Macroeconomic Measurement Versus Macroeconomic Theory

Ideally, scientific theory and scientific measurement should develop in tandem. In recent years this has not been the case in economics. There used to be a time when leading economists, or their students, established or led statistical offices and took care that the measurements were consistent with the theory and vice versa. Not anymore. Macroeconomic theorists and macroeconomic statisticians do not even speak the same language any longer. They do use the same words, such as ‘consumption’, ‘investments’ or ‘unemployment’ but the meanings they attach to these words are often wildly different.

This book maps the conceptual and definitional differences between macroeconomic theory and measurement and explores them in some detail while also tracking their intellectual, historical and, in some cases, ideological origins. It also explores possible policy implications. In doing so, the book draws on two separate strands of literature which are seldom used in unison: macro-statistical manuals and theoretical macro-papers. By doing so, the book contributes to the effort to bridge the gap between them without compromising on the idea that a meaningful science of economics should, in the end, be based upon individual people and households and their social, political, juridical and cultural embedding instead of a ‘representative consumer’, or Robinson Crusoe figure.

This work is essential reading for students, economists, statisticians, and professionals.

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A book like this, comparing theoretical and empirical concepts and definitions of (neoclassical) macroeconomic variables with the concepts and definitions of the (macro-)statisticians had to be written. As there isn’t one while considerable differences do exist. Which leads to misunderstandings. To be able to do write such a book, one has to be a ‘Jack of all trades’. I qualify. But as this proverb goes there is a trade-off to this: I’m a master of none. I’m not professionally occupied either with labor statistics or data on consumption, capital or, investment or with constructing ‘real’ variables (although I have constructed and estimated such estimates). For all these subjects there are people better equipped to write about the concepts and definitions, even when the economic history approach I use in this book does add value to the often technocratic analyses of the specialists. Also, I did not publish any DSGE model (and do not intend to do so. A systematic comparison of the statistical and the theoretical concepts is, however, lacking – so somebody had to bite the bullet. As far as I know, this book is the most systematic and in-depth overview available of the differences between the concepts and definitions of theoretical, neoclassical macro-economics and the macro-statistics as embedded in the National Accounts, the Flow of Funds and the Labor Statistics. As knowledge about the differences between the theoretical and statistical concepts is pivotal to the interpretation of the data as well as the models, it fills a void – it is for instance important to know that, generally, the neoclassical macro concept of consumption deals only with non-durable, non-government goods and services. My endeavor will often be wanting, shallow or even plain wrong, but it does show that such differences can and have to be pointed out if we want to move to a better science of economics. It is a call to arms.

Not many economists share an interest in comparing basic traits of the statistics to those of neoclassical macro-theory even when many are interested in either the statistics or the theory. Some, however, do. Nathan Tankus provided me, unwittingly but intentionally, via his Twitter account, with invaluable links to articles and authors. The ideas of the economist Means, which are pivotal if one wants to move from a theory based on market prices only to statistics based on market but also on administered and regulated prices, would not be in this book without him. Early attempts of several of the chapters in this book have been read and criticized by Josh Mason and Dyane Coyle, while an early draft of the chapters
on money has been presented to Daniel Mügge, Professor of Political Arithme-
tic, and colleagues at the University of Amsterdam. I owe a debt of gratitude to
all of them. The ideas of Frits Bos, long ago a fellow student as well as a former
colleague at the Centraal Bureau voor de Statistiek, permeate the book. The idea
that rigorous quantification of social processes does not exclude a genuine and in
depth interest in the fate of real ‘common people’, and even is a necessary part of
investigating their lives, which is one of the guiding principles behind this book,
is a clear consequence of long term contacts with the Economic History group at
the University of Groningen.
1 Introduction

Introduction

This book discusses the complex conceptual differences between macroeconomic measurements and neoclassical macroeconomic theory, which this chapter outlines in three parts:

- **First part of Chapter 1.** Paragraph 1.1 The ‘why’ of the book, the three basic questions as well as some sources and methods of investigation.
- **Second part of Chapter 1.** Paragraphs 1.1–1.10. Theoretical backgrounds to the framing, discussion and interpretation of the results of the investigation.
  - 1.2 Conceptual differences extend to the cores of neoclassical macro theory and statistical macro-measurement;
  - 1.3 The two very different meanings of ‘micro-founded’;
  - 1.4 The differences between macro-models and macro-statistics have a history;
  - 1.5 Macroeconomic events outside the framework of macro-models as well as macro-statistics;
  - 1.6 The changing boundary of our idea of ‘the (macro) economy’ and the immensely measurable nature of monetary transactions;
  - 1.7 Hey, *national accounts* are political accounts;
  - 1.8 Overarching integration: the modern flow of funds (FOF) / national accounts;
  - 1.9 An overview of the key differences between DSGE macro-models and macro-measurements;
  - 1.10 Mitchell-style business cycle indicators, the accounts and DSGE models.
- **Third part of Chapter 1.** Paragraphs 1.11–1.13 Elements of the structure of the story.
  - 1.11 The conceptual model of the book (1) – five interrelated phases of development of a macro-statistical variable;
  - 1.12 The conceptual model of the book (2) – cases;
  - 1.13 The conceptual model of the book (3) – meta-formulas.
1.1 Why this book?

What is macroeconomics all about? After 2008, I re-educated myself as a macro-economist, and this became a pressing question, one that ideally has two answers. An empirical one and a theoretical one, which are supposed to be two sides of the same coin. But it turned out that in macroeconomics this is not always (and has not always been) the case. Until 2008 the theoretical side – as embedded in the neoclassical dynamic stochastic general equilibrium (DSGE) models – had dominated the field for several decades. But the worldwide economic downturn showed that theoretical macroeconomics provided insufficient answers to the events of the downturn as stated in terms of the national accounts, the flow of funds and the labor data. The measurement of macro-economic data had greatly evolved but not in unison with the development of theory (see Card (2011) about this for an in depth overview of ‘Labor’ and ‘Unemployment’). Two kind of ‘currencies’ had developed and the exchange rate between these two currencies was and is not easily tractable (Andrle, Brůha and Solmaz 2017). It turned out that even when the same words are used, the theoreticians crafting the models and the statisticians estimating the real world are not always talking about the same thing. Consumption as it’s measured is not ‘consumption’ as it’s used in the models, capital is not ‘capital’ and ‘unemployment’ is not ‘unemployment’. Also, different words are used to denote, at first sight, comparable concepts. Quite some neoclassical theorists among whom quite some Noble laureates for instance use the word ‘leisure’ to denote what statisticians call ‘unemployment’. This linguistic confusion is not new. In 1944 Haavelmo noted, pondering the relation between economic theory and the then-burgeoning craft of measuring the macroeconomy, ‘the confusion . . . caused by the use of the same names for quantities that are actually different’ (Haavelmo 1944, p. 7). Another example: according to the majority of models, all government expenditure, called ‘government consumption’, is wasteful. By definition. It uses resources but adds nothing of value. This means that, according to the large majority of DSGE models, government expenditure on education or health care does not add to prosperity. According to the statisticians, though, ‘government consumption’ does add value which is the very reason to call it ‘consumption’. Clearly, two remarkably incongruous concepts of consumption are used. *Ceci n’est pas une science?* Yes, there are DSGE models that do accept the possibility that government expenditure might actually produce useful public goods or services (Stähler and Thomas 2011; Iwata 2012). But the core central bank models used to inform policy (Bokan et al. 2016) and, crucially, models used in education (Sims 2015) do not follow this road. These models argue that government expenditure is wasteful, while statisticians hold an opposite view.

So, it turns out that we have to answer two questions, not one. The first is about theory: ‘what are neoclassical DSGE macro-models all about?’ The second is about measurement: ‘what are macro-statistics all about?’ Answering these questions is not always easy, especially when it comes to theory. As indicated, not all DSGE models use the same conceptualization of variables. Furthermore, many
neoclassical macroeconomists are less than precise when it comes to defining variables. I’m not the first one to notice this. According to Thorstein Veblen, this fuzziness is a defining feature of what he called neoclassical economics. He stated about the tendency to translate everything into an unobservable internal discounting of pleasure and pain by atomistic individuals:

It is not simply that the hedonistic interpretation of modern economic phenomena is inadequate or misleading; if the phenomena are subjected to the hedonistic interpretation in the theoretical analysis they disappear from the theory; and if they would bear the interpretation in fact they would disappear in fact.

(Veblen 1909, p. 175)

It was one of the reasons for him to coin the phrase ‘neoclassical’ for this kind of economic discourse; this book can be understood as an endeavor to check if this Veblen quote still has truth to it, over one hundred years later. Anyway, this lack of precision and the often implicit nature of assumptions makes it quite complicated to investigate the concepts of the variables used in the neoclassical models. The all-important concept of consumption which is at the heart of neoclassical macro has to be gleaned from occasional remarks in papers, footnotes and by reading between the lines. Macro-statisticians, to the contrary, take great care to define their variables. When it comes to consumption, Eurostat states:

Actual individual consumption . . . refers to all goods and services actually consumed by households. It encompasses consumer goods and services purchased directly by households, as well as services provided by non-profit institutions and the government for individual consumption (e.g., health and education services). In international comparisons, the term is usually preferred over the narrower concept of household consumption, because the latter is influenced by the extent to which non-profit institutions and general government act as service providers.

(Eurostat 2018c)

Impressive tomes are written detailing and operationalizing these definitions to enable consistent measurement and even to enable measurement at all, while modelers conveniently often leave the government and also non-profits out of their concept of consumption, most of the times not being explicit about this. Such differences in culture – occasional footnotes versus impressive tomes, explicit and detailed statements versus implicit use – make it difficult to compare the concepts and definitions of the theoretical models with those of the statisticians. Sometimes, concepts can even only be understood by spotting omissions. Non-profits (churches, unions, amateur sports clubs, charities like the UK National Trust which with 2.551 square kilometer is the largest private landowner in the UK) are an explicit sector in the statistics. But I’ve never seen them mentioned in the models, not even between the lines. They are seemingly left
out of the neoclassical production and consumption boundary. Another example: most DSGE models not only exclude government production of public goods and services from their consumption concept but also exclude durable consumption goods, like cars or the proverbial use value yielding chair of Alfred Marshall (Marshall 1920). I only understood this when I ran into a DSGE model which explicitly included them and mentioned that including durables was the exception to the neoclassical macro rule. Another difference: statisticians by definition look at the recent or, sometimes, distant past. The models, choice oriented as they are, look at the near but also at the distant future. The main actor of the models, the ‘representative consumer’, makes, within the in the long run binding confinement that the economy always returns to a benign equilibrium, choices which designate this future (in a subsequent chapter I’ll discuss HANK models, models which have more than one representative consumer). The reason consumer durables are often not included in the models is related to this: existing consumer goods restrain the representative consumers in their choices (having a chair influences the discussion to buy a chair) which complicates modelling this future and enabling the ‘representative consumer’ to choose freely. Statisticians however have to include purchases of consumer durables as they are part of total monetary expenditure which means that you can’t leave them out with running into inconsistencies (why is paying for the services of a taxicab considered ‘consumption’ and buying a car not?), which points to another difference: the choice theoretical background of the models requires that the representative consumer is not constrained by other people. The measurements, to the contrary, are fundamentally about such constraints: transactions like buying a car are always with other people or organizations. The models with one representative consumer rules out such transactions by definition. You do not have monetary transactions with yourself.

Summarizing: the differences between the models and the measurements are large and fundamental. This book sets out to flesh out and discuss some of these differences. Which means that a third question has to be added: ‘what are the main conceptual and definitional differences between the DSGE macro-models and the macro-statistics?’ Subsequent chapters will set out to answer the three questions as I’m not aware that any book doing this in a systematic fashion exists. The rest of this chapter will provide some background information and explain the multilayered structure of the book as well as the basic methodology used to answer the questions. Some additional remarks: in the first sub-question I introduced the word ‘neoclassical’. The reason to use this phrase is simple but pressing: the DSGE models are a conscious effort to embed the ideas of neoclassical economics about the nature of capital, labor and, especially, the _homo economicus_ in a macroeconomic framework. There are other macro models, these will not be investigated. The attentive reader might have noticed that I did not use the phrase ‘gross domestic product (GDP)’. This variable is a keystone of the national accounts – but a keystone can only be a keystone in relation to a building. When I relate to measurements it is to the building, not the keystone.
1.2 Conceptual differences extend to the cores of neoclassical macro theory and statistical macro-measurement

Differences between neoclassical macro-theory on one side and macro-measurement on the other are manifold. This is not just the case when it comes to mere definitions. The rift extends to the foundation the statistics and the models are built upon, to how concepts are related as well as to the basic approach of how science should be done. Statisticians go to great length to define their variables as precisely as possible, engage in discussions about these concepts and are eager to adapt time series to definitional changes. These ideas are written down in specialized articles and elaborate handbooks. Unemployment is a case in point. It consists not only of long and short-term unemployment but also, among other things, of involuntary part time work and of people available for work but who, for whatever reason, are not seeking work. The manuals are clear on this. But: what is the binding element of all these statistical variables? The same question can be posed for the models. It took me some time to realize that Edward C. Prescott, one of the winners of ‘The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel’ (TSRPMoAN), when using the word ‘leisure’, actually writes about what statisticians define and measure as ‘unemployment’ (Prescott 2016). He is far from the only TSRPMoAN winner who does this even when no neoclassical manuals seem to exist which explain this specific use of language. Why do they do this? But there is more to this. What is the foundation of their belief that calling unemployment ‘leisure’ is warranted? Such questions lead us to the core of theory and measurement. A smart non-economist observer blessed with undue perseverance and starting to read neoclassical macroeconomic theory and trying to answer such questions about unemployment might, after reading tons of often bland and boring journal articles and central bank working papers, answer the question ‘what are Neoclassical DSGE macro-models all about’ with a single word:

**Utility!** Utility is the non-monetary psychological variable which is central to the ‘representative consumer’, the single person also called ‘social planner’ which in the workhorse neoclassical macro-models stands for society and whose preferences about today and tomorrow permeate the models from beginning to end. Or better: from top to bottom. True, in more advanced models there may be more persons or even banks and entrepreneurs – but these maximize ‘utility’ too. It is the relentless maximization of utility present and utility yet to come which makes the model-word go round! As work does not yield utility but, to the contrary, disutility being unemployed is better than being employed! Which means that unemployment can be called ‘leisure’.

This ‘utility’ of the ‘representative consume’, who stands for society, is somehow related to the variable with the same name in the microeconomic models of the *homo economicus*, a variable which pervades economic theory and which has done
introduction

so for quite some time (Marshall 1920), even when no mechanism for adding
individual utility of individual people is provided. But ‘social’ utility is why neo-
classical DSGE economists equate unemployment with leisure. Optimizing util-
ity, and not money, makes the world go round in the models.

But ‘utility’ is not at the heart or even the fringe of economic measurement.
Far from it. An equally smart non-economist observer blessed with an even larger
amount of perseverance would answer the question ‘what are macro-statistics all
about?’, after reading tons of always bland and boring manuals about the NA
and the FOF and after investigating screen after screen of data and scores of press
releases, also with one word. But a quite different one:

Transactions! Whatever the statisticians measure, it’s not ‘utility’. They do not
even try. They measure transaction based monetary flows of income, production,
labor, all kinds of expenditure and also credit in a granular way. Hey, you
really should take a look at the data about domestic credit to the Irish construc-
tion sector before and after 2008, information which is routinely available in
the datasets of the Central Bank of Ireland!

They also measure stocks of financial assets (including different kinds of
money) and they measure sectoral debts and the monetary value of fixed assets.
And they also directly measure one non-monetary variable: paid labor. And
unemployment. And they measure prices and interest rates and, neat, the flows
are interconnected. A change in one flow is by accounting necessity connected
to offsetting changes in other flows. They do this by bottom up aggregating

Graph 1.1 Credit advanced to Irish resident private-sector enterprises: real estate,
land and development activities – outstanding amounts and transactions
Source: Central Bank of Ireland, financial statistics Table A.14
individual transactions by individuals, companies and government entities and even charities and churches. But they do not measure ‘utility’. They do not even try. Transactions, not optimizing utility, show how the world is going round.

That’s also why statisticians call unemployment ‘unemployment’: people without work want to enter an employment transaction but aren’t able to find a counterpart meaning that they are ‘un-employed’.

So it’s looking forward against looking backward, utility against transactions, bottom up against top down, granular data against stylized sectors and explicit optimizing against the evolution of society. Other models, more consistent with the statistics do exist (one example: Godley and Lavoie 2007). In this book I will however restrict my attention to the neoclassical ‘DSGE’ macro-models. The very design of these models complicates comparing statistical with theoretical concepts and definitions – as the theoretical ones are equated with psychological variables while a rather limited production and consumption boundary is used. Remember the absence of consumer durables, non-profits, public goods and services and indeed even, as we will see, money and financial markets. As Willem Buiter stated about pre crisis DSGE models, precisely one century after Veblen: ‘Both the New Classical and New Keynesian complete markets macroeconomic theories not only did not allow questions about insolvency and illiquidity to be answered. They did not allow such questions to be asked’ (Buiter 2009). Consistent with Veblen’s prophecy, money and transactions disappeared from theory and fact. As present day DSGE models state: they are based on ‘sound’ analysis of ‘deep’ and ‘fundamental’ psychological relations which escape the laborious and gritty work of actual measurement and day to day action and hence the discussion about the fact one wants to measure and how this should be done. According to Arjo Klamer, this emphasis on deep, abstract and eternal truth below the factual surface is typical for the modernist view of life (Klamer 2001). Unfortunately, it also means one has to dig hard and deep and to read between the lines to find out what the modelers are really writing about. Even then, as there are no official manuals and formal definitions one DSGE model might use a concept in a slightly different way than another. Digging hard and deep however does yield results. Returning to the concept of consumption in the models, neoclassical authors state the next things: ‘Dynamic stochastic general equilibrium (DSGE) models typically (as do most models) treat government spending as wasteful; such spending does not contribute to enhancing private sector utility or productivity’ (Russel Kincaid 2008). Or to quote Daragh, Jacquinot and Lozej (2014, pp. 4, 5): ‘Neoclassical economic theory typically assumes that government expenditure is wasteful’ and ‘Regarding consumption goods, we maintain the assumption from many models that government consumption expenditure is wasteful’. Such sentences have to be taken literally. It is about all government spending, including spending on roads, education or healthcare. Mind that statisticians do not define government consumption as intermediate use by the government but as the production of public goods and services. But what if for instance as happened in the UK, the
postal services are privatized? A DSGE model about the situation after privatization is, taken the model literally, about another economy than a DSGE model about the situation before privatization. The boundaries do not change – but the area within does. The citations above are clear. But they are also hard to find. The models are silent on this – even when the citations above do seem to be consistent with the verdict of Veblen.

There is more to this. The neglect of government production is remarkable. In the larger body of economic thought, expenditure on public goods and services – either individual consumed ones or public ones – is considered to be a part of total consumption (Samuelson (1954). The entire fifth ‘book’ of *The Wealth of Nations* (Smith (1784, first edition: 1776)) is dedicated to this. And analysis of government expenditure is of course a viable branch of the tree of economics. It’s not as if economists turn a blind eye to the government. The problem of the models is however already indicated in the last sentences of the famous 1954 Samuelson three page article about government expenditure:

> To explore further the problem raised by public expenditure would take us into the mathematical domain of ‘sociology’ of ‘welfare politics’. . . . Political economy can be regarded as one special sector of this general domain, and it may turn out to be pure luck that within the general domain there happened to be a subsector with the ‘simple’ properties of traditional economics.

(Samuelson 1954, p. 389)

Traditional aka, in the definition of Samuelson, political economy means, in this context: the neoclassical analysis of markets. Somehow, it’s not easy to use this apparatus to analyze non market transactions. But even then some DSGE models do accept the idea that government expenditure can be a boon to society (Stähler and Thomas 2011; Iwata 2012). A comparable situation exists for consumer goods. Often durable goods, like cars, are excluded for reasons of convenience: leaving them out circumvents the problem of how ‘use-value’ of durable goods after the purchase adds to utility.2 Most models exclude them. But some don’t leave this out (example: Monacelli 2009). It can be modelled, which means that defining government expenditure as wasteful by definition and omitting cars and chairs out of the models is a conscious choice which defines the core of the models. It’s all about utility. And activities yielding utility in most models are quite restricted, however this is often not well described in the models.

Statisticians take the opposite approach. Take, again, consumption. When statisticians make international and historical comparisons, the concept of ‘Actual Individual Consumption’ (AIC) is used. This is an aggregate of household purchases of private durable and non-durable goods and services plus government expenditure on individual consumed public goods and services like education and health care but excluding collective public goods like roads and law and order, which are measured separately (Eurostat 2018b). There are good reasons to do this. Importantly statisticians are more or less forced to include ‘government consumption’ like education into their concept of consumption as there are non-trivial differences
between countries as well as large historical changes within countries when it comes to the boundaries between individually consumed ‘private’ and ‘public’ goods and services. Healthcare is a case in point. The UK National Health Service (NHS) is public but some of the services provided by the NHS are private in the USA. Taking the inner conceptual consistency of DSGE models serious – which I do – means that the models consider expenditures on the NHS ‘wasteful’ while they consider comparable expenditures in the USA as ‘adding to utility’. The statisticians however look at transactions: as long as the services are part of the ‘money economy’ and based on transactions, like wages paid to nurses, they are within the production boundary, it does not matter if they are provided by the government, companies or even households themselves or non-profits, like churches (or ‘NPISH’, non-profits institutions serving households, in the terminology of the national accounts). Privatizing the postal service does not matter for the measurement of AIC. Monetary transactional activities are the core of macro-measurement – a net cast wide. If we want a consistent body of macro theory as well as macro measurement, the DSGE models will also have to cast their net wide, much wider than at the present. Neither the core variables – utility and transactions – or the production and consumption boundary of the respectively the statistics are consistent with each other.

1.3 The two very different meanings of ‘micro-founded’

The differences between statisticians and theoreticians stretch into semantics. Both use the phrase micro-founded. It’s the core idea holding DSGE models together. But modelers give it another meaning than the statisticians. The theoreticians assume that the neoclassical microeconomic utility formula which defines their *homo economicus* also applies to society as a whole. There is, according to them, one neoclassical ‘microeconomic’ utility curve for the entire macro-society, which means that the macroeconomic ‘representative consumer’ (their model of society) behaves in the same way as the microeconomic *homo economicus*. The relation between social and individual utility is not clear – the aggregation problems mentioned by Veblen (1909), Marshall (1920) and Arrow (1950) still persist today. But a utility curve for entire societies shaped like a utility curve for the *homo economicus* is still assumed. All of society acts as one giant *homo economicus*. Hence the phrase ‘micro-founded models’, which is shorthand for ‘neoclassical macroeconomic models which assume that a society behaves like one neoclassical individual’. In the case of a number of representative consumers with either different preferences, different power or different constraints on their actions this still holds: all of them behave like the micro economic *homo economicus*. Hence the phrase ‘micro founded’. Statisticians also use the phrase ‘micro-founded’. But with a totally different meaning. For them it means that their aggregate data are, in the end, based upon measurement and aggregation of myriads of monetary micro-transactions. Only one example: the title of an OECD paper by Coli and Tartamella (2015): ‘The Role of Micro Data in National Accounts. Towards Micro-founded Accounts for the Household Sector’. Instead of describing the influence of top down decisions on future states of the world it’s about bottom up...
aggregation. The theoreticians and statisticians do not always seem to be aware of this difference – the words imprinted on their respective coins sound the same but are part of different languages and people do not seem to be aware of the existence of different languages. Also a transactions based measurement system like the national accounts (NA) or the flow of funds (FOF) by definition implicates that the macro-statistics are fundamentally not about a single ‘representative consumer’ but about relations between multiple people and companies and the government and banks and non-profits. The idea of a single representative consumer is opposite to the foundations of the NA/FOF. The accounts map and aggregate the monetary flows engendered by an incredible complicated maze of persons and organizations which all have monetary transactional relations which each other, in the case of debt and credit and in fact many production and consumption contracts even of a long-term nature. It is the opposite of the ‘representative consumer’ which, in the models, does not trade but who does have ‘trade-offs’ between the present and the future. Good things are happening. Especially since 2008, the models have been extended with more consumers, banks, foreign countries and even class: institutional detail is added and transactions are becoming important. Also, academic economists like Thomas Piketty and Moritz Schularick are extending the use and scope of existing statistics, also by adding their new own long term estimates of economic variables to the existing body of knowledge. And they are not the only ones making long-term and very long-term data are made available (Reinhart and Rogoff 2009;Dimsdale, Hills and Thomas 2010). But the rift is still deep and wide. Micro-founded is, by many an economist, still understood as a phrase which harkens back to theoretical neoclassical micro-economics. And by statisticians as a method of measurement and aggregation.

1.4 The differences between macro-models and macro-statistics have a history

The dichotomy between neoclassical theory and measurement is not a recent occurrence. The transactions central to the statistics are part of the same ‘money economy’ which was emphasized by the theory and measurements of Thorstein Veblen’s best student and one of the dominating economists of the first half of the 20th century, Wesley Mitchell. In 1916 he stated: ‘Among recent tendencies in economic theory none seems to me more promising than the tendency to make the use of money the central feature of economic analysis’ (Mitchell 1916, p. 140). He pitted this against the psychology and utility oriented approaches of John Stuart Mill and especially William Stanley Jevons, in the event approvingly quoting a 1915 article of a young Cambridge professor by the name of J.M. Keynes. He is however quite positive about Alfred Marshall as, in line with the criticisms of Veblen and contrary to earlier utility oriented economists, Marshall emphasized real prices actually paid, which means: the transactions central to macroeconomic measurement (in this book, the 8th edition of his Principles of Economics from 1920 will be cited, Mitchell cites the 6th edition of 1912).
Mitchell would, during the rest of his long career, put monetary transactions where his mouth was. He published the first real national income accounts of the USA, for the 1909–1919 period (King et al. 1921) and the much more detailed companion book (King et al. 1922), stressing the importance of these data for especially an analysis of the distribution of income. Later, he guided economists like Simon Kuznets and Morris Copeland and helped to conceptualize and organize their work on NA and FOF. Next to this, he was crucially involved with statistical business cycle analysis while he also stood at the cradle of the Friedman and Schwartz book about the monetary history of the United States (Friedman and Schwartz 1963). The hypothesis that no other 20th century economist contributed more to estimating the ‘money economy’ and translating the criticisms of Veblen of utility and neoclassical economics into measurable concepts can’t easily be refuted, which all serves to underscore the idea that the dichotomy between neoclassical macro-utility on one hand and macro-estimates of the monetary economy and the aggregate value of different kinds of transactions was already visible during the first decades of the 20th century. And while aggregate transactions were already measured in detail in King et al. (1922), the problems with aggregating utility were also already clear to the mind of perceptive economists. To quote Alfred Marshall:

*the task of adding together the total utilities of all commodities, so as to obtain the aggregate of the total utility of all wealth, is beyond the range of any but the most elaborate mathematical formulae . . . if the task be theoretically feasible, the result would be encumbered by so many hypotheses as to be practically useless.*

(Marshall 1920, p. 521)

This problem of measuring utility is still not solved: ‘utility’ in the models is not aggregated from the bottom up but introduced in the models as a top down unmeasured variable. A relation between individual utility of real persons and utility of the representative consumer representing society is not specified or mentioned. This circumvents but does not solve the aggregation problem already mentioned by Alfred Marshall and more thoroughly analyzed by Kenneth Arrow, an analysis which led him to coin the impossibility theorem (Arrow 1950). Nowadays, these criticisms still stand (Morreau 2014). Unless everybody is exactly equal it is not possible to aggregate individual preferences into consistent social preferences. The statisticians to the contrary do not use utility but ‘monetary transactions’ as their core variable. As every profit and loss account shows, there is a clear and identifiable relation between individual and aggregated transactions and, within the confines of a company or a person or an economic sector or even a country, between different kinds of expenditure. Macro-measurement is as such almost the antithesis of the models, while utility defies measurement and aggregation, monetary transactions are immensely measurable and enable aggregation in a big way. In the meanwhile the concept of micro-utility has regressed to the purely psychological variable already criticized by Thorstein Veblen and has not become a more advanced version of the ‘use-value’ related variable defined by
Alfred Marshall and dear to modern marketeers. It still defies measurement. While the NA are by now measured as a matter of routine, on a quarterly basis and the world over. In a sense and when it comes to macroeconomics, economic science has come full circle since the criticisms of Veblen. Albeit, when it comes to the models, on a more sophisticated level of mathematical description. And when it comes to measurement, on a much higher theoretical as well as practical level of statistics and measurement.

The differences between models and measurement also extend to the social realm. Modelers often work at universities, are pressured to ‘make a name’ and do not have the same publication avenues as the often anonymous statisticians. ‘Heroes’, to borrow a phrase from the analysis of corporate culture, are people who published a lot in prestigious journals and who get cited a lot. But who are our statistical heroes? I’ve lauded Wesley Mitchell, an economist-statistician who in his age was very well known. But while lesser contemporaries like John Bates Clark, Alfred Marshall and Irving Fisher are still well known he is all but forgotten. John Bates Clark, one of the neoclassical economists starting to tinker with the concept of a classless, genderless and race less society modelled with the concept of the representative consumer even has a very prestigious price named after him. A Wesley Mitchell prize of economic measurement is lacking. . . . It’s not just that there is no such price. It’s also that economic statisticians do not seem to feel the need for it. Their culture is not aimed at making a name or becoming a scientific hero. But it’s aimed at measuring the economy in an anonymous way, while theoreticians literally need to make a name to keep their job and are part of a culture which glorifies individual honor bestowed upon them by society. The highest honor, TSRPiEsMoAN, is not awarded to institutes. Statistical work for various reasons often requires anonymity while main results are often anonymously published by institutions. As stated: differences are huge – even when TSRPiEsMoAN winners like Jan Tinbergen, Milton Friedman, Simon Kuznets and George Stigler started out as economist-statisticians – the last three of these at the national Bureau of Economic Research (the total number of prize winners associated with the NBER is 27). But the social and cultural world of the statisticians is not the same as that of the theoreticians.

1.5 Macroeconomic events outside the framework of neoclassical macroeconomic models as well as macroeconomic statistics

Also, even when a variable like unemployment is covered by the statistics but not (at least not in a way consistent with the definitions and measurements of the statisticians, as we will see) by the models, both do not seem to bother to directly measure financial bubbles, even though these can be and are, to an extent, inferred from the quarterly NA data and even when upswings and downswings were the explicit subject of investigation of Mitchell (1913, 1927); Burns and Mitchel (1946) and Tinbergen (1939) and even when Friedman and Schwartz (1963) made an explicit distinction between what now are called financial crises
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and ‘normal’ upswings and downswings of the business cycle. The statisticians are large and by satisfied with measuring data on a yearly and not on a cyclical time scale. Also, modelers left many if not most of the causal variables identified by Tinbergen (1939) as well as the monetary variables identified by Friedman and Schwartz (1963) out of their models. Figure 1.1 shows credit to the construction sector in Ireland. As is well known, there was a construction bubble (and bust) in Ireland between 2000 and 2009. Which is perfectly visible in the data on credit (mind that the flows are quarterly data). These data are part of the integrated NA/FOF data – they are routinely available on the Eurostat website, among other places. But even when the event is measured the statistics do not label it ‘a bubble’ in any formal way. The NA data enable the identification of bubbles – but do not formally measure them. They focus, taking the year as their fundamental time unit, on expenditure, income and production and the way these flows are financed. The flow of funds also take lending and borrowing into account, as well as stocks of credit and debt, looking at banking but also at receivables and payables. As the FOF uses the same (sub-)sectors and terminology as the national accounts this means that the systems can be and are integrated. A major feat of economic measurement. To be more precise, in the modern integrated NA/FOF accounts ‘income’ is not equal to expenditure but {income plus net credit} is equal to {expenditure on goods and services as well as expenditure on new and existing financial assets}, which enables the measurement of bubbles. But ‘bubbles’ are not part of this conceptual apparatus as the actual measurements are based upon years and quarters meaning that multi-year events are outside of the conceptual scope of formal measurement. In paragraph 1.10 we will see that cycle instead of calendar oriented statistics do exist, however.

For quite some time bubbles also where outside of the conceptual set up of the DSGE models (Buiter 2009). Banks – one of the well-defined sectors of the national accounts – were for decades left out of the models. During the last years, theoreticians as well as institutional inclined economists have tried to extend their models with banks to enable their models to show bubbles. Claudio Borio coined and operationalized the idea of the financial cycle (Borio 2012). In this book the model of Bokan et al. (2016), an elaboration of part of the core DSGE model used by the European Central Bank, will often be used as a kind of default DSGE model. This model enables bubbles to exist. Contrary to Borio, Bokan et al. however do not use the measurements of time series data of the integrated accounts, even if these do show bubbles. The rift still exists. Another exemption: economic class. Economic class is not based on income and education but on ownership. Some people have to work for a living, others can live from the ownership and capital and land. Bokan et al. (2016) re-introduce a class they call ‘entrepreneurs’ which literally owns and rents out all the capital into their model. But they do not even bother to check if such a class exists and how it has to be conceptualized, defined and measured while this can be done. Fessler and Schürz (2017), who also tackle the question of ‘capitalists’ in the modern economy, go to great lengths to investigate if such a class exists, how it can be measured and how large it is. Their results are based on more or less the same classical, ownership related
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economic definition of class which, among many other 19th-century economists, was adopted by Marx:

*Intergenerational wealth transfers are a main driver of class location. Our class typology can serve as an excellent proxy for the position of a household in the wealth distribution. We discuss why this class typology has many potential advantages with regard to the measurement and analysis of wealth. Class is key in order to understand wealth inequality.*

(Fessler and Schürz 2017, summary)

Bubbles and busts and ‘class’ are, as yet, not an integrated part of the accounts or the models, let alone of an integrated science of economics were measurements and theory tally, even when Wesley Mitchell pioneered the estimation as well as the dating of business cycles while ‘class’ as an economic category was prevalent in the writing of many 19th-century economists. At present, monthly measurements of producer of consumer sentiment or industrial production are used to measure cycles while the work of Bokan et all. and Fessler and Schürz show that the class gap can be tackled, too. But class and the swings of the business cycle data are not yet well tied to either the national accounts or the models. Next to mending a rift there is a road to travel, too.

1.6 The changing boundary of our idea of ‘the (macro) economy’ and the immensely measurable nature of monetary transactions

One can pose the question if the rift between macro-theory and measurement has always been as large as it is today. As shown, the rift has been present for quite some time but it can be argued that it has not always been as large as it is today. To show this, this paragraph contains a short introduction into historical aspects the development of national accounts and, somewhat later, the flow of funds, mainly focusing on the ‘production boundary’ or the question what is and what isn’t covered by theories and measurements. And how this differs from neoclassical economics. The focus of this investigation will be the government: should government production be covered by theory and measurement or shouldn’t this be the case? This won’t cover the entire production boundary but it will serve to show that boundaries changes, albeit in in the case of macroeconomics in an opposite way when it comes to the measurements and the models.

We’ve seen that the NA/FOF include government expenditure in ‘final demand’ as it adds a boon to society. As stated, most of the models take the radical libertarian position that government expenditure is a waste, by definition. Recall the statement of Samuelson about the realm of what he considered to be ‘traditional economics’ – government expenditure was simply not covered by ‘political economy’ as he defined it, as this kind of political economy was only occupied with markets. Is it right to use this particular definition of ‘political economy’ and, more importantly, can we call this kind of exclusive market
oriented thinking ‘macroeconomics’? Did ‘political economists’ indeed purge the
government from their thinking and is defining the macro-economy as solely the
realm of consumer choice of private goods sound economic procedure? There
are reasons to doubt this. The government has for a long time been an important
element within the production boundary as defined or used by generations of
economists. Mitra-Kahn (2011) argues that it was Keynes who introduced the
government into the accounts while earlier economists left the government out
of their production boundary. He discusses Adam Smith, who in 1776 published
The Wealth of Nations (Smith 1784, first edition 1776). According to Mitra-
Kahn (who also discusses earlier developments) this book had a large influence
on our definition of the macro-economy. It is about the transactional monetary
economy. Smith labelled many paid services (but not all) ‘unproductive’, an idea
which, according to Mitra-Kahn, influenced government statistics (which, to be
sure, at the time were a far cry from the modern national accounts) but some-
how Mitra-Kahn is silent about Smith’s ideas about the government and seems
to assume that Smith excluded the government from the production boundary.
The boundary proposed by Smith was, according to Mitra-Kahn, around 1900
successfully challenged by Alfred Marshall who included more services but not
yet the government in his idea of productive work and whose students, when
they started to rise through the ranks of the UK bureaucracy, managed to change
the statistics accordingly. The concepts of Marshall were at the end of the 1930s
brushed aside by John Maynard Keynes, who (therewith extending the work of
Colin Clark), introduced the production of the state into the national accounts to
enable an analysis of non-inflationary wartime spending (Keynes and Rothbarth
1939; Keynes 1940). To be able to do this he also established the present day
Office for National Statistics (ONS) in the UK, which had to measure the vari-
ables defined by Keynes while he also managed, during his trips to the USA, to
get his ideas accepted in the US government offices, therewith sidelining Simon
Kuznets and his more welfare oriented approach to national accounting. As a
consequence, national accounting was set on a track which was meant to ena-
bles an analysis of a war economy and a central role for the government which,
despite some tinkering at the margins (Bos 2003, 2013; Eurostat 2013), basically
endures to this day. A system which, according to Mitra-Kahn, is not fit for an apt
analysis of welfare oriented policies.

The ideas of Mitra-Kahn are highly interesting. But they are UK-centered. And
they need elaboration. The main conceptual contribution of Keynes to national
accounting was not the introduction of the government into the accounts. The
role of the state had long been stressed by economists like Adam Smith. And
not just by him. It has been included in national accounts and preceding esti-
mates of the national economy from the very beginning. In 1608 Simon Stevin,
a Flemish/Dutch polymath who among many other things also invented or at
least perfected decimal notation, improved windmill design and developed an
ultra-fast ‘wind powered beach carriage’, published ‘Vorstelicke Bouckhouding’
(‘Accounting for Princes’) (Stevin 1608). This book (actually: chapter of a larger
book) was inspired by an earlier French example. It was about keeping accounts
for the estate of the prince, not about accounting for the state or the nation. But such approaches to the wealth of the sovereign instead of the commonwealth would wane. A few decades later William Petty, a polymath who among other things developed a device for ‘double writing’ and who charted Ireland, wrote his *Political Arithmetick* (published in 1690 but written around 1676). This book argued and estimated among other things ‘That the Power and Wealth of England, hath increased above this forty years’. It was not about the estate of the prince. It was about the state of the nation. He wrote about employment, expenditure and wealth and made some comparisons with other states like the ‘Hollanders’ and the French. According to Mitra-Kahn (2011) this was not the first or last individual endeavor to define and estimate national prosperity. But it serves to illustrate the growing focus on the nation or, as Petty also called it, the ‘Commonwealth’. It also paid special attention to the productive role of the government, as the title of the second chapter alleges: ‘That some kind of Taxes, and Publick Levies, may rather increase than diminish the Common-Wealth’. This last point was not lost on Adam Smith when he published his *Wealth of Nations* about one century later. Not mentioned by Mitra-Kahn (and many other economists) the entire fifth and last part of the *Wealth of Nations* is devoted to productive government expenditure and the increasing role of the state. Clearly, ideas about productive government actions have a long pedigree when it comes to ‘political economics’ – the use of Samuelson of this term is clearly idiosyncratic even when, in a rhetorical sense, it enabled him to showcase his analysis. Anyway, Stevin as well as Petty as well as Smith focused on the money economy. This would change. Like the emphasis on the role of the government.

Marshall is accredited by Mitra-Kahn with refocusing the attention of economists on markets and individuals and including many, albeit not all, services but not the state in the productive economy (Mitra-Kahn 2011). Reading Marshall’s *Principles of Economics* (8th edition, Marshall (1920)) shows that services are indeed included and a focus on individuals and markets is prevalent. As such his thinking was heavily influenced by economists focusing on ‘utility’ like Jevons and Böhm-Bawerk. According to him, the economy was in the end not about producing furniture, but about the utility a chair yielded even when real money prices did play a role on markets. For Marshall it however did not matter if the chair was produced by the market or the government. He admits the existence of government factories as well beneficial government policies related to health while he notes the relatively fast growth of the number of government employees. But despite this and contrary to Adam Smith (and while writing at the very height of British colonial power) he does not devote any special attention to the government as such, which is a mayor deviation from Petty and Smith. Also, national income or, as he prefers to call it, ‘the national dividend’ does play quite a role in his book. But he was behind the times when it comes to this subject. The extensive list of literature on national accounting in Bowley (1942) shows that in 1920, when the 8th edition of *Economics* was published, there already was quite an extensive literature about this ‘national dividend’. The idea propagated by Mitra-Kahn (2011) that it were mainly the ideas of Smith and Alfred Marshall
which influenced the measurement of the wealth and income of the nation is clearly incorrect – scores of economists tried to estimate and define it and made large progress. Somehow Marshall missed this and did not use this literature to define the ‘national dividend’ in any precise way, though his ideas seem to be related to the flow of income (see also Bowley 1920). Much more attention is devoted by him to aspects like utility and consumer surplus – fundamentally non-monetary variables – than to the boundaries of the money economy. It is well possible – my knowledge of the history UK statistics is not extensive enough to be able to corroborate this – that his students indeed changed the nature of UK statistics by putting more emphasis on services. But did they, as the work of Mitra-Kahn implicates, also like Marshall more or less forget about the government as a distinct category of the national economy? If so, they were clearly behind their times. To show this we have to cross the ocean. Around the same time as Marshall published his 8th edition, an economist of the same stature but working in the USA was already making his mark: Wesley Mitchell. He became the head of the newly established National Bureau of Economic Research (NBER). As an economist, he did not put emphasis on utility but on the ‘money economy’ and its measurement, being well aware that the ‘money economy’ was not just about earning money but also about the challenging task of wisely spending money – for instance by housewives (Mitchell 1912). Comparing this with the bland statements of Marshall about the ‘utility’ of furniture, Mitchell was decades ahead. In Mitchell’s thinking, there was conscious life and dedicated effort, and not just furniture, at the other side of the monetary production boundary. Anyway, one of Mitchell’s most remarkable results was an early NBER study, ‘Income in the United States: Its Amount and Distribution 1909–1919’ (King et al 1921). This book, which estimates value added in the different sectors of the USA economy, discusses the production boundary in a much more specific way than Smith or Marshall. In its little read detailed companion volume (King et al 1922) we can find the next phrase in the chapter about the government, written by King (King 1922, p. 201):

In dealing with the product of government, the same criterion is used that has been applied in the industrial fields previously studied; namely what book or money income do individuals, as such, derive therefrom. Evidently, governmental units expend great amounts for wages and salaries, but they pay no dividends. Large sums are, however, disbursed in interest, mostly to private individuals, but to no inconsiderable extent to banks.

Clearly, the government was included in the first major national accounts study of what already was the major economy in the world, based upon a purely monetary criterion: government employees are paid a wage. Including the government in the ‘national dividend’ was – contrary to the remarks of Mitra-Kahn – not an invention of Keynes. More important: actual measurement forced economists to be much more precise and clear about what they were talking about than Smith and Marshall ever were forced to be, which eventually led to concepts like...
‘actual individual consumption’, which includes the consumption of individually consumed goods and services provided by the government, like large chunks of education. Excluded are the depletion of stocks of natural assets as a negative and also excluded household work (King et al. 1921) but this omission is explicitly mentioned and a very rough estimate of the importance of household work is provided. Inclusion of the depletion of stocks of natural resources as a negative still has to be incorporated in the accounts.

The influence of people like Mitchell but also Bowley and Colin Clark (who estimated integrated accounts for the UK (Clark 1937) can also be witnessed in the work of Keynes himself. The Economic Consequences of the Peace (Keynes 1919) still used a large amount of not well integrated data to prove Keynes’s point about the state of an (admittedly fragmented) national economy. Eighteen years later, in the autumn of 1939 when he published the articles which would become his ‘How to pay for the war’ in the London Times, he used national accounts data based upon the work of Colin Clark but (guided by Keynes) extended and updated by Rothbarth (Keynes and Rothbarth 1939). There are several interesting parts to this epoch making piece. First, it showed the power of national accounting as a tool for policy. Second, it contained income estimates per income group, a mayor advancement and a deliberate goal. As Keynes (1940) stated in the acknowledgments: ‘I have been assisted throughout on the statistical side by blr. E. Rothbarth of the Statistical Department, Cambridge University, who is responsible, in particular, for the estimated division of total income between the income groups’. Third, it rightly envisioned government expenditure as expenditure with the same main goals as private expenditure: consumption and investment. This enabled Keynes to provide a much more systematic analysis of the economy than he could provide in ‘The economic consequences of the peace’: his work was finally up to the standard of King et al. (1921). He was well aware of the distributional effects of high wartime inflation: the poor would suffer most. Eager to prevent this he was able to state, with some quantitative precision, how much disposable income of different groups of consumers had to be restrained to lower consumption expenditure to be able to free resources for the war effort while keeping the purchasing power of the lower income group afloat at least to an extent. Importantly, he used the three basic national account approaches (income, expenditure and production) in combination. Nowadays, such data are a staple of GDP press releases in the shape of the ‘supply and use tables’ (Eurostat 2018a) though it has to be stated that the standard national accounts do not contain data on different income groups – Keynes’ main national income innovation has been discarded!

See also Tily (2009). There is a nasty twist to this. Patnak (2018) argues that, at least inspired if not guided by John Maynard Keynes, during World War II the British government pursued a policy of ‘profit inflation’ in India, increasing profits and decreasing the purchasing power of the poor to free resources for the war effort – a policy which led to the Bengal famine of 1943–1944 which claimed the live at least three million people (though Keynes might not be ‘credited’ with rejecting the free grain offered to the British government for use in Bengal by the USA and Canadian governments).
Mitra-Kahn is right to point out the flabbergasting feat that, while not a government employee, Keynes managed to establish an entirely new government office to measure the data he needed, and to stress his influence on the development of the national accounts in the USA in the same period. His catch that Keynes himself admitted that it was only in 1939 that he, according to his own testimony, really figured out why the models of Colin Clark were not fit for his purpose of designing a non-inflationary war effort – they left out ‘supply and use’ by the government but also, not mentioned by Mitra-Kahn and probably more important, the distribution of income – should be in the textbooks (Mitra-Kahn 2011, p. 211). But Mitra-Kahn misunderstands why Keynes shed his last Marshallian feathers. He assumes, that Keynes did not want to show an estimate of private sector GDP which declined because of the war effort and hence opted for a definition of GDP including the rapidly growing war effort of the government – which would show an increase of GDP. This really is of the mark. The entire goal of Keynes was to estimate how much private consumption and investment could and had to shrink. Part of his calculations implied that, as the government produces output and uses resources, too, a reduction of private expenditure of 10 percent won’t lead to a reduction of total expenditure with 10 percent as private expenditure is less than 100 percent of total expenditure. His analysis was no doubt influenced by his memories of the inflation of 1917–1920, which must have taught him that any model used to analyze the situation had to be coherent and consistent and hence to cover aggregate expenditure and total final demand instead of only private expenditure of it or the amount of money going around. And the logic of the model required him to estimate the total tax base in the UK, including government employees, and total investments, including investments of the government. Mitra-Kahn is also not right that the more welfare oriented GDP definitions of Simon Kuznets were ‘sidelined’ by Keynes. Hirschman mentions that Kuznets himself had a decisive influence on the planning of the US war effort with an analysis which, tough production and not income oriented, was highly reminiscent of ‘How to pay for the war’ (Hirschman 2016, pp. 82–83) and basically a kind of input-output analysis. And tough Kuznets (a student of Mitchell) indeed tried to engineer a more welfare oriented concept of GDP the production oriented approach was not a new concept. Actually, the first chapter of Kuznets National Income and Its Composition, 1919–1938, Volume I (assisted by Lillian Epstein and Elizabeth Jenks) is called ‘concepts, classifications and procedures’ and contains a whole taxonomy of different kinds of concepts of ‘national income’ based upon basically the same accounts (see also Bos 2003, pp. 9–16, 2013) for more extensive analysis of such points) while Kuznets (1955) includes military equipment in its definition of fixed capital. The idea that Smith and Marshall influenced statistics is right. But it is not right to state that their ideas decisively influenced the accounts. The development of the accounts knew an own, transaction and measurement based logic while there surely was an international and not just a UK community of economists and statisticians developing national accounting. The very fact of measuring ‘the economy’ forced economists to grapple with concepts and definitions in a way they had never done before. This development
gained momentum when measuring national accounts became institutionalized. Hirschman (2016) states that, before the 20th century, no country published national accounts data even when economists were tinkering with the concepts. This would, however, soon change. A non Anglo-Saxon example: between 1939 and 1941 Jan Derksen published as an employee of the Dutch Centraal Bureau voor de Statistiek (CBS) and no doubt inspired by Jan Tinbergen, a whole string of national account studies for the Netherlands which tackled conceptual and measurement questions (CBS 1939; Derksen 1940, 1941). After the war he would go on to become the head of the national accounts division of the United Nations, coordinating the international discussion about what should be measured and what shouldn’t. The already mentioned literature in Bowley (1942) is arranged by country, which abundantly shows the international character of developments in national accounting and the many persons influencing this development. The point was that ‘the economy’ was defined not just by a limited number of well-known Anglo-Saxon economists but also by an international group of economist-statisticians who defined but also discovered the transactional macro-economy. It were these statisticians who added rigor, coherence and precision to the concepts and definitions and Keynes could clarify his concepts only after grappling with these statistics. It has to be noted that these statisticians and economists often were no students of neoclassical economists like Marshall but of institutional economists like Veblen and Mitchell (Kuznets got a training as an institutional economists at the Institute of Commerce in Kharkiv, Ukraine). And the most prominent (neo)classical educated economist playing a decisive role in establishing the (measurement) of the national, Keynes himself, put ample emphasis on the time and trouble it took him to get rid of old ideas. As a consequence of such actions and consistent with ideas of those like Samuelson (1954), which were very widely accepted, separate accounts for the government were established. Also, concepts like government consumption (i.e. consumption of individual households of government produced goods or services like education) and AIC were developed. It was a clean sweep. The government produces value, however conceptualized and measured and was included in the production and consumption boundary which were increasingly measured by specialized institutes. Even neoclassical models of the government became more explicit and rigorous. But for one exception. The DSGE models for whatever reason and without discussion purged the idea of a productive government from the models and stuck to the ideas and methods of what Samuelson called ‘traditional economics’. The government was excluded or at least the idea that the government was any good was denounced. Even if several authors showed that government production can be included as a positive. Excluding the government was, and is, a conscious choice. So, the macroeconomic production and consumption boundary changed. On the side of measurement it became much clearer and precise. On the side of theory the government was also was increasingly included in the neoclassical models. Until the rise of DSGE models after around 1970. A major regression.

At this point it is necessary is necessary to dwell on the nature of the logic of the national accounts which, unlike the logic of the periodic table, evolves over
time as economies evolve over time. These accounts are, despite a multitude of imputed posts, deeply rooted in the monetary nature of our economy. This monetary nature of the economy does not only consist of monetary prices but also and by accounting necessity of the social nature of transactions and flows of income and spending, which enables aggregation. This leads to the possibility to classify and measure household income, consumer credit provided by banks, investment expenditure of manufacturing or agricultural production. Monetary transactions – the ‘money economy’ of Wesley Mitchell – are by their very nature eminently and immensely measurable and show, when aptly classified, relations between sectors. The whole point of an individual price is its public and sticky nature. In a market the seller and the buyer both need to know the fixed money price, quality (including delivery conditions and transport) and quantity of a transactions (or at least the procedure how these are decided) ex-ante. In the case of taxes, which are more one-sided than market transactions, the way taxes are set also has to be known in advance. Any transaction enters into at least two sets of sometimes informal but more often formal accounts; the account of the seller and the account of the buyer and, in case of income taxes and VAT, also into the accounts of the government. Three sets of accounts measuring one transaction! In the case of companies, the value of sales is of course decisive for the ability to pay contractual factor incomes and purchased inputs. Bos (2003) shows that there are in fact eight accounts which, on the aggregate level, have to match. And although delineating sub-sectors like ‘transport’, ‘construction’, ‘education’ or ‘agriculture’ is not always as easy as boundaries shift over time it is possible to do this. The same holds a fortiori for the sectors – households, companies, non-profits, financial institutions and the government – and economic categories (wages, profits, interest, rent). These change over time but surely stay recognizable in the short, medium and often also in the long term. Economic actors are interconnected by the flows and stocks of incomes and sales denominated in the unit of account: like wages, profits, interest, sales, credit, debts. The ‘empirical discipline’ of measuring this economy forced economists to think more deeply about this economy than they had ever done before – the issue of actual individual consumption which raises its head once international or historical comparisons of household consumption are made being only one example. Also, all the actors had to be included in the model. Leaving out criminal organizations would yield, by accounting necessity, a black hole in the system. This transaction based logic of the measurements has been pivotal to the development of the national accounts and even more so to the flow of funds and has its implication for scientific economic theory. As Haavelmo stated:

The practical conclusion of the discussion above is advice that economists hardly ever fail to give but that few actually follow . . . that one should study very carefully the actual series considered and the circumstances under which they were produced before identifying them with the variables of a particular theoretical model.

(Haavelmo 1944, p. 7)
In national accounting, the economists actually did this, which led to the modern NA/FOF data which do not only allow an analysis of the Irish bubble but which the basis for physical as well as monetary input output tables which enable economists to analyze how final demand is related to sectoral production of, say, CO₂. Or to measure the labor share of income. Sound measurement: a mayor feat of the science of economics, enabled by the social and immensely measurable nature of monetary transactions.

1.7 Hey, national accounts are political accounts

Many of the choices made by modelers and statisticians are influenced by values. Most obviously: the national accounts are called ‘national’ for a reason. The nation is preponderant even when recent developments in financial technology and international value chains start to make this choice more burdensome. In this process, social strive played and plays a role. A recent example of the issues at stake: Cravino, Lan and Levchenko (2018) show, using the consumption basket used to estimate consumer price inflation and looking at different incomes, that consumption of middle incomes deviates from the average in a way that makes them more vulnerable for increases or decreases in interest rates than other consumers. In such a situation, not using the consumer price index but for instance a broader index also comprising interest will affect different income groups in a different way. Stapleford (2009) analyses the battles between, among other actors, the government, unions and companies about the concept of the ‘consumer price index / cost of living index’ in the USA. He relates the very existence of the consumer price index to the wish to shift class struggle about the purchasing power of wages from companies and organizations to the more ‘civilized’ realms of statistical offices and official indexation clauses, which is not surprising. The accounts are used for the management of national economies. Keynes (1940) is the primeval example. Which means that they are permeated from their design to their publication by political considerations. This is not the same thing as stating that they are just a dreamed up description of the ideal state. The boundaries between sectors like construction and agriculture have not just been drawn for political and ideological reasons but also because of practical as well as technological and economic reasons. The same holds for the separation between the sector households and the business sector or, to an extent, for a variable like Gross Domestic Product (GDP) (Office of National Statistics 2018) or the consumer price index. Delineating ‘households’ instead of churches or dormitories as a sector is a choice. But households can be delineated: they are not just a statistical artifact. The latest version of the national accounts emphasizes ‘ownership’ however more than previous versions, which, as we will see, can lead to fundamentally different estimates of ‘the economy’. Choices have to be made. The data can only be understood against the background of these choices. And the choices will have a political element. But: other choices could have been made. In the 15th century, there would have been sound economic reasons to delineate ‘The Church’ as a separate sector, while nowadays central banks, which in the 15th
century did not exist and which would not come into existence for centuries to come, are the only companies with and own sub-sectoral delineation – economies evolve. The accounts have to evolve with them. The fact that ‘national’ accounts become increasingly troublesome because of international flows of income and ownership shows that even the system of nations evolves. The Irish accounts have in fact already be adapted to the unusual large income and ownership flows into and out of this island economy. But even that is in the end a political decision, even if made by the statisticians.

1.8 Overarching integration: the modern flow of funds/national accounts

The flow of funds are less well known than the national accounts which means that a short introduction might help the reader. They are not designed to estimate the ‘non-financial’ flows like income, production and expenditure but to estimate flows of lending and borrowing in combination as well as to estimate stocks of financial liabilities and assets. They are of relatively recent origin. In 1944 the NBER (headed by Wesley Mitchell) assigned Morris Copeland with the task to develop, together with the Fed (the central bank of the USA), a financial corollary to the rapidly evolving national accounts:

About the circuit flow of payments and its relation to national income and output, our knowledge is exceedingly vague. We do know, however, that the flow of payments does not adjust itself automatically to the flow of goods men are able to produce and need to consume. Indeed, several theorists have argued that cyclical fluctuations in business activity are due primarily to recurring changes in the relative size of these two flows. The findings this investigation promise should put us in a far better position to diagnose our recurrent chills and fevers, and to: seek remedies.

(Mitchell 1945, pp. 61–62)

Copeland successfully accomplished the task, and only about a decade after Mitchell’s statement was made central banks all over the world started to estimate monetary statistics with the FOF as the overarching framework. The agenda set out by Mitchell still is the agenda of the flow of funds, as shown by a recent quote of the Office for National Statistics (ONS) in the UK which, even when less eloquent, conveys the same message as the Mitchell quote above:

An understanding of the economic performance of the UK is especially important for effective policymaking and improving welfare. The non-financial accounts have long been extensively monitored as a health check for the economy, but they do not fully capture the build-up of financial risk. For instance, changes to the underlying resilience of the UK’s source of funding can impact the economy in a way that is not obvious from studying fluctuations in income
or output. . . We have partnered with the Bank of England to address this, by enhancing the coverage, quality and granularity of financial accounts statistics for the UK.

(Office of National Statistics 2018)

An example of how these accounts are used can be found in the monthly monetary press releases of the ECB. These show the creation of money as a function of sectoral growth of credit: how much money is lent by the banks, how much is borrowed by households, non-financial companies, the government of financial companies as well as how much of this money ends up ‘abroad’. The credit data shown in Figure 1.1 are part of these statistics on the national level: the money borrowed by Irish construction companies from money creating banks or, as they are called in the accounts, ‘Monetary Financial Institutions’ (MFIs) adds to money growth in the Eurozone. This is however not just about the flow of credit to Irish construction companies and the ‘GDP economy’. An example are data on balance sheet of banks. Mortgages have become by far the largest asset on the balance sheet of the consolidated banking sector and quite often also by far the largest debt on the balance sheet of households. As sales of existing houses do not add to the flow of new goods and services (aside from fees for real estate brokers and the like) and are hence not included in the national accounts, even when they are central to vulnerabilities and might readily lead to economic ‘chills and fevers’, as also argued by the ONS (2018). Interestingly, estimating the flow of funds forces the statistician to use a quite broad concept of money. Many transactions, especially between businesses, are initially financed by payables/receivables, not by commercial credit or direct payments. These payables/receivables are promises to pay with legal tender or deposit money and are a legal way to buy something: a change in ownership takes place. They are a means of exchange. They are also an asset, as they are a classical item on company balance sheets and hence a store of value. The flow of funds by necessity treats these promises to pay as money, which shows that the FOF are not just about money as we pay it but also about other money-like items like payables and receivables or long-term savings and a host of other financial instruments. Another example: when entities like shadow banks are not included in the FOF, ‘black holes’ will appear. In fact, the whole apparatus to measure credit bubbles is available, while the statements of Mitchell in 1944 as well as the more recent statements of the ONS indicate that measuring such bubbles is a prime goal of the FOF. Unfortunately, there still are no official bubble measurements (see however Borio 2012).

The modern national accounts have at present incorporated large parts of the flow of funds, which has quite some consequences for economics 101, whose textbooks state that

\[ \text{Income} = \text{Expenditure} \];

modern national accounts to the contrary state that;

\[ \text{Income plus net credit} = \text{Expenditure of goods and services plus net acquisition of real and financial assets} \].
These assets include changes in cash and deposits which clearly shows that if people save more money and channel this to savings accounts expenditure on goods and services has to fall, unless net debt increases. Analyses using this framework are for instance Keen (2016) and Ryan-Collins, Werner and Castle (2017). But it has to be stressed that it is included in the basic framework of the modern national accounts and also wealth inequality statistics as these, recently, have been added to the flow of funds by the US Federal Reserve (Batty et al. 2019). This all leads to the next general comparison of the models and the measurements.

1.9 An overview of the key differences between DSGE macro-models and macro-measurements

Summarizing the discussion, the main differences can be stated as follows:

<table>
<thead>
<tr>
<th>National Accounts/Flow of Funds</th>
<th>DSGE models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic model</td>
<td>One, two or three representative households which optimize social utility by making a choice between labor, consumption and investments now and in the future.</td>
</tr>
<tr>
<td>Production/consumption/income boundary</td>
<td>Market production minus production of banks minus public goods and services minus durable consumer goods. Non money-creating banks are increasingly incorporated into the models. Consumption is taken to be the psychological value of purchasing of goods and services. If convenient, it is defined as the use of goods. Production of NPISH is neglected. Some models incorporate government production, some incorporate banks, some incorporate consumer durables. I do not know models which do all of this</td>
</tr>
<tr>
<td>The circular flow of various monetary streams of incomes, expenditures and productions, powered by myriads of monetary transactions made by millions of households and businesses as well as by the government.</td>
<td></td>
</tr>
<tr>
<td>All monetary production of new goods and services, including non-market government production and production by ‘NPISH’ (churches, unions, sports clubs etc.) and including money yielding criminal activities. There are some imputations, however, the most important being one for the assumed value of rent of owner occupied houses. Another, ‘FISIM’, is not discussed here</td>
<td></td>
</tr>
</tbody>
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(Continued)
### Table 1.1 (Continued)

<table>
<thead>
<tr>
<th>National Accounts/Flow of Funds</th>
<th>DSGE models</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Are variables well defined?</strong></td>
<td>The national accounts and the flow of funds data and labor statistics have internationally recognized official compendia which extensively and intensively conceptualize and define the variables.</td>
</tr>
<tr>
<td><strong>Relation to welfare or prosperity</strong></td>
<td>The model is expenditure oriented and has no direct relation to individual prosperity. The ‘volume’ of total production can be calculated (real GDP) and is often taken to be a metric of the level and growth of prosperity, partly for its own sake and partly because it is often closely related to (un)employment. The composition of production and consumption is also measured but not used to indicate prosperity.</td>
</tr>
<tr>
<td><strong>Relation to economic ‘schools’</strong></td>
<td>Partly classical (the definition of capital including non-produced capital), partly (old)-Keynesian and old-institutional. Examples are the emphasis on total monetary expenditure, sub-sectoral divisions; the possibility of involuntary unemployment, the inclusion of NPISH, the treatment of the government and the pervasive role of lending and credit. Some imputations however have a clear neoclassical character.</td>
</tr>
<tr>
<td><strong>Market clearing required?</strong></td>
<td>No. Profits/losses and changes in income related to involuntary unemployment as well as changes in stocks and the current account are crucial balancing items in the accounts.</td>
</tr>
<tr>
<td><strong>Nature of the goods and services</strong></td>
<td>Heterogeneous and historical. Qualities and quantities and relative prices change over time which leads to a changing sectoral structure of the economy.</td>
</tr>
<tr>
<td><strong>National Accounts/Flow of Funds</strong></td>
<td><strong>DSGE models</strong></td>
</tr>
<tr>
<td>------------------------------------</td>
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</tr>
<tr>
<td><strong>Basic coordination principles</strong></td>
<td>Markets, the governments, NPISH and household transactions, future transactions only when based upon explicit or implicit legal contracts. No <em>ex ante</em> market clearing required. Prices contain a rent element and can change the distribution of wealth and income in a non Pareto efficient way.</td>
</tr>
<tr>
<td><strong>Structure of production</strong></td>
<td>Detailed sectoral and subsectoral subdivisions including of financial companies, government production and NPISH</td>
</tr>
<tr>
<td><strong>Basic actors</strong></td>
<td>Households, firms, government, external sector, financial institutions</td>
</tr>
<tr>
<td><strong>Basic method of estimation</strong></td>
<td>Aggregation of micro-data, continuous source criticism. Care is taken to make historically and internationally consistent estimates. Especially new products and changing relative prices make this complicated.</td>
</tr>
<tr>
<td><strong>Linkages to other models</strong></td>
<td>Labor market accounts, flow of funds, input-output models, environmental accounts (like relation of CO2 production to the structure of production and final demand).</td>
</tr>
<tr>
<td><strong>Nature of money</strong></td>
<td>Credit originates monies and money like assets. Credit (including trade credits) are originated via transactions between often private agents; credit and lending enables ex-post accounting identities to be ‘true’, even without market clearing.</td>
</tr>
</tbody>
</table>
1.10 Mitchell-style business cycle indicators, the accounts and DSGE models

In 1947 Tjalling Koopmans published a famous article titled ‘Measurement without Theory’ (Koopmans 1947). In economic discussions this article is often understood to be a criticism of the national accounts. It isn’t. It criticizes a book written by Arthur Burns and (again) Wesley Mitchell, Measuring Business Cycles (Burns and Mitchell 1946, also Mitchell 1913, 1927). This book described how monthly data on heterogeneous individual economic variables can be combined into a synthetic variable to measure business cycles, using cycles instead of quarters or years as the central measuring unit. It kind of precedes present day VAR and especially principal components analysis (see Andrle, Brůha and Solmaz 2017). It can be understood as another kind of macroeconomics, less occupied with the level of output, sectoral production, sectoral distribution and accounting relations and more with cyclical swings and the empirical propagation of financial and other shocks. Important is the distinction between leading, coincident and lagging indicators. Some variables tend to lead business cycles, some tend to lag. These business cycle series were often based upon monthly sub-series. Since, quarterly accounts have been developed, which has diminished the difference between the two approaches as this enhanced the possibilities to use national accounts data for business cycle analysis. At the other side, the business cycle analysts developed indices of leading, coincident and lagging indicators as well as indicators used to measure economic sentiment which eases the accounting identities inherent in the national account and the flow of funds. The development of business cycle analysis is still closely associated with the National Bureau of Economic Research and methods are used by statistical institutes the world over, one example being the grey bars in the famous ‘FRED’ graphs, indicating the lengths of downturns. Figure 1.2 shows that the cyclical indicators neatly coincide with declines in GDP – but do not capture the growth – the change in level – of GDP. Neither do they capture relations between sectors of the slow build-up of financial vulnerabilities. On the other hand, the national accounts data neatly show the volatility of investment as compared with consumer and government spending. We will come back to this.

But first it is worthwhile to look at the complexity of the data in figure 1.2. Nominal data are gathered, using an extensive network of contacts and based upon explicit laws. Subsequently they are aggregated using the delineations and interrelations of the NA. Next, these aggregated data are deflated using a deflator which estimated in a comparable way. The resulting data are seasonally adjusted and changed into a seasonally adjusted annual rate of growth by multiplying them by four. Second, the role of business cycle indicators in DSGE models is more important than often understood. Lucas, one of the founding fathers of DSGE modelling, was explicit about his endeavor to explain these fluctuations (the grey bars) using a general equilibrium framework and a ‘micro-founded’ methodology while he did (at this time) not try to explain the level or even the movement of GDP or to use information about the interconnectedness of...
sectors (Lucas 1977), which means that the theme of this book – comparing the concepts of DSGE variables with the variables of the national accounts – might be perceived as somewhat dishonest: the DSGE project did not start out to explain national accounts and flow of funds developments in the first place. The recent models however do use the national accounts terminology (consumption, investment etc.) and the authors of the models often calibrate the models using national accounts variables as well as, in the background, the national accounts identities that production is equal to the different kinds of expenditure. But in the beginning Lucas focused on another item: business cycles as identified by Wesley Mitchell. Though not all of the variables included in these cycles. It is, at prima vista, not clear why he left employment and involuntary unemployment – key variables of Keynesian theory and macro-measurement – out of his description of the stylized facts of the ‘Mitchell’ cycles. He also only focused on the minor cycles as identified by Friedman and Schwartz (who used an explicit Mitchellian framework as shown by Rockoff 2006) and left the mayor cycles identified by these authors and at present better known as financial cycles outside of his scope. The 2008 crisis did not fit the DSGE research agenda for a reason, DSGE models were not meant to explain or encompass such events. But only to explain smaller

Graph 1.2 Real private consumption, real private investment and real government consumption plus investment, USA: year on year change (%) by quarter, chained 2012 USD, seasonally adjusted annual rate

Source: U.S. Bureau of Economic Analysis, retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed, GCEC1, GDPIC1 and LB0000031Q020SBEA, accessed 12 May 2019
up and downturns. On the other hand, the graph does show that Mitchellian business cycle indicators do correlate with the national accounts data on, for instance, private investment even when these have been thoroughly deflated, seasonally adjusted and changed into growth rates. In Chapter 7, we will return to the deflation procedures used.

1.11 The conceptual model of the book (1): five interrelated phases of development of a macro-statistical variable

One of the elements which in a loose way will structure the next chapters of this book are the phases of development of a statistical variable. These phases are not applied in a rigorous way but will pop up in every chapter. Frits Bos (2003) distinguishes, when analyzing the development process of economic statistics, four interrelated phases with many forward and backward linkages. All these phases are necessary (albeit not always in a hierarchical way) to enable measurement of an (economic) variable. Here, a fifth one will be added.

The first phase: conceptualization. This is a rather philosophical phase which, when restricting ourselves to consumption, functions to answer the question ‘what is consumption anyway?’ An example from the ESA 2010, lemma 3.93:

*Two concepts of final consumption are used:*

(a) final consumption expenditure;
(b) actual final consumption.

*Final consumption expenditure is expenditure on goods and services used by households, NPISHs (Non Profit Institutions Serving Households, MK) and government to satisfy individual and collective needs. In contrast, actual final consumption refers to its acquisition of consumption goods and services. The difference between these concepts lies in the treatment of certain goods and services financed by the government or NPISHs but supplied to households as social transfers in kind.*

Note, again, the importance of government goods and services but also the fact that not all consumption has to be purchased by households. Even then, it is about the acquisition of goods and services, not about their actual use.

The second phase: definitions. A shorter, more practical summary of the concept with often clearer delineations:

An example from the ESA 2010, lemma 3.94:

‘final consumption expenditure consists of expenditure incurred by resident institutional units on goods or services that are used for the direct satisfaction of individual needs or wants or the collective needs of members of the community’. Note that, in an implicit way (the ‘resident institutional units’ mentioned) national
boundaries are introduced which, also in an implicit way (but treated in an explicit way in another part of the ESA 2010) means that expenditure of tourists, who are not residents of a country, is counted as an expenditure of the home country of the tourists and hence as an export of the destination country.

**The third phase: operationalization.** Questions like which period, which sources, which products, which method (surveys or administrative date of both), which populations, will be answered.

The ESA 2010 advises yearly as well as quarterly measurements and advises when estimating sales use (unlike in the case of unemployment) to rely on business but not consumer surveys as well as, for practical as well as methodological reasons, administrative data like VAT. It provides an exhaustive list of goods and services which ought to be measured, most visible in the list of items included in the ‘basket’ on which the consumer price index is based. The difference between using variable cycles as the prime temporary variable of estimating frameworks or calendar variables is another example.

**The fourth phase: measurement.** Gathering as well as processing the data:

Gathering the data is quite a job which requires a lot of people and, hence, a lot of money. It’s the economic equivalent of the Large Hadron Collider. After data gathering, the information has to be processed. Processing often requires a lot of tacit knowledge as well as a plethora of micro-decisions, for instance in the case of quality changes of products, of new products or old beer in new bottles (which, for instance when going from 500 milliliters to a pint, will be smaller than the old ones).

In this book, we will add a fifth element:  
**Presentation and publication.**

As is clear, statistical variables are conceptualized in a precise way while the results of the measurements are often published by statistical institutes in press releases but also in data bases. Importantly, the academic world of the theoreticians literally requires one to ‘make a name’ while the publications mentioned and even the manuals are often anonymous proceedings.

These five phases will not be used in a systematic way to structure the book but they will be the background of the discussion as the rift between the statistics and models concerns all these phases.

1.12 The conceptual model of the book (2): cases

Not all economists are well-versed in tacit statistics, defined here as the discussions surrounding measurement of variables and the aggregating of micro-results.
Introduction

To show the importance of this kind of work as well as to enable a deeper understanding of the theory behind measurement, each chapter will contain an example of an application of concepts and definitions or of aggregation methods to sets of data to show that the simple application of these methods can lead to surprising interpretations of existing information. But this is not about these surprising interpretations as such. It’s about the power of the concepts: are the able to enlighten us, or do they just obfuscate?

1.13 The conceptual model of the book (3):
meta-formulas

The book contains chapters on the monetary nature of transactions, money and debt, labor and unemployment, land and capital, consumption (including government consumption), investment (including government investment) and household purchases of cars, (un)real production as well as ULC, RULC and NULC. Chapters on the interest rate and imports could have been added. The interest rate is however covered in a way highly consistent with this book in Borio, Disyatat and Rungcharoenkitkul (2019). Leaving imports, exports and international financial flows out is an omission. But: why the other chapters?

Economists use a few ‘meta-formulas’ which structure economic discourse. The same holds for macroeconomic statistics. These formulas are used to organize the chapters of the book. One famous meta-formula is:

(i) \[ Y = f(\text{capital, labor}) \] or \[ Y = f(K, L) \]

Meaning that production is produced by capital and labor. This leads us to chapters about capital (chapter 5) and labor (chapter 4). We will however, in line with the statistics and consistent with classical economics, also add ‘land’ or ‘unproduced assets’ like natural resources as well as ‘legal’ assets like patents to definition of Capital. These are distinct categories in the national account statistics. Also, Land gained renewed significance as a crucial economic variable after 2008. Another point: capital is estimated by statisticians not as a volume of machinery or ‘intangible assets’ but as the value of ‘rights to nominal income’ connected to ownership of these items, production costs of these items or (re)sale value, capital cannot be used to explain production. For one thing, this value of nominal production is often decisively influenced by the development of relative prices, including the interest rate, and not just by productivity. Capital can however be used to explain the distribution of nominal income and wealth. As total production and total income are equal it is possible to replace the Y in the first formula with “Income” (I) and to look at income related to capital. Looking at it from the income side also means that, in the case of labor, we won’t only look at the labor force but also at unemployment. If we do this while also adding Natural Resources (NR) as a distinct category of capital formula (i) changes. We should also add the utilization rate of fixed capital as well as the utilization rate of natural resources to get at a non-neoclassical formula ‘r’ stands for average rent; ‘i’
stands for the rate of return on capital; and ‘w’ stands for the average wage rate:

(ii) \[ Y = I = (ru_1NR + wu_2L + iu_3K) \]

With \( r \) for rent, \( u_1 \) for the utilization rate of natural resources, \( u_2 \) for the utilization rate of labor, \( u_r \) for the utilization rate of fixed capital, \( w \) for the wage rate and \( i \) for the average return on utilized fixed. Consistency with the national accounts would however warrant a distinct category for legal unproduced capital like patents, production rights and bandwidth. In this book, attention will be paid not just to labor but also to unemployment and not just to produced capital but also to ‘land’. Another meta-formula is:

(iii) \[ Y = C + I + O + (Ex – Im) \]

This, however, is the textbook version. In this book we will follow the national accounts and use the credit enhanced formula:

(iv) \[ \{ Y + \text{net credit} \} = \{ C + I + O + (Ex – Im) \} + \text{net acquisition of financial assets} \]

In this formula, \( C \) is private consumption (chapter 6), \( I \) is private investment (chapter 7), \( O \) is government investment and government consumption (i.e. education, the juridical system and the like; chapters 7 and 6), \( Ex \) is exports and \( Im \) is imports. As stated, Exports and Imports will be left out of the book but we have to add ‘net credit’ to these categories, as statisticians state that expenditure is financed by income plus net credit and spent on goods and services on one hand and financial assets (including increases in amounts of deposit money or cash), as well as on existing fixed assets on the other hand. Specific chapters on financial assets are absent but they do play a role in the description of consumption and investment. Exports and imports will however be excluded from this book. Money will be discussed against the background of the credit formula the ECB (and all other central banks) use to estimate M3-money. The money meta-formula will be treated in more detail the chapter about money (chapter 2). Aside of these variables, attention will be paid to the way statisticians calculate ‘real’ variables (i.e. variables expressed in fixed prices), the price level, the difference between real variables and physical volumes (chapter 8). We will, however, start with a chapter not about specific variables but about the nature of a monetary economy (chapter 2).

Notes

1 See, for well-crafted and still valid criticisms of this concept, Veblen (1898, 1899a, 1899b, 1900, 1909). When reading consumer behavior text books it is striking how much these are in line with what Veblen considered sound economic science.

2 DSGE models as a rule also exclude purchases of durable consumption goods. In his chapter two Petty states that these are a kind of capital goods and add to the wealth of a nation (ditto Marshall). They are included in the US flow of funds.

3 As stated by the website economicshelp: ‘We can try to measure utility by using a hypothetical unit of measurement’ (Economicshelp 2019). Trying to measure anything with a hypothetical unit of measurement won’t bring you anywhere. The nature of units of measurement is that they are not hypothetical but well specified.
1 The balance sheet of Microsoft shows an increase of around USD$50 billion for short-term debts (assets) as well as capitalized leases (liabilities) for these years.

2 It is noteworthy that postal companies earn a seigniorage income on the emission of stamps: the interest earned on money paid for stamps not yet used as well as the profit on stamps forgotten somewhere in your drawer or bought by collectors (on private seigniorage: Knibbe 2015 and (more radical) Bossone and Costa 2018).

3 Reading (von) Hayek as well as Ludwig (von) Mises I always get the impression that they wanted to restore the pre-war social and monetary order of the Austria-Hungary which enabled the upward mobility of their lesser-gentry families. See also Slobodian (2018).

4 Theoretically this story is consistent with Murray and Markley-Towler (2019) especially of the consistent strategy of factories to expand production to cut costs and to produce at the minimum cost level even when they do not cover changes in product specifications as part of the evolvement of the pricing system. See also De Haas and Knibbe (1993).

5 At the 2017 Leuven rural history conference three of the four presenters of the

6 The most remarkable feat was the eradication of bovine tuberculosis by the members of the cooperative dairy factory in Kimswerd in 1900/1901. The members obliged themselves and new members to sell all cows tested positive for tuberculosis – at a time when the contagious nature of it was still contested. At this time, tuberculin had only recently hit the market while using the services of professional veterinarians was also not completely common.

7 In 1927 the cooperative factories in Friesland (who worked together when it came to this) used a formula to calculate the price of milk, to understand the formula it is necessary to know that the milk was used to make butter as well as hard cheese while butter contained 15 percent of water while hard cheeses lost 14.5 percent of their weight during the ageing process:

In the case of cheese with 20 percent fat per 100 kg of milk:

\[
\text{butter value of milk} = (\text{fat in fresh milk} - 0.88 \times \text{fat in cheese milk}) \times 1.15 \times \text{price of butter}.
\]

\[
\text{cheese value of milk} = 0.855 \times \text{production of cheese} \times \text{price of cheese production costs} = 1.6 \text{ cents per 100 kg} - \text{price per 100 kg of milk (A + B - 1.6)}
\]

This means that the price of milk is tied to technological aspects of the products (as opposed to consumer preferences), market prices and factory costs, which means that, contrary to the vision of Hayek, these prices do contain explicit information and are not just quantities which obtain informational content only in relation to the company of the producer.

8 According to the 1919 annual report of the Lijempf dairy company of the graph:

Echter niet alleen het productievraagstuk baarde ons dit jaar zorgen ook de loonwinstes en arbeidersbewegingen vroegen veel van onze krachten en hoewel wij in deze zware tijden de exploitatiekosten graag zou min mogelijk wilden opvoeren aan den anderen kant moeten wij toch ook met onzen tijd meegaan en hebben getracht in dezen zoo veel mogelijk den gulden middenweg te bewandelen. Achterige werkdag en vrije Zaterdagmiddag werden door ons ingevoerd en werd er tevens een vaste pensioenregeling aan onze zaak verbonden. (Short translation: we have to swim with the tide and introduced an eight hour working day and a free Saturday afternoon while also introducing worker pensions.)
9 The depletion of national resources is also discussed: ‘No systematic deduction from the National Income is made in our estimates to cover depletion of natural resources. Doubtless this item is of considerable size as well as of peculiar interest’.

1 While deposits can’t disappear other than by being used to pay down MFI debt the debts which led to their creation can disappear, for instance in the case of bankruptcy.

2 Divisia indices are not the only attempt to reintroduce money in neoclassical models. For the record: other economists try to tweak the definitions of money (Cynamon, Dutkowsky and Jones 2006; Lucas and Nicolini 2015), the gist of these ideas is comparable to ECB (2012a) as they try to adapt the definition of the M2 and M3 aggregates to institutional developments.

3 The article ties the ‘real’ interest rate to the rate of population growth and even suggests the possibility of negative rates. At present, 60 years later, such ideas are the talk of the town. Stunning.

4 This does not always show in gross flows. But as business loans and consumer credit loans often have a much shorter shelf life than mortgages net flows are dominated by mortgages.

1 Actually, Friesian butter traders buying butter from farmers on the butter market in the beginning of the 19th century kept their ‘shop’ open longer than usual on low price days as they knew that farmers had to go home again and at a certain point had to accept bargain prices. On high price days, the market of course closed early as soon as everything was sold. Just the opposite of what Lucas states.

2 The phrase ‘neoclassical’ is included in the title of one of the articles used, calling it the neoclassical view is hence right.

3 The war effort started earlier and was in full swing in 1941. The overheating was however only characteristic for 1942–1944 and a part of 1945.

4 In Cole and Ohanian (1999) the text as well as the literature states that Keynes’ General Theory appeared in 1935, not 1936. This must have been missed by them as well as by reviewers.

1 A quick scan of websites on which second hand agricultural machines are sold showed that the often the amount of ‘machine hours’ or ‘hectares harvested’ were mentioned.

2 The ‘7.26’ is a lemma of the ESA 2010 manual.

3 As the national accounts basically define fixed assets as a factor of distribution it seems right to me to include production permits and the like into the concept. R&D is however a ‘sunk cost’ as well as, in business accounts, not treated as an investment. It might yield patents which can be included in our concept of capital. But R&D itself should be excluded even when it yields an array of small but significant improvements in quality or productivity.

4 These problems might also be understood as basic characteristics of the dynamism of our economy, which to me seems a more fruitful way to think about them. A good example of the insights an analysis of these developments yields: Lafrance 2016.

5 Consumer durables do have a second hand value and can be included, as happens in the USA flow of funds statistics.

6 He introduced or at least used the idea of the representative consumer to be able to disregard the distributional consequences of unequal ownership of wealth.

7 The concept of ‘land’ sometimes leads to confusion. It relates to ‘unimproved’ land and is the ‘location, location, location’ value of real estate or the value of real estate without the value of the building
Classical economists, including Marx and Mises (in his PhD thesis), used an economic definition of classes. Your economic position (laborer, capital owner) and not for instance your education, profession and income define your class.

Heparin is a chemical that prevents blood from clotting in the case of for instance dialysis. It’s extremely expensive and extracted from the ‘mucus’ which lines intestines. Extracting the mucus from the intestines still is manual work. Heparin saves lives. There are issues. Intestines of pigs as well as cattle are used, which makes for problems with it being halal/kosher and the Hindu equivalent of this.

See Sekera 2016, for a criticism of the rational, neoclassical nature of Samuelson’s consumer of public goods.

Samuelson was well aware that including public consumption into neoclassical economics also required a widening of the scope of transactions beyond market transactions, considering the last sentence of his 1954 article: ‘Political economy [i.e. market oriented neoclassical economics, M.K.] can be regarded as one special sector of this general domain [i.e. all transactions, M.K.], and it may turn out to be pure luck that within the general domain there happened to be a subsector with the “simple” properties of traditional economics’.

Coastal societies surviving winters on dried salmon or cod or farming societies with large amounts of animals fed with hay did have quite a stock of capital in the physical sense and, in the case of hay, often also the monetary sense. As our basic unit in this book is the year and not the season investments in such seasonal stocks do not count.

On a net basis the accounting identity $S = I$ of course holds when it comes to investment. On a Gross basis, large changes in balance sheets may accompany the events which by necessity make this identity true ex post. In Spain, during the pre-2008 building boom, the accounting identity was true. More means were devoted to investment which meant that the net savings rate increased. However, other kinds of spending were financed with foreign loans which, when a ‘sudden refinancing stop’ occurred, lead to banking trouble: the banks had to pay back their short term loans but could not obtain the money from the people borrowing from banks as these loans were long term. Unemployment went from 7 to 25 percent. All the while, $S = I$ was true.

Maddison continuously revised and extended his data (Maddison 1992, 1994).

The index number of federal fixed assets (1996 = 100) increased from 11 in 1939 to 17 in 1941, 34 in 1942 and 76 in 1944. In 1946 a decrease started which lasted till 1951, when an inexorable rise started which accelerated after 1985 and tapered off after 1991. The post 1939, 1951 and 1985 rise were largely due to increased military spending. It is challenging to compare 1960 interstates with 2000 yet fighters, but the pattern of increase and decrease probably shows a genuine development (Nn1 2001, table 2).

A ‘line estimate’ is a better description of an index of real output or purchases or income than a ‘volume estimate’.

Literature


CBS (1939). ‘Enkele berekeningen over het nationale inkomen van Nederland’. Speciale Onderzoekingen van de Nederlandse conjunctuur no. 2.


Kay, J. (4 November 2014). ‘Nathaniel Mayer Rothschild. The second richest man of all time was poorer than us’. www.ft.com/content/2d1bb8ca-6412-11e4-bac8-00144feacbd0


Bowens, L. (2016). ‘Double trouble? How closely related are Britain’s ‘twin’ deficits and should we be concerned?’ https://bankunderground.co.uk/tag/flow-of-funds/


Tily, G. (2016). ‘UK real wages decline of over 10% is the most severe in the OECD (equal to Greece)’. Blogpost at TUC, 27 July 2016. www.tuc.org.uk/blogs/uk-real-wages-decline-over-10-most-severe-oecd-equal-greece


CBS (1947). ‘Uitkomsten van enige berekeningen betreffende het nationale vermogen van Nederland in 1938’. *Statistische en econometrische onderzoeken no. 3*.


