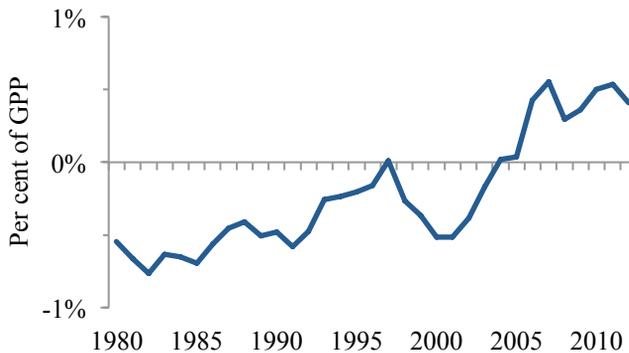


1. Introduction: It is the Only One We Have

This is definitely not a mainstream macroeconomics textbook. *Earth Economics* studies the economy of our planet from the perspective of an autarkic system (a ‘closed economy’). Macroeconomics is essentially national in orientation as it deals with national policies (admittedly often in an international context). Eartheconomics focuses on the global level. It does so by ignoring the constituent national and regional parts of the planet economy and thus we will focus on policy making that increases global rather than national welfare. Indeed, eartheconomics is a subject on its own. Economists analyse world issues by aggregating nations into regions and regions into even larger entities. Starting at a low level of aggregation (the nation state), they expect to arrive at the top (the world economy), but it is more probable that they actually lose sight of the whole.



Source: IMF World Economic Outlook April 2012 Database

Figure 1.1 Aggregate of all national current accounts according to IMF

Figure 1.1 illustrates the error of aggregation by means of the total of the current accounts of all nations. The current account measures the external financial flows (international payments and receipts) of a country and since a

payment of one country is always a receipt for another country, the sum of those flows should be zero. Figure 1.1 shows that this logical condition is not met in the major analytical database of the International Monetary Fund. It is clear that before 2005 the national data collectively must have overestimated the payments of countries (as the total of all national current accounts is negative) or, what amounts to the same, underestimated receipts. Since 2005 the total of all current accounts is positive and the national current accounts therefore must on average overestimate the net receipts (that is: receipts minus payments) of the countries of the world. Figure 1.1 therefore clearly shows that the underlying national and regional data in the IMF's flagship publication, the *World Economic Outlook* must be wrong on average and that the direction of error differs between the pre-crisis period and the period of the Great Recession. By implication the analyses built on these data must be biased. Incidentally, this is the last time that we will take a look at the global current account: eartheconomics is based on the recognition that Earth's current account should be zero until Earth starts to trade with other planets.

Indeed, the idea of the whole – the global economy – is often lost in the analyses of the international organizations. Commenting on this phenomenon, Robert Wade, a leading development economist at the London School of Economics, notes that:

The World Bank and the IMF still buy into this basic idea. They pay remarkably little attention to the global economy, instead taking the country as the unit and seeing the world economy as an aggregate of countries. The whole thirty-year run of the World Bank's flagship, *The World Development Report*, takes the country as the unit of observation and prescription, and says very little about the international system in which countries have to operate. The recent push away from macroeconomics towards thinking small reinforces the same tendency (Izurieta 2009, p. 1162).

Eartheconomics starts at the highest level of aggregation offering a new approach to world economic issues. Macroeconomics, so to say, studies the bees, eartheconomics studies the beehive.

The methods of macroeconomics and eartheconomics, however, only differ in degree and are not fundamentally different (as is the case with microeconomics that studies the behaviour of the *individual* firm, consumer, employee, etc.). Both macroeconomists and eartheconomists study collectives (the consumers, the firms, the unemployed, government, etc.) and typically are interested in output, (un)employment, inflation, wages and income, interest rates, government spending and taxation. But macroeconomists do this at the level of nations and thus have to explicitly consider the economic interactions with other nations (trade, foreign investment, lending, borrowing, development aid and remittances) that are registered on the Balance of Payments, and also have to study the movement

of exchange rates. From this perspective an eartheconomist has an easier life: Earth does not interact economically with other planets (yet).

1.1 AN INTRODUCTION TO BASIC CONCEPTS

Earth Economics provides a sound and accessible introduction of basic macroeconomic concepts, including methods and principles, and their application to real world data. I use the latest statistical material and guide the reader to relevant sources on Earth statistics including production, (un)employment, population, the components of effective demand, income distribution, the world capital stock (including natural resources), etc. All macroeconomic concepts will thus be introduced using real world data which will both enable a better understanding of the concepts and provide the reader with up to date knowledge of the factual state of the world economy.

This book respects the heritages of Keynes (short-term demand management: the ISLM model) and Solow (long-run neoclassical growth). I do so not out of economic respect, but because these tools are very useful to understand the Great Recession and also because they are in a down to earth manner elementary to analyse the policy responses to that crisis. If you are most interested in maths, micro foundations and the latest complexities of modern macroeconomic theory, or if you want to learn only about your own home country, then my advice is to put this book aside. But before you leave, consider Text Box 1.1 that lists recent top notch references that use the basic tools of macroeconomics that feature in *Earth Economics* as well.

Text Box 1.1 References on ISLM, neoclassical growth and growth accounting

Colander (2004) provides a review of trends in the use of the ISLM model since the early 1970s noting that empirical research with the model was absent before 1980 but substantially revived after 1980.

King (2000) provides a closed economy introduction to new versions of the ISLM model that take (rational) expectations and optimization into account.

Mankiw, Romer and Weil (1992) estimated the Solow growth model; this article runs in the ten thousand quotations and continues to inspire a lot of research.

Kumar and Russell (2002) do a thorough analysis of production frontiers and a growth accounting decomposition.

Although the limitations of the ISLM model and the basic Solow growth model are well recognized by their users, the models still serve a number of

useful purposes. In particular in policy discussions these models often provide the common framework to which one can refer during discussions and, moreover, these models are often used to communicate a more complicated underlying analysis. The ISLM model essentially explains how interest rates and production are influenced by shocks and, moreover, what policy can and cannot do. A lot of new features have been introduced in the model including an aggregate production function, a labour market and debt dynamics that add complications that are relevant in the real world. These complicating factors are important for a good understanding of how Earth's economy works and what recent macroeconomic discussions are all about. The Solow model essentially explains how saving, investment, population growth and technology interact in the long run to determine productivity, that is: economic welfare. Versions of this standard neoclassical growth model interestingly provide useful insights into poverty traps and the requirements of a take-off towards sustained growth. Sometimes policy advice derived from these models is contradictory providing the useful lesson that policies that are good for the long run may not be applicable, useful or warranted over the short term (and *vice versa* of course).

Earth Economics stops where other textbooks start to develop links and interactions with other countries or other important add-ons like (rational) expectations and micro foundations. Some have asked me why on earth I stop when things get interesting. I have two simple answers to that challenge. Firstly, Earth data are not yet sufficiently available to allow more complicated theories to be meaningfully illustrated and, secondly and more importantly, it *is* interesting to stop and analyse our current state of affairs from the perspective of the closed economy that Earth ultimately is. Earth economists study short-term fluctuations and long-run growth in the Earth economy. They use this highly aggregated level of analysis because the world economy is the only economy where the concept of a closed economy – one that does not trade with other economies – makes sense. After all Earth does not trade (yet) with Moon or Mars. Of course the application of this concept to real economic activities does not mean that there is no international trade on Earth. (I also note for fun that the necessary economic theories are available once interplanetary trade becomes a reality in the future; see, for example, Krugman 1978 and Hickman 2008.) The countries of our world trade with each other; my point is simply that our world does not trade with other worlds and in this sense the application of the closed economy concept is the only logically appropriate one. The Earth perspective often provides a different and more challenging picture than the usual analyses based on aggregate or average findings for the individual countries in the world economy. The Earth perspective shows the big picture and asks nagging questions: What would be the best course of action for a world

government? How could we improve well-being of the earthling? By stopping short of the topical issues in open macroeconomics these key questions for humanity emerge in a framework that critically challenges many of the mainstream policy analyses and recipes.

1.2 FROM MACRO TO EARTH

Macroeconomics deals with the performance, structure, behaviour and decision-making of an entire economy. Typically, the analysis takes place at the national level, and macroeconomists study how production, (un)employment, and prices interact. One important tool is the development of theoretical models that explain the relationships between income, production, consumption, unemployment, inflation, savings and investment. These models can be constructed in many ways: in graphs, diagrams and mathematical equations. In this book you will learn to appreciate the merits and weaknesses of each of the different ways to express how macroeconomic variables relate to one another.

Earthconomics is no *l'art pour l'art*. The questions that we study are relevant as economic policies influence large numbers of people around the globe in a very concrete way: unemployment, growth and inflation influence our daily lives. The important issues are to understand:

- the causes and consequences of short-run fluctuations (the business cycle),
- the determinants of long-run economic growth (increases in national income) and the long economic waves, and
- what we can and, equally importantly, cannot do to stimulate development and prevent or remedy downturns of the economy.

Answering the last question (what we can and cannot do) always requires a close examination of actual economic variables, their development and relations with other economic variables. This is why *Earth Economics* is as much about theory and empirical research as it is about policy.

The key abstraction of *Earth Economics* comes at some costs. Firstly, this perspective 'neglects' that countries can learn from, cooperate with and help each other, but also that countries differ to a large extent, focus on national interests and may, for example, not agree on the appropriateness of some considered economic, monetary and/or financial policy. Secondly, the construction of Earth data is often complicated especially when statistical procedures differ largely between countries, when statistically important countries do not collect the data, or when political correctness and ideology

plays a role (in the former Communist countries unemployment officially did not exist so it was set at zero). These costs should not be neglected, but they should also not be exaggerated and – importantly – be balanced against the benefits of a new manner of framing policy questions that are important for world development.

Text Box 1.2 Earth data

You need to do some economic detective work to find the economic data for planet Earth, because there is no Planetary Bureau of Statistics to which you can turn. Relatively reliable data are available for Gross Domestic Product (both nominal, at constant prices and at purchasing power parity), consumption, investment, government spending and inflation (Consumer Price index, GDP deflator and deflators for investment, government expenditure and consumption) and the (potential) workforce (both population and active population). These data sets that are provided by the International Monetary Fund (www.imf.org), the World Bank (www.worldbank.org), the United Nations (www.unctad.org) and the International Labour Organization (www.ilo.org) have been used in this book and will be used in the exercises so that the reader will get acquainted with the ins and outs of many international data. Sometimes the data are only available for a few years (an example is the world capital stock), are provided only once in a while (as in the case of the world output gap estimates of the IMF) or simply very incoherent and bad. For the world interest rate this book follows the convention to use a US rate. This may turn out to become an unsatisfactory choice, for example, if US debt problems were to influence US rates differently than the rates of other countries.

Sometimes the sources contradict each other yielding different estimates of growth, productivity and so on. This is a normal phenomenon (although not always reported as such). If you are interested in measurement you may wish to consult van Bergeijk (1998) or Morgenstern (1950).

1.3 PLAN OF THE BOOK

The next chapter is devoted to global National Accounting (or more precisely: Planetary Accounting) in order to introduce the most important tool that economists use to measure economic aggregates, to explain important statistical conventions and to provide a broad overview of spending and income categories at the planet level. Following this important chapter we will study eartheconomics in three different parts.

Part I is devoted to the short term and studies the fluctuations and policy responses (demand management). Chapter 3 discusses Earth's business cycle dealing with fluctuations in production, prices and unemployment. Chapter 4 provides the basic eartheconomic model that deals with consumption, investment and saving and discusses the global saving glut. Chapter 5 endogenizes investment discussing several investment theories and derives the conditions for product market equilibrium (the so-called IS curve). Chapter 6 introduces government and deals with taxation and public debt dynamics. Chapter 7 introduces money and derives money market equilibrium (the LM curve). Chapter 8 brings the elements of Chapters 4 to 7 together in order to build the eartheconomic demand schedule, to confront this with the supply side of the economy and to analyse how the world output gap develops and relates to unemployment. Chapter 9 deals with policy puzzles generating insights into why economists disagree and about what. The chapter provides in an interesting way a number of recapitulations and exercises to test the ability to use the tools of short-term analysis.

Part II focuses on the long run. Chapter 10 starts with the very long-run perspective of two millennia of growth and productivity before moving towards the Harrod-Domar and Solow models. Chapter 11 uses different versions of Solow-like models to take a look at the take off into a sustainable growth period and at impediments of growth, including poverty and middle-income traps. Chapter 12 discusses the long economic waves and the unsustainability of exponential growth (both from an economic and an ecological point of view) in order to offer an alternative perspective on the Great Recession.

Part III deals with global governance (Chapter 13 looks at the past and Chapter 14 looks at the future). In this Part we will step a bit outside the boundaries of a traditional economics textbook because there is analysis, philosophy and politics: this Part studies the developments of the *economic* conditions for the provision of global public goods (and for that it is necessary to study the amount and size of nations that make up the world community). This provides a basis to understand the prospects for policy coordination and multilateral rules and regulations. It will allow us to take a look at new forms of global governance that have emerged since the start of the millennium and at the role that the emerging economies are and will be playing in the international institutions.

1.4 HOW TO USE THIS BOOK

This is a textbook and therefore *Earth Economics* contains exercises and lists key concepts at the end of each chapter. Exercises are embedded in the main

text and offer the reader moments to reflect on the arguments and methods presented. Since I believe strongly in self-study the answers to the exercises are included as an appendix to this book. I have refrained from referring to debates and studies that are essentially framed in national perspectives. The list of references at the end of this book is thus a useful starting point for the study of the economics of Earth; I maintain a dedicated website at www.eartheconomics.info where I list additions to that emerging literature.

You can use this book in four ways. The first use of the book is to learn more about the empirics of the Earth economy and about the global policy issues during the Great Recession. This is the first book with an exclusive focus on Earth and you can benefit from the collection of data from a great many sources and studies and their presentation in a consistent and comprehensive framework.

The second use of *Earth Economics* is as a textbook in a preparatory course in macroeconomics at the bachelor's level or a refresher course. The reader is alerted that the book abstracts from all open economy issues, although sometimes clear messages for policy coordination emerge.

The third use at yet another level is as an introduction to the tools and concepts that economists use to discuss economics. Non-economists should be able to understand that debate and with some effort they can learn how to survive in a discussion with economists: where to ask questions, where to listen, where to skip and where to ignore.

Or the reader can simply start in Part III on global economic governance. This part can be read without any prior knowledge and deals in a non-technical way with the economics of global public good provision in the context of the emergence of fast growing and populous countries.

1.5 KEY CONCEPTS

- Aggregate
- Autarky
- Closed economy
- Current account
- Data
- Eartheconomics
- Macroeconomics
- Microeconomics
- Net