by scholars, mostly from other disciplines, with neither side being fully aware of the axioms and theorems on which that figure is actually based. I hope that in all simplicity to which this book must necessarily take recourse it will help expand knowledge about the meaning of the “fetish,” as GDP is sometimes called, and of the methodology through which it is being constructed in order to find a sober mid-way path situated between the two opposing camps. My central, and new thesis is that national accounts, within their axioms, contain an implicit theory of economic value, – a thesis that may be of interest even to a wider audience of learned economists. With that thesis the book summarises, – so it may be confessed – a life-long research undertaken for answering a simple question: what is it, precisely, that grows when an economy “grows”?

The book is divided into three consecutive parts, roughly characterised as past, present, and future. Part I recalls three elements of present economics teaching, rooted in earlier history. There are the great founders of the discipline, such as Wassilij Leontief and Léon Walras who are juxtaposed here as representing two alternative ways of economic thinking; there is the historical reality of two different economic systems having worked and competed, side by side, over most of the twentieth century, and there is the famous theoretical controversy carried out between the two universities of Cambridge, one in England, one in America, over the theory of capital. The historical flash back of part I is not made for its own sake but in order to demonstrate that economics is inherently bi-polar in its progress, one of the characteristic marks of a social science. There is proposed a thesis, and one does not have to wait long for the anti-thesis to appear, and the search for truth develops into a political debate.

Part II, after that historical reflection, returns to the present, and addresses two fundamental questions of how to measure capital and income, today, namely comparability of economies over time, on the one hand, and over space, on the other. The theory on the basis of which to attack these issues is not taken from economic textbooks, but from the national accounts themselves because – so the central thesis of the book – it is through observation and measurement that you define content, and meaning of an economic variable, and not through a mathematical model. Part III follows up and applies the obtained clarification to two fields of economics, which demand renewed attention in the future, social distribution of income, and theory of international trade, the first one, because it seems that economic wealth is increasing together with economic poverty, and the second one because of the rather recent fact that half of international trade is run by now as intra-corporate trade with a tendency of further expansion.

Here is a brief overview of the individual chapters. The opening chapter of part I (chapter 2) is dedicated to two exemplary personalities counted among the founding fathers of economics, Wassilij Leontief, of the twentieth century, and Léon Walras of the nineteenth. Walras is introduced as representing economic theory, “pure” economics, as he likes to call it, and Leontief represents empirical economics by which is understood economics based on statistical evidence. It so happens that in economics, and contrary to physics, for example, the valid theory of today had been born before the tools for proper statistical verification were invented, so that Leontief, the empiricist, comes after Walras, the theoretician, in economics history. A logical development, as has been practiced in physics, would go the other way: put observation first, and derive the proper theory, thereafter, and this is also the reason for beginning with Leontief here, in opposition to the historical, but less logical, sequence.

Léon Walras, professor of economics at Lausanne, Switzerland, works with the same mathematical tool as Leontief, but applies it to a different purpose. If Leontief considers himself a Walrasian he is right in that it is Walras who first introduced linear algebra into economics. The purpose, however, for which Walras uses it, is quite the contrary. Walras teaches at a time when statistical data describing and following up the development of an economy are non-existent. Walras, as a consequence, has no choice other than to describe an economy in terms of a model, and linear algebra provides such a model. Walras is one of the first to picture the working of an economy within the frame of a system of linear equations where each equation reflects a different market, and the two sides of an equation describe supply and demand as a function of price on each market. Walras builds what today one would classify a model of an economy, quite in contrast to Leontief, who, a hundred years later, is in a better position. Leontief sees before him the possibility to construct not simply a model, but a virtual statistical representation of the American economy, and sets out, in a unique research project, to collect and to process the necessary, and enormous amount of statistical data. His system, too, consists of n linear equations, but with a different and new meaning: The sum of all transactions received by one industry must equal the sum of all payments made to it by the others. Leontief’s equations are elementary rules of consistent accounting while Walras’ equations express a possible state of a fictitious model. Walras could do no better at his time, of course, but that does not spare his work from appropriate critique.

Léon Walras may also be considered as one of the fathers of what today is known as “microeconomics”, and put in contrast to “macroeconomics.” Not that he saw the full range of this discipline before him in the richness it is taught today, but he has paved the way by imagining an economy working without any kind of government, purely on the basis of markets. In fact, he

reproached Adam Smith for doing otherwise, and in his system of equations a government sector is not there, a tradition which has been extended and carried on until Debreu's famous proof of mathematical equilibrium of the universal market model. Here again there is a contrast to Leontief who in his empirical work could not ignore assigning a place to the government sector, and may thus truly be put into the macroeconomic camp of the discipline.

Objectivity of economics science cannot be ascertained by experiment. It is found in economic reality, or better to say history, instead. A history which comes close to such an experiment has been formed by the coexistence, and mutual rivalry, of two different systems of economic organisation, during most of the twentieth century, capitalism in the West and socialism in the Eastern part of the world, the latter system being meant to correct and straighten out the vices of the first. Chapter 3 discusses the substantial difference between the two systems, which show in the respective terminologies employed to describe their economy, as well as in the corresponding different national accounts. Contrary to what one might expect these differences appear not to be fundamental, but as history has revealed, they could be reconciled and transformed into one another. That experience is an important support of the view that there is objectivity in the way an economy is studied and described, today.

Chapter 4, the last chapter of the historical part I, turns to economic theory. It sketches a once famous debate about the concept of capital known as the "Cambridge controversy" as it was carried on between the universities of two Cambridges, one in England, one in Massachusetts. Both protagonists were pure theorists with not much knowledge about national accounts. Each side built their own model of how they thought capital functions in an economy, and neither cared to take a look into their national accounts to find out how capital is actually measured in empirical reality. No wonder, the controversy ended undecided, and is more or less forgotten today. It is recalled here in order to demonstrate the importance of making empirical observation before, and not after, you form a theoretical concept.

History is a fruitful field for debate, but imminent practical problems are posed and formulated by the present, of course. Having accepted that economic facts are stated by way of accounting the logical foundations of such an important technique must be laid open, which is the task of chapters 5, 6, and 7 in part II. The first of them, chapter 5, establishes the theory on which is based the argument of the followers. We know that the phenomena of physics are described in terms of space, time, and mass. A social science does not dispose of such absolute dimensions of quantification, in general. It is only economics that has something similar under its "microscope", in that an economy produces objective and independently observable values. They are created and expressed in transactions between institutional units which are defined

by law, and able to own property. The theory of value, therefore, is to economics what Newtonian mechanics is to physics. It formulates a set of axioms which cannot be proven by themselves, but may be assumed in order to describe reality and deduce all further theorems. You may say that the historic oppositions between Leontief and Walras, between a capitalist and a socialist system of economic governance, and even between the two Cambridge schools, related in Part I, are all due to differences of opinion about the necessary axioms of a proper theory of value.

The accounting theory of value developed in in chapter 5 is applied to analysing two elementary problems of economics, in the chapters thereafter, comparison of national values over time (chapter 6) and comparison between nations (chapter 7). Both problems are traditionally comprehended as problems of “index number theory” and outsourced from national accounting offices to expert mathematicians. There they have been used to develop a full, new academic discipline in which a national accountant rarely dares interfere, and is happy to accept a solution elaborated and agreed upon by the experts. A look at economics history explains the situation. When the national accounts were created, neither temporal nor international comparability were of importance anywhere within the envisaged horizon of application. The then already ambitious, and often doubted, goal was to arrive at a scheme that would comprehensively and coherently describe the multiple processes of production and exchange going on just within one and the same national economy. Comparability was not important, as long as comprehensiveness and internal coherence were the main tasks which had to be solved in order to convince the public of the value of the new statistics. Comparability became important only after that first task of establishing a trustworthy nominal system of accounts for an individual nation had been successfully attained. Meanwhile, however, index number theory had taken its own path of development, and although the two fields of research are close they are not rooted in the same ground. National accounts are interested in measuring production and income, and these are measured in terms of what is now officially defined as “volumes.” Index number theory comes from the other side, and develops methods to measure changes in, and comparison between, different prices. The marriage of the two disciplines is performed, in brief, by the equation $v = p \times q$. But careful scrutiny of the conceptual content, as it is implied by their method of measurement, in either of these variables reveals that the equation is incomplete; it fails to name and explicate a unit of measurement. A realistic theory of value must be explicit in this respect, and chapter 6 makes a proposal.

Once national accounts existed and were regularly continued by statistical offices international comparison of economic performance became an issue,

which is the topic of chapter 7. International organisations entered on the accounting scene, and there were two main promoters. The United Nations, interested in policy and support of economic development adapted an accounting framework which had been designed and tried by the University of Pennsylvania, producing what is now known as the Penn tables of international comparison. It is based on the so-called Geary-Khamis system of index numbers. The GK-system constructs a system of linear equations, one for each country and one for each product group in GDP, similar to the Walrasian equations which postulate that supply and demand must be equal. From that condition one deduces real effective exchange rates and world average prices. The reason for applying such a complex method is that actual exchange rates are governed by demand and supply, not of products, but of the underlying national currencies and trade of financial assets, rather than national products. Only a few percent of the daily turnover at foreign exchanges is devoted to trade in products, almost all of it serves financial and speculative interests. Actual exchange rates, therefore, are inadequate for comparing production and consumption of goods and services between nations, and the GK-system establishes a theoretical set of exchange rates more appropriate for that purpose. But, as explained in chapter 7, the present way of operating that system needs some small adjustment in defining its unit of measurement in order to fulfil the task of comparability in a fully satisfactory way, and the proposition for that is worked out there. Both propositions for better coherency in accounting elaborated in chapters 6 and 7, incidentally, pave the way for further advancing the analysis of the underlying accounts, themselves. The additivity postulate defended in chapter 6 may be used to spot not only the origin of technical progress as done at present, but also to follow up the path of distribution it takes through the total economy, by way of changing prices. And normalising the GK-system properly, as proposed in chapter 7 leads to a new method of comparing competitiveness of countries in respect to particular product groups.

Part II having dealt with problems of current accounting, part III turns to issues, which have hardly been addressed yet, but appear at the political horizon and demand attention under the general topic of social inequality, in the future. It consists of two chapters, one about inequality in income (chapter 8), and one about inequality in terms of trade (chapter 9). The first topic has been brought to the fore-front by the recent and famous study of Thomas Piketty, in particular, while the second is still an unpolitical issue although it has been a theme in development economics ever since the former colonies have become independent, and it reappears now in the form of international value-added chains. Both issues are closely connected to the theory of value implied in the national accounts. Chapter 8 introduces a new way of looking at social

income in that it transgresses the sphere of private households within which traditional income analysis is restrained, at present, and takes into consideration the whole circuit of incomes flowing through all sectors of an economy where part of the wage of a worker is taxed, financing a salary paid to a government employee who pays from it interest to a bank, and so on. There is a statistical tool on the market allowing such new and extensive analysis, called “social accounting matrix”, and chapter 8 makes extensive and exemplary use of it.

New data and new problems are also coming up now and in the future concerning international trade, or, as one now says more precisely (OECD), the relationship between “interconnected economies”, in the global arena. With the advent of large international corporations operating on a global scale, production is no longer organised within the boundaries of one national economy, but reaches out globally, tying countries together in an overall, global enterprise. About half of international trade is now intra-corporate trade, and the new phenomenon demands new analysis. Chapter 9 collects some ideas. It is not by chance that Leontief appears here once again, as he has been one of the early economists to become engaged with economic globalisation in his research. The first outline of an accounting structure for the global economy he presented in his Nobel Prize lecture at Stockholm in 1973. From it he developed a large system of data compilation as a project for the United Nations in their endeavour to study and monitor “a new International Economic Order,” in answer to problems of development in newly independent countries of the world, and of environmental degradation observed everywhere. The Leontief UN-project is an excellent example of how to combine speculative modelling of future economic growth with hard facts collected from the present. This system was still based on the notion of independent national economies interacting with each other. The new reality of multinational organisation of production has generated a second generation of world data bases in the form of input-output tables informing about national export and import not only in terms of goods and services produced but also identifying the corresponding countries of destination, and of origin, respectively. These elaborate systems are briefly described in the second section of chapter 9, leading to the new concept of value-added chains, or trade in value-added which is the modern way of looking at international trade, and replaces the theory of comparative advantage by the old Smithian concept of absolute advantage. Production is not allocated to where it is cheaper, comparatively, in respect to some other product within the country, but to where it is absolutely cheapest in the world.

Methodological issues such as they form the substance of this book do not range at the fore-front of economic discussion, in general. Nevertheless, they

are an essential component of the discipline just like in any other science. Connecting a certain mathematics to a particular empirical observation is not a trivial thing, and demands careful recognition of the specificities on each side. An attempt has been made in this book to contribute to conceptual clarity by identifying certain incongruences and failures which have been carried on all along through the history of economics, and to do so in the spirit of Wassilij Leontief as expressed at the occasion of his being awarded the Bernhard-Harms prize by the Weltwirtschaftsinstitut in Kiel, Germany, the place where he had taken his first professional job: “Ich glaube, manchmal vergisst man in unserer Wissenschaft, dass sie eine empirische Wissenschaft ist, die auf Erfahrungen beruht ... Wie der Naturwissenschaftler seine Instrumente benötigt, so braucht der Wirtschaftswissenschaftler seine Messungen, seine Beobachtungen und Daten ebenso sorgfältig aufgebaut.” (W. Leontief 1971, p. 11). Sometimes, I think, one forgets in our science that it is an empirical science relying on experience. Just as the natural scientist needs his instruments, so the economic scientist needs his measurements, his observations and data constructed with similar care.) The specific instrument that has been under scrutiny here are the national accounts, and the mathematical concept under which they have been analysed is the theory of economic value. Both fields, so the central thesis of the book, are intimately related and re-inforce each other; recognising and scrutinizing that relationship helps solve some riddles, or inconveniences that have accompanied and occupied economic research for quite some time, in the past.