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Neo-classical economics: A trail of economic destruction since the 1970s

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*'...soon or late, it is ideas, not vested interests, which are dangerous for good or evil'.
John Maynard Keynes, closing words of *The General Theory* (1936).*

Abstract

This paper argues that the international financial crisis is just the last in a series of economic calamities produced by a type of theory that converted the economics profession from a study of real world phenomena into what in the end became mathematized ideology. While the crises themselves started by halving real wages in many countries in the economic periphery, in Latin America in the late 1970s, their origins are found in economic theory in the 1950s when empirical reality became academically unfashionable. About half way in the destructive path of this theoretical tsunami – from its origins in the world periphery in the 1970s until today's financial meltdowns – we find the destruction of the productive capacity of the Second World, the former Soviet Union. Now the chickens are coming home to roost: wealth and welfare destruction is increasingly hitting the First World itself: Europe and the United States. This paper argues that it is necessary to see these developments as one continuous process over more than three decades of applying neoclassical economics and neo-liberal economic policies that destroyed, rather than created, real wages and wealth. A reconstruction of widespread welfare will need to be based on the understanding that what unleashed the juggernaut of welfare destruction was not 'market failure'; it was 'theory failure'. Being a résumé of a larger research project, the paper includes references to more detailed studies of these processes of 'destructive destruction'.

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Introduction

Two institutions established soon after WW II provided the conditions for a thirty year period of unprecedented increase in human welfare: The 1947 Marshall Plan, in the end re-industrializing not only Europe but creating a *cordon sanitaire* of wealthy nations around the communist block from Norway via Southern Europe to Japan, and the 1948 Havana Charter which established the rules of international trade that made this industrialization plan possible.

Both institutions were based on a key insight from Secretary of State George Marshall's 1947 Harvard Speech announcing his plan: that civilization had always been built on a particular type of economic structure. 'The farmer has always produced the foodstuffs to exchange with the city dweller for the other necessities of life. *This division of labor is the basis of modern civilization.* At the present time it is threatened with breakdown.'¹

¹ http://www.oecd.org/document/10/0,3746,en_2649_201185_1876938_1_1_1_1_00.html (italics added). Marshall's insight still holds. An important common element in the approximately 50 failed or failing

Industrialization became the marching order, and the Havana Charter organized world trade accordingly: as long as there was either an industrial plan or unemployment was present in a country it was possible to protect what the great liberal John Stuart Mill had promoted as 'infant industry protection'. Starting at the same time, this vision of industrialization formed the very core of classical development economics.²

At the same time, wise legislation following the 1929 financial crash had harnessed finance as the servant of production, and already in 1945 Roosevelt's advisor on science, Vannevar Bush, had given the West the task of pushing forward the 'never ending frontier of scientific knowledge' through continuous innovations.³ With a tripartite political setting – a balance of countervailing powers – between big business, big labor, and big government, all pieces were in place for the formidable increased welfare and economic growth that followed over the next decades.

The vision that solidified in 1947 was not new, however, and not unique to the West. When Russian intellectuals some years after the 1917 revolution started analyzing communist economic policy, they found that it was essentially the same industrialization policy that had been followed under Sergei Witte, Minister of Finance under the last two tsars, but under a very different political regime. It is easily forgotten that during the 20th century this type of vision was shared along the whole political axis. Henry Ford's United States, Hitler, Stalin, and Western European Welfare States all had a common understanding of wealth creation in industrialization and mass production and – parallel – an understanding of the necessarily subservient status of the financial sector to that of production.

The 1947 vision was implicitly based on German economist Werner Sombart's definition of capitalism as a system of production containing three main elements: a) the entrepreneur, b) the modern state, and c) the technological system, i.e. Vannevar Bush' never ending frontier of scientific knowledge. These three main elements of successful capitalism were, however, extremely difficult to formalize, and gradually they all disappeared from economic theory. The new typical definition of capitalism became that of a system of private ownership where all coordination outside the firm is determined by the market. As Sombart's three elements disappeared from neoclassical economics, so did the qualitative understanding of economic growth and development. Economics came to be based on what Schumpeter called 'the pedestrian view that it is the accumulation of capital *per se* that propels the capitalist engine'. This, and the disappearance of Schumpeter's distinction between the monetary sphere ('the accounting units') and the real economy, opened the way for the present dominance of the financial sector over the productive sector.

The 1947 type of understanding had a very long history in Europe. American economic historian Richard Goldthwaite shows the historical importance of the dichotomy between raw materials and manufacturing in a recent book: what is generally seen as Europe's 'commercial revolution', Goldthwaite argues, was in fact a process of emulating other countries, one of import substitution: manufactured goods, that had previously been imported

states today is that the manufacturing industry contributes less than six per cent of GDP (see Reinert, Kattel & Amaizo quoted below).

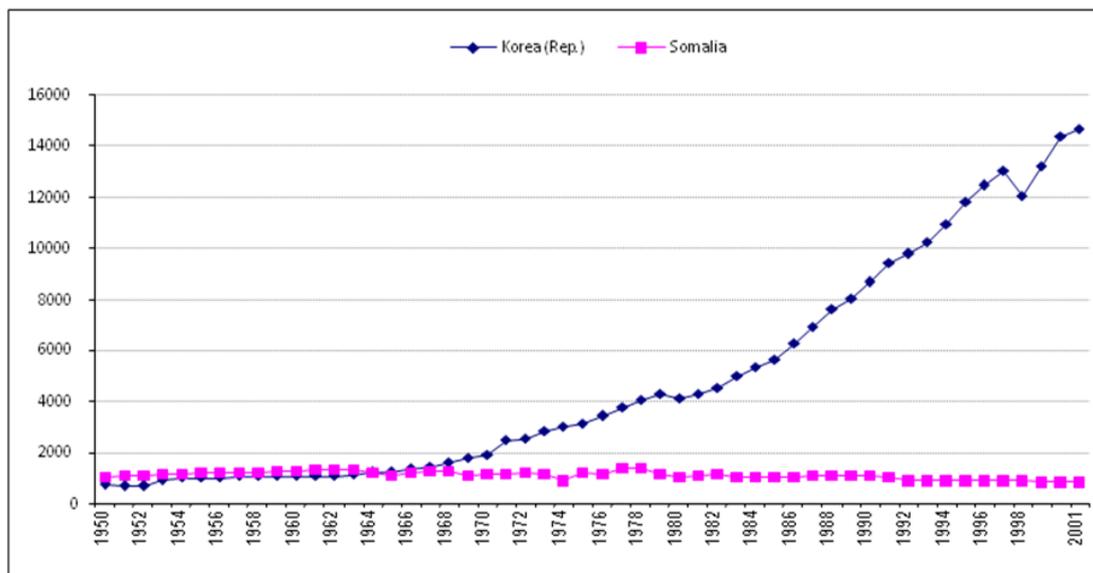
² For a discussion, see Kattel, Rainer, Jan Kregel and Erik S. Reinert. *Ragnar Nurkse (1907-2007): Classical Development Economics and its Relevance for Today*. London: Anthem Other Canon Series, 2009.

³ <http://www.nsf.gov/od/lpa/nsf50/vbush1945.htm#transmittal>

from the Levant started to be produced in Europe from the 12th century onwards.⁴ A recent book documents that this process of emulation – rather than of comparative advantage – was the main strategy also of Enlightenment Europe.⁵

Figure 1: Comparing economic development in Somalia and Korea

Korea (Rep.)-Somalia, GDP per Capita 1950-2001



Source: Reinert, Amaizo and Kattel, 2009.⁶

The wealth and poverty of nations are still determined by the dichotomy between raw materials on the one hand and manufacturing and advanced services on the other. Figure 1 illustrates the explosive growth of South Korea, starting only in the very late 1960s, as that nation diversified its economy away from agriculture and raw materials and into manufacturing industry. Through very heavy-handed industrial policy, Korea broke away from its ‘comparative advantage’ in agriculture. By comparison, Somalia – being richer than Korea until the mid-1960s – did not, and instead continued to specialize according to its comparative advantage in being poor.

Understanding this extremely important distinction – between raw materials subject to diminishing returns, monoculture, and perfect competition on the one hand, and manufactured goods and advanced services subject to increasing returns, dynamic imperfect competition, and a large division of labor on the other – was the economic basis for Stalinism, for the Marshall Plan and Keynesian social democracy in Western Europe following World War II, and for US capitalism. The trail of economic destruction that has sequentially hit the world

⁴ Goldthwaite, Richard (2009). *The Economy of Renaissance Florence*. Baltimore: Johns Hopkins University Press, pp. 6-8.

⁵ Reinert, Sophus, *Translating Empire, Emulation and the Origins of Political Economy*, Cambridge, MA, Harvard University Press, 2011.

⁶ Reinert, Erik S., Yves Ekoué Amaizo and Rainer Kattel ‘The Economics of Failed, Failing and Fragile States: Productive Structure as the Missing Link’, in Kahn, Shahrukh Rafi & Jens Christiansen *Towards New Developmentalism: Market as Means Rather Than Master*, London: Routledge, 2010, pp. 59-86. WP version http://tg.deca.ee/eng/working_papers/

since the mid-1970s is largely the result of neo-classical economic theory ('mainstream economics, 'standard textbook economics') which – by destroying economics as an empirical science – unlearned the wisdom of close to 800 years of economic policy and also the former common understanding of wealth creation from the United States on the right to the USSR on the left.

The problem: unlearning the activity-specific element of economic growth and welfare

Economic growth for most of the 20th century was based on standardized mass production, what is also called *Fordism*. Henry Ford used to say that 'you can have the car in any colour you like as long as it is black'. Also the Soviet Union depended on mass production, and in communist China everyone even dressed alike. As indicated there was an important isomorphism – an element of strong structural similarity – along the political right-left axis: all successful 20th century societies were based on the same standardized industrial mass production. As Goldthwaite points out, industrialization, albeit on a much smaller scale, has been the one factor of success that built Europe. This had been recognized very early in practical policy, during the late 1400s, in England. The theoretical explanation came in 1613 with Italian economist Antonio Serra⁷, whose theory of economic development based on increasing returns and a large division of labor was quoted by the main industrial theorist of the 19th century, German economist Friedrich List, and also by Marx. List not only inspired US and continental European economic policy, he also inspired Russian Finance Minister Sergei Witte – already mentioned – who translated List's work from German into Russian. For an important early link between Friedrich List and Marxist understanding of the importance of industry, see Szporluk (1991)⁸.

For most of the 20th century, then, advanced nations left and right all followed the same industrialization strategy. David Ricardo's free trade theories based on comparative advantage were in practice only used towards the colonies. While the United States insisted on Ricardian trade theory and standard textbook economics as the foundation for the world economic order, Paul Krugman complained as late as the 1990s that US own trade policy failed to follow the principles of Ricardian trade theory:

'the view of trade as a quasi-military competition is the conventional wisdom among policy-makers, business leaders, and influential intellectuals...It is not just that economics has lost control of the discourse; the kind of ideas that are offered in a standard economics textbook do not enter into that discourse at all...'⁹

Just like with David Ricardo's theories in 19th century England, the US Washington Consensus free trade theories were for a long time mainly intended for export, not for use at home. Unfortunately, in the end the West also started believing in the propaganda version of its own economic theory.

⁷ Serra, Antonio, *A 'Short Treatise' on the Wealth and Poverty of Nations (1613)*, ed. Sophus A. Reinert, London: Anthem Other Canon Series, 2011.

⁸ Szporluk, Roman, *Communism and Nationalism: Karl Marx Versus Friedrich List*, Oxford: Oxford University Press, 1991.

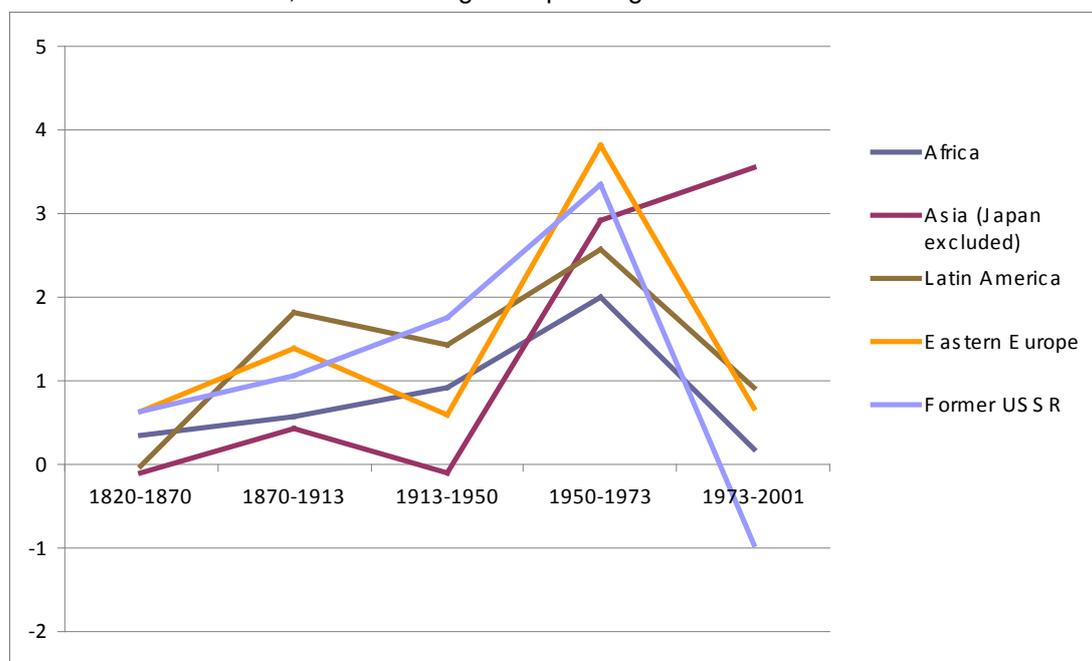
⁹ Quoted in Reder, Melvin, *Economics. The Culture of a Controversial science*, Chicago: University of Chicago Press, 1999, p. 6

A creeping mathematization and formalization of economics took place after World War II. Economics became 'social physics' based on late 19th century physics. With this development the distinction between industry and the production of raw materials – between increasing returns and large synergies on the one hand and diminishing returns and monoculture on the other hand – became blurred and disappeared. Increasing returns was thrown out of economic theory because it was not compatible with equilibrium; instead equilibrium should have been thrown out as the centrepiece of economics because it is not compatible with reality. Traditional development economics disappeared and The Washington Consensus slowly took over. Technological change, increasing and diminishing returns, and entrepreneurship disappeared from economic theory, obliterating any signals of dangers of a de-industrialization. In short: with the coming of neo-classical economics and neoliberalism all economic activities came to be seen as being qualitatively alike, in sharp contrast to the immediate post-WW II axis between the US and the USSR referred to above.

Economics *de facto* returned to the 'colonial' postulates of David Ricardo: that the international economy could and ought to be based on nations bartering labour hours: What a nation produced – industrial high-technology or subsistence agriculture – did not matter. On top of this, the World Bank and the International Monetary Fund started assuming full employment in all their models. Even if only 10 or 20 per cent of the potentially economically active population in a country actually had a job, full employment was assumed. This cruel Washington Consensus postulate made it possible to launch and continue the devastating shock therapies that hit The Third World and then The Second World. Only now 'the chickens are coming home to roost' as the American saying goes: only now, as the wave of destruction of neo-classical economics hits the United States and Europe through de-industrialization and financial crisis.

Figure 2: Development economics lost:

Growth rate of GDP per capita of selected world regions; regional average in selected periods between 1820 and 2001; annual average compound growth rate



Source: Kattel, Kregel and Reinert (2009). Original data from Maddison 2003.

Figure 2 shows the excellent world development record from 1950 until 1973, compared to the dismal performance following from 1973 to 2001. During this period Latin America experienced a string of 'lost decades', Africa's beginning industrialization was reversed, and The Second World – the communist planned economies – experienced a free trade shock that made them poorer than they had been under a notoriously inefficient planned economy. The old truth was once again revealed: a nation with an inefficient manufacturing sector is much better off than a nation without any manufacturing sector at all.

As can be seen from Figure 2, only Asian nations continued to be successful. Asia was largely unaffected by the free trade shock and continued their industrialization strategies, that in India and China had started already in the late 1940s. In fact, if India and China with their huge populations are removed from the data sets, globalization has been more a failure than a success. As we shall see later, this is even more so if we look at this development in terms of real wages rather than in terms of GDP per capita (because wages as a percentage of GDP have been reduced across the board).

From the mid-1970s: The Washington institutions chasing and destroying 'rents' in the productive sector only to re-create them in the financial sector

Since its very inception in the late Middle Ages, capitalism has been a process of what economists call 'rent seeking': through incessant invention and innovation capitalists have sought above average profits, also called rents. The early successful capitalist societies – Venice, the Dutch Republic, and England – all built their wealth on three types of rent. 1. They dominated the manufacturing sector in Europe, achieving the rents from increasing returns that are absent in agriculture. 2. They collected rents from dominating long-distance colonial trade, and 3. They all collected rent from dominating the market for a natural resource: salt in Venice, pickled – or salted – herring in the Dutch Republic, and wool in England. In all cases the raw materials went into manufacturing.

In a modern economy rents from oligopolies and innovations spread first as increased profits to the entrepreneur, then as higher wages to an increasingly skilled labor force, and then as higher taxable income to the state. In effect the system becomes one of triple rent-seeking: capital, labor, and government collude to share the oligopolistic rents. Minimum wages are an important tool for insuring such a 'collusive' distribution of the rents from innovations. In other words, rent-seeking in a sea of oligopolistic competition is what capitalism is all about. As labor also became oligopolistic through unionization, John Kenneth Galbraith described capitalism at its best – as in the US in the decades following World War II – as a system of countervailing powers of *big business*, *big labor*, and *big government*. Emulating the West, the Soviet Union attempted to create the same type of rents from the very same industries and economic activities – from steel and car production to space travel – that dominated in the United States. The best years of capitalist growth and the best years of growth of planned economy were based on the old idea – dating from Antonio Serra in 1613 – that economic growth and welfare were *activity-specific*, at any point in time they were produced by certain economic activities. Appendix 1 shows the qualitative differences between economic activities that are good for economic development (Schumpeterian activities) and those that are bad for economic development (Malthusian activities).

The same best years of growth were found in the Nordic countries, which were long seen as a very successful Third Way between capitalism and communism. The Swedish case is

interesting because the formula for industrial success after WW II can be personified in three individuals, Schumpeterian economist Erik Dahmén (1916-2005), who for decades worked for *Stockholms Enskilda Bank*, the bank's owner Marcus Wallenberg (1899-1982), and social democratic politician Gunnar Sträng (1906-1992). Sträng held ministerial posts in the Swedish government from 1947 until 1976, the last 21 years as Minister of Finance. Industrialist Wallenberg and his advisor Dahmén had lunch every Wednesday, and capitalist Wallenberg and social democrat Sträng met, often in secrecy, to solve the big issues. This type of arrangement developed the Fordist wage regime – that the fruits of industrial productivity were shared between capital and labor – and the accompanying ratchet wheel effect of welfare capitalism: wages could only go up, not down. Steadily increasing wages – the fact that capital steadily became cheaper compared to labor – provided a key engine of growth in the golden decades of economic growth.

That wages were irreversible in monetary terms – the ratchet wheel effect – also had an important positive effect during what Hyman Minsky correctly called a financial crisis: the so-called 'oil crisis' of the 1970s. During this crisis the monetary policy of the Federal Reserve under the leadership of Arthur F. Burns – from 1970 to 1978 – was expansive, and the end result was that the purchasing power of wages and salaries was maintained during the crisis while negative real interest rates forced money out of banks and into productive investments in the real economy. Neo-classical economists, with their excessive emphasis on monetary stability rather than the stability of the real economy (Keynes' 'tyranny of the general price level'), tend to look on Burns as a failure. Compared to what we are seeing during this financial crisis – demand collapsing from austerity and the financial sector benefitting from debt deflation – Arthur F. Burns' solution is vastly to be preferred. Burns was a student of Wesley Clair Mitchell, the business cycle theorist, who again was a student of Thorstein Veblen, who rightly can be characterized as a precursor of Keynes.¹⁰

As an economist of the old institutional school, Arthur Burns was aware of the risk of using equilibrium economics when what was really happening was something entirely different, namely cumulative causations. Burns' words from 1954 apply extremely well to the Western world today:

'The warnings of a Marx, a Veblen, or a Mitchell that economists were neglecting changes in the world gathering around them, that preoccupations with states of equilibrium led to tragic neglect of principles of cumulative change, went unheeded.'¹¹

Everywhere economic theory came to follow the same path of least mathematical resistance towards equilibrium as being the only dominating metaphor: the key factors that could not be formalized and mathematized – factors that determine the qualitative differences between economic activities in Appendix 1 and factors that create financial crises – were just left out of the theoretical edifice of economics. At present Western democracies have largely unlearned how their own countries got rich, and this lack of knowledge jeopardizes recovery.

During the years of Western triumphalism that followed the fall of the Berlin Wall all vestiges of capitalist moderation, e.g. those contained in the teachings of Thorstein Veblen, John

¹⁰ See L. Randall Wray, "Veblen's Theory of Business Enterprise and Keynes' Monetary Theory of Production", in Reinert, Erik S. and Francesca Viano (eds.), *Thorstein Veblen: Economics for an Age of Crises*, London: Anthem Other Canon Series, forthcoming 2012.

¹¹ Arthur F. Burns, *The Frontiers of Economic Knowledge*, Princeton: Princeton University Press, 1954, p. 46.

Maynard Keynes, and Karl Polanyi, were gradually abolished. The present financial crisis is a direct result of an intellectual arrogance where things that could not be modeled by the tools chosen by the mainstream gradually came to be seen as irrelevant. The huge rents collected today by the financial sector are made possible by the assumptions on which neo-classical economics is built and which produce the 'flaws' of the model: the rents presently collected by the financial sector are in effect assumption-based rents.

It is now generally recognized that Hyman Minsky provides the best modern understanding of financial crises. But when present chairman of The Federal Reserve, Ben Bernanke, wrote a book about the 1929 crisis and the Great Depression a few years back, he mentions Hyman Minsky only once, and that just to dismiss him. This because Minsky 'had to depart from the theory of rational economic behavior'.¹² During the last 30-40 years being a mainstream economist has meant not to accept mechanisms that doubtlessly are hugely important, on the grounds that these mechanisms were in conflict with the fundamental assumptions of standard economic theory. In this way even the people with the main responsibility for handling the crises were gradually isolating themselves from the most relevant theories explaining it.

Neo-classical economics starts from assumptions of 'perfect competition', 'perfect information', and 'perfect foresight'. This is a situation where it is difficult for a company to make money, a situation – including the assumption of diminishing returns – that reflects the reality of Third World countries rather than that of First World ones. Not understanding that capitalism is about collecting innovation-based rents, the World Bank and IMF spent almost 40 years destroying production-based rent in the world periphery – from Peru via Russia to Mongolia and now the West itself – while tilting the playing field towards financial rents. Existing industrial rents were largely destroyed by premature shock liberalization, but – as we shall see in Figure 6 – this policy instead led to rapidly increasing rents in the financial sector.

Figure 3 shows how real wages in Peru were more than halved when the free trade shock and subsequent de-industrialization hit the country starting in the mid-1970s. The vocabulary now pertaining to the policy of wage destruction was also invented here: in Peru the year 1978 was officially named "The Year of Austerity" (*Año de la Austeridad*). Seen from the Washington Institutions the story could be presented as one of success because exports were skyrocketing. In reality the income of the average person was more than halved. I have also, in detail, documented a very similar process of de-industrialization and halving of real wages in Mongolia starting in the early 1990s.¹³

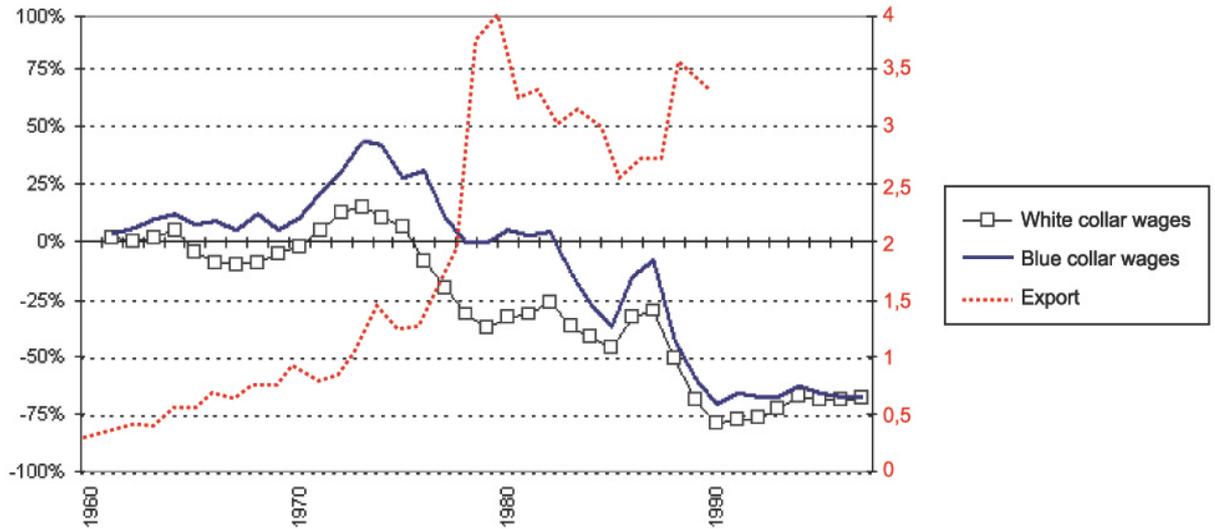
Presently financial markets have collapsed also in the West, and even the United States finds that too much free trade has undermined its manufacturing base, and that the lack of purchasing power of the common man is a main obstacle to recovery and increased employment. In an attempt to recover – having unlearned the essential Keynesian paradox of thrift – the West embarked on the same austerity-based attack on purchasing power and wage levels that had previously been employed in Peru and other Latin American countries

¹² Bernanke, Ben S. (ed.), *Essays on the Great Depression*. Princeton: Princeton University Press, 2000, p. 43.

¹³ Reinert, Erik S., 'Globalisation in the Periphery as a Morgenthau Plan: The Underdevelopment of Mongolia in the 1990's', in Reinert, Erik (ed.), *Globalization, Economic Development and Inequality: An Alternative Perspective*, Cheltenham: Edward Elgar, 2004, pp. 157-214.
<http://www.othercanon.org/papers/>

and later in the Second World. The results promise to be just as devastating to real wages and purchasing power in the West as it has been elsewhere.

Figure 3: Industrialization, de-industrialization and falling real wages in Peru



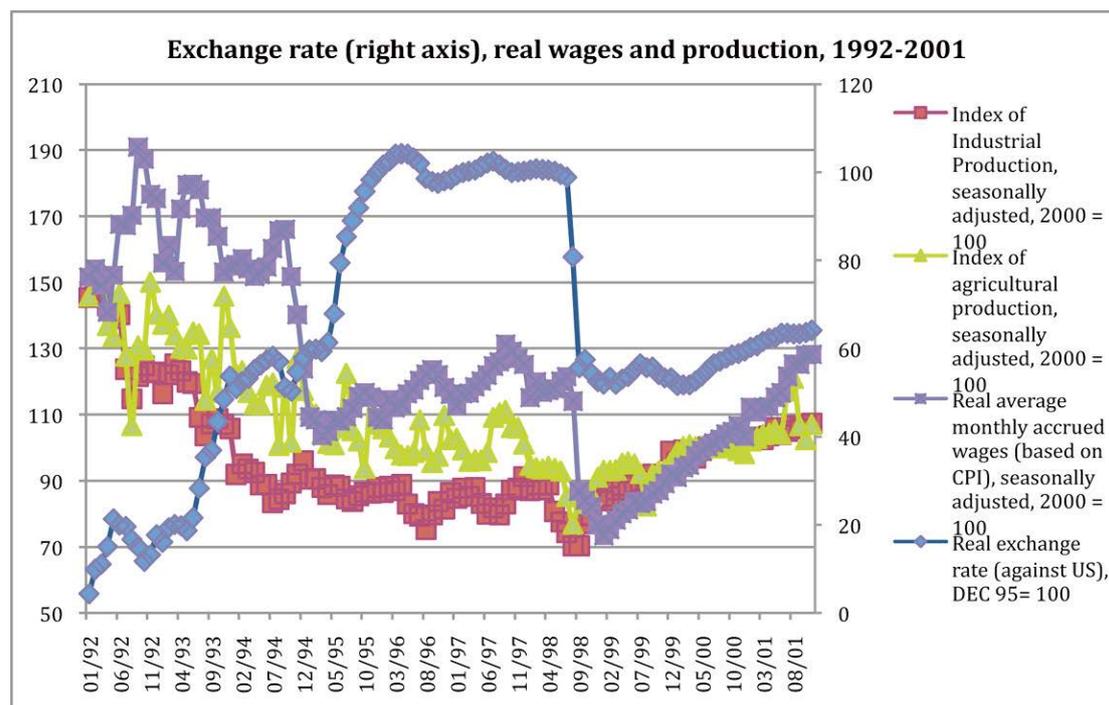
Source: Reinert 2007.¹⁴

The de-industrialization of large parts of Latin America and of the little industry that had been created in Africa started during the mid-1970s. The de-industrialization of the Second World started more than 20 years later, after the fall of the Berlin wall. A third wave of destruction was represented by the financial crises starting in Asia in the summer of 1997 and in Russia in the summer of 1998. These crises provided a dress rehearsal for the crises that would hit the capitalist core, the United States and Western Europe, 10 years later. An important element in Figure 3 is the apparent success of exports accompanied by collapsing wages. A similar pattern of increased exports accompanied by falling wages can now be observed in the EU periphery, normally reflecting a deterioration of the Terms of Trade.

Part of the same problem as the Asian Crisis was the 1998 collapse of Long-Term Capital Management (LTCM) in the United States, losing 4.6 billion dollars in less than 4 months. However, these two warnings showing the mechanisms of economic collapse were never seen as signs that something could be wrong with the economic system and economic theory. The Asian crisis was seen as a result of 'Asian values' and 'crony capitalism', not of any weakness in the structure of capitalism or in economic theory. LTCM [Board of directors](#) members included [Myron Scholes](#) and [Robert C. Merton](#), who – ironically enough – shared the [Nobel Memorial Prize in Economic Sciences](#) a few months into the Asian crisis, in 1997. Instead of seeing the writing on the wall, the economics profession blindly gave its most prestigious reward to the creators of financial tools which investment Guru Warren Buffet later would call 'time bombs' and 'financial weapons of mass destruction'.

¹⁴ Reinert, Erik S., *How Rich Countries got Rich... and why Poor Countries stay Poor*, London: Constable, 2007.

Figure 4: Exchange rates and falling real wages and production in Russia, 1992-2001.



Source: Reinert & Kattel (2010).¹⁵

Figure 4 shows the destruction of the productive structures and real wages in Russia, starting with the neoliberal shock therapy of 1992. Industrial production was reduced by more than 50 per cent, and real wages by almost 50 per cent. Note that agricultural production took a similar destructive dip. It is also important to note the important role which must have been played by the huge overvaluation of the rouble. Only with the massive devaluation in the fall of 1998, production and wages started to recover.

In the 1930s the crisis was solved through ‘trade wars’ which created employment. During the present crisis the equivalent is ‘currency wars’, which mainly cause financial gains from speculation. The damage created to national productive structures by artificially high exchange rates – as in Greece and other countries in the EU periphery – can be read off in the Russian graph in Figure 4. This further contributes to a phenomenon discussed in the next section: the growth of the financial sector as a percentage of GDP at the expense of the production sector.

Resurrection as post-industrial feudalism?

The first wave of neo-classical wealth destruction hit most of Latin America starting in the mid-1970s. At the same time Africa started losing the little industry the continent had managed to build. The second big wave of destructive destruction hit the Second World after the 1989 fall of the Berlin Wall. The present economic crisis in the European Union started in the Baltic countries, and was fundamentally caused by the long-term effect of the severe de-

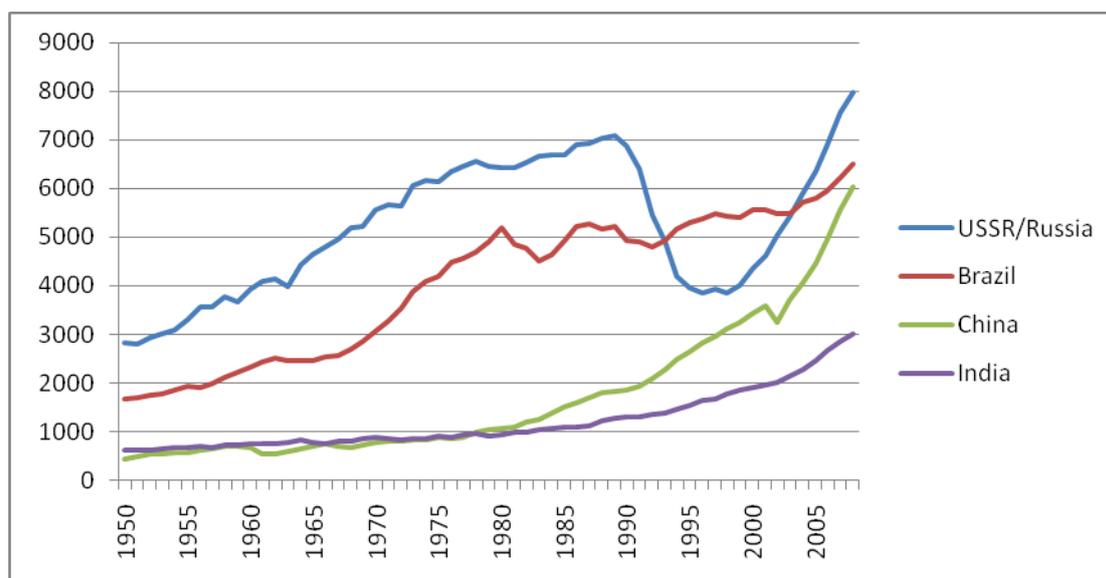
¹⁵ Reinert, Erik S. & Rainer Kattel (2010), ‘Modernizing Russia: Round III. Russia and the other BRIC countries: forging ahead, catching up or falling behind?’ <http://tg.deca.ee/files/main/2010090707562222.pdf>

industrialization of those countries that took place in the early 1990s, coupled with the refusal to adjust the exchange rate in order to save the productive structure rather than to save the banks.¹⁶

Now seemingly country after country in Europe, starting with Greece, become victims of the same pattern of de-industrialization and overvalued currencies. It is surprising that Germany seems not to have learned the lessons regarding overvalued currencies that emerge so clearly from the 1990 unification of the two Germanies. While the market exchange rate between the *Westmark* and *Ostmark* – the currencies of West and East Germany respectively – at the time was one *Westmark* for three *Ostmark*, with the unification wages were converted at the rate of one to one. This made economic activity in the former East Germany uncompetitive, which in turn a) forced people to move from the East to the West, and b) made the unification process – raising the standards of living in the East – immensely expensive. The same mechanisms are presently at work in Greece.

Only few nations outside the core of capitalism – Western Europe and North America – escaped the waves of destruction of the 1970s and 1990s. Only now, with the failure of mainstream economics to clearly distinguish between the financial sector and real wealth creation, are Western Europe and North America being hit by the destructive destruction of neo-classical economics. Figure 5 shows how the presently very successful BIC countries – Brazil, India, and China – escaped virtually unhurt from the free market fundamentalism and free trade shock that accompanied the fall of the Berlin Wall, what one author dubbed ‘the end of history’. The experience of the BRIC countries contrasts sharply with the massive welfare destruction that hit the USSR/Russia.

Figure 5: Per capita GDP in selected countries: 1950-2008, in 1990 international dollars: USSR/Russia, Brazil, China, and India.



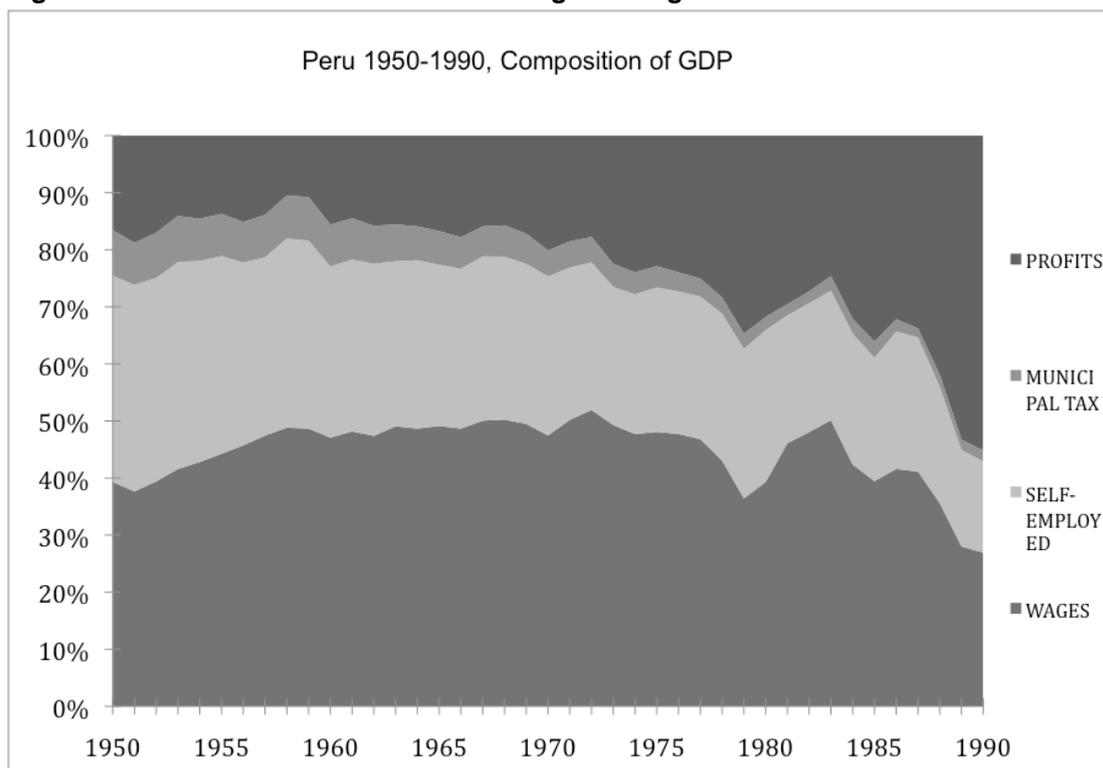
Source: Angus Maddison (2003) and The Conference Board and Groningen Growth and Development Centre, Total Economy Database, June 2009, <http://www.conference-board.org/economics/>

¹⁶ Reinert, Erik S & Rainer Kattel (2007). 'European Eastern Enlargement as Europe's Attempted Economic Suicide?' <http://tg.deca.ee/files/main//2007070309122525.pdf>

The main difference between the BIC countries (Brazil, India and China) on the one hand and the USSR/Russia on the other lies in the speed of trade liberalization. India and China only slowly opened up the system of industrial protection that had been in place since the late 1940s. No doubt both China and India had protected their industries too long. The difference in the curves in Figure 5 shows, however, the extreme risk of opening up for free trade too early rather than too late.

Brazil's 'economic miracle' started only in the 1960s and early -70s, but since then both the Brazilian economy and Brazilian development ideology have been out of synch with the rest of the Western Hemisphere. While the smaller Latin American countries could not escape the clutches of a market fundamentalism that destroyed state capacities and economic institutions which are needed for economic development, Brazil escaped relatively unharmed. Like India and China, Brazil was protected by institutional inertia and a large diversity of economists. There neoliberalism met with a critical mass of resistance from economists of other persuasion than the neo-classical one. The huge Brazilian development bank, BNDS – which now has a larger capital base than the World Bank – continues to play a decisive role in Brazil's growth.

Figure 6: Peru: De-industrialization and wages falling as a share of GDP: 1950-1990.



Legend, from top, profits, pre-dial (tax), income of the self-employed, wages.

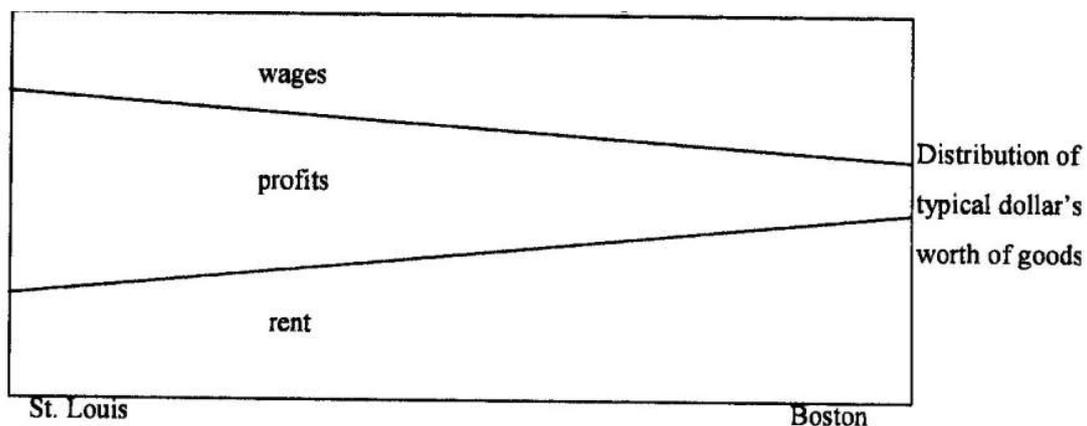
Source: *Banco Central de Reserva del Perú*. Breakdown of GDP by source has not been published after 1990.

Figure 5, which compared the BRIC countries, indicates that Russia may have recovered lost territory. However, the countries that had been through the shock therapy of de-industrialization continued on a different growth path than before, regardless of being formerly capitalist or formerly planned economy. The mass destruction of industry destroyed the rents for a huge number of industrial workers and middle class office employees. The GDP of these de-industrialized countries went through a structural transformation in which wages and

income of the self-employed radically shrank as a percentage of GDP, while the FIRE sector (Finance, Insurance, and Real Estate) grew rapidly. Figure 6 shows this national redistribution of income from labor to capital in the case of Peru. This is a pattern of income distribution that reminds one more of feudalism than of an industrial society, and which hides huge social problems.

In many ways, the United States can be seen as the prototype successful developmental state. US economist Henry Carey (1793–1879) insisted that trading too much with Britain would preclude the United States from enjoying the bounties of future technological change. Carey also devised what he called a ‘commodity map’, which illustrates how the presence of a manufacturing sector changes the way income is distributed within a nation. Carey’s map, which could also have been called a ‘development synergy’ map, is an illustration of the centuries-old observation of the effects of a manufacturing sector. Today, the map can be used to explain the mechanisms that led to the structural changes in income distribution that we observe in Peru in Figure 6, the mechanisms by which Washington Consensus policies increased poverty in the world periphery. I suggest Figure 6 may also represent the structural change presently taking place in the West, and which occurred with the large dip in Russian GDP shown in figure 4. The Russian resurrection of growth was accompanied by a new income distribution where the FIRE sector had grown very much.

Figure 7: Henry Carey’s ‘Commodity Map’ (1858)¹⁷



(Modified from Carey 1858a, iii, p. 187]

Figure 7 represents the breakdown of a typical dollar’s worth of goods, i.e. a proxy for what we would call output or GDP. The height of the graph represents 100 per cent of GDP. Carey shows how different the composition of GDP was in the developed East compared to the undeveloped West of the United States at the time; the graph indicates how the composition of output changes as one moves gradually from Boston to St. Louis – from right to left in the figure – or vice versa. Economic development – increasing the division of labor and manufacturing – is represented by moving east from St. Louis, Missouri towards Boston. Poverty and backwardness grow as one moves west from Boston to St. Louis. St. Louis thus represents the situation in the undeveloped world or periphery today. Here, raw materials – e.g. cotton or cattle – are produced; land is abundant and cheap, labor is unskilled and cheap,

¹⁷ Source: Perelman, Michael (2002). ‘The Comparative Sociology of Environmental Economics in the Works of Henry Carey and Karl Marx’, *History of Economics Review*, 36, Summer: 85-110.

tasks are simple, and the division of labor is limited. Under such conditions, Carey says, profits take up a large share of the GDP.

The East, Boston, represents today's developed world with a large division of labor that adds a lot of value to a raw materials base. In the East, in contrast to the underdeveloped West, a multitude of workers combine their efforts within a complex social division of labor to work raw materials into ever more sophisticated products. More skills are required, increasing returns create higher profits and higher barriers to entry. Here, wages and rents form a much larger portion of the value of products, while profits shrink to a smaller percentage of GDP. The shock therapies from Latin America to Russia and Mongolia created a structural economic change that corresponds to travelling from Boston to St. Louis in Carey's diagram.

If a nation should move over time from Boston to St. Louis, that means undoing the synergies of development, reversing the critical mass that creates wealth, in a sense travelling from capitalism back in time towards something resembling feudalism in a post-industrial variety. This more than 150 year old graph shows how Washington Consensus policies that started in the late 1970s have produced the same regressive effect as Henry Carey claims moving from Boston to St. Louis would have done in 1858: wages as a percentage of GDP sank slowly, while rents and profits – the FIRE sector: finance, insurance and real estate – grew correspondingly.

The solution: Back to basics, resurrecting the alternative canon of economics

Perhaps the best metaphor for today's economic situation in the West is that of Walt Disney's Uncle Scrooge and his bin of unproductive money (what the Bible refers to as 'mammon') representing a growing part of the financial sector. Scrooge's money is idle, and he only uses it for bathing purposes. Imagine Scrooge having lent money to Greece and other countries, and the debt payments – while causing the Greek economy to shrink – only accumulating as a bigger bin of idle money in which Scrooge swims. Presently our efforts to 'save' Greece and other countries only cause transfers of money from one bin of idle money to another: it does not reach Greece and its people whom we are pretending to save. As Francis Bacon said already 400 years ago: 'Money is like muck, not good except it be spread'.

Neo-classical economics – not distinguishing between the financial economy and the real economy – tends to see this destruction of real wealth and accumulation of idle capital merely as an innocuous market activity. Neoliberalism in practice meant financial capital hijacking the market rhetoric in order to re-enact what seems to be developing into a modern version of debt slavery. This is the same problem democracy was not able to handle in the 1930s. Karl Polanyi suggests that the systems that emerged during the crisis of the 1930s were similar only in disregarding *laissez-faire* principles. Indeed, we can observe that the most important thing communism, fascism, and Roosevelt's New Deal had in common was that they all saw the need to reign in the financial sector to become the servant rather than the master of capitalist development.

The situation facing the world in 2012 is in many ways also similar to that which faced the world in the revolutionary year 1848. Free trade economics had triumphed in 1846 with the Repeal of the Corn Laws, but victory was to be short-lived. Widespread social problems and a massive financial crisis in 1847 had prepared the ground for revolutions in all large European countries with the exception of England and Russia, in 1848. The enemy then was

Manchester-liberalism based on the free trade theories of David Ricardo, a very similar movement to today's neoliberalism. Manchester-liberalism and neoliberalism both threat to undo the wealth-creating synergies of an industrialized economy.

The revolutions of 1848 produced two politically extreme positions, two utopias: communism and Manchester-liberalism. But by the mid-1890s the economics profession in Europe had rid itself of both political extremes. The victory of the middle ground was well described by German economist Gustav Schmoller in his 1897 inaugural speech as Rector of the University of Berlin:

'The simplistic optimism of 'laissez-faire' and the childish and frivolous appeal to revolution, the naive hope that the tyranny of the proletariat would lead to world happiness, increasingly showed their real nature, they were twins of an ahistorical rationalism.... The old doctrines of individualistic natural law were transformed from the humanistic idealism of an Adam Smith to the hard mammonism of the Manchester School and (were useless for the present situation)... The period 1870-1890 led to the theoretical and practical bankruptcy of both the old schools'.

Again the task is to recuperate the middle ground. Of the three political systems which brought financial capital under control during the 1930s – communism, fascism and The New Deal – there is little doubt what most people today would choose. But is that an option as long as neo-classical economics – the useful fools of the financial sector – virtually monopolizes Western universities? Starting in the 1970s neoliberalism – the 'Manchester School' – once again showed its destructive powers. After waves of destructive destruction, first in the Third World, then in the Second – former communist world, the turn has come to the First World, to the West itself. We again ought to remember the lesson from Gustav Schmoller and the Historical School of Economics that he founded, the school that created the Western European welfare state. Several wheels do not have to be reinvented. The principles of the Havana Charter – unanimously approved by the members of the United Nations in 1948 – can also in today's context serve as a blueprint for a world economic order that creates, rather than destroys, mass welfare.

In the triumphalism that followed the fall of the Berlin Wall, both the political middle ground and its successful tools for welfare creation were lost to an economic theory largely based on what Schumpeter described as the Ricardian Vice: Applying severely simplified abstractions to the solution of practical problems. Or, as my colleague Wolfgang Drechsler calls it: 'irrelevance as methodology'.

If the American Dream is to be recaptured, it cannot be done without resurrecting the kind of economic understanding which, from 1820 onwards, created American industrialization, but in a new and present context. One place to start understanding what went wrong in Europe is to contrast the gradual and successful integration of Spain into the EU during the 1980s – based on the principles of Friedrich List – with the failure of de-industrializing shock therapies applied to the Baltic countries first in the 1990s, and then with the 2004 EU integration.

There is a political middle ground to be recaptured, and with it another canon of economics than the one represented by neo-classical economics and the Washington Consensus. This experience-based canon must also – as did Schumpeter and many others – distinguish the real economy from the financial sector, seeing that, if unregulated, the symbiosis that in good times exists between the financial sector and the real economy may develop into a situation

where the financial sector no longer adds value to the real economy, but parasitically destroys value, as countries from Greece to the United States are now experiencing.¹⁸ In this other canonical tradition economic activities are qualitatively different, and this understanding forms the necessary foundation for creating national wealth. A whole tradition – a qualitatively different way of thinking – needs to be rediscovered, resurrected, and applied to economic policy.

Appendix 1: Schumpeterian and Malthusian Economic Activities

Characteristics of <u>Schumpeterian activities</u> (= 'good' export activities)	Characteristics of <u>Malthusian activities</u> (= 'bad' export activities if no Schumpeterian sector present)
Increasing returns	Diminishing returns
Dynamic imperfect competition ('rent-seeking')	'Perfect competition' (commodity competition)
Stable prices	Extreme price fluctuations
Generally skilled labor	Generally unskilled labor
Creates a middle class	Creates a 'feudalist' class structure
Irreversible wages (‘stickiness’ of wages)	Reversible wages
Technical change leads to higher wages for the producer (‘Fordist wage regime’)	Technical change tends to lower price for the consumer
Creates large synergies (linkages, clusters)	Creates few synergies

Source: Reinert (2007)

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¹⁸ See Reinert, Erik S. 'Mechanisms of Financial Crises in Growth and Collapse: Hammurabi, Schumpeter, Perez, and Minsky', *Malaysian Journal of Economics (Jurnal Ekonomi Malaysia)*, forthcoming 2012. WP version <http://tg.deca.ee/files/main//2012040412332727.pdf>

The asymptotes of power

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Introduction

This is the latest in a series of articles we have been writing on the current crisis.² The purpose of our previous papers was to characterize the crisis. We claimed that it was a 'systemic crisis', and that capitalists were gripped by 'systemic fear'. In this article, we seek to explain *why*.

Begin with systemic fear. This fear, we argue, concerns the very existence of capitalism. It causes capitalists to shift their attention from the day-to-day movements of capitalism to its very foundations. It makes them worry not about the short-term ups and downs of growth, employment and profit, but about 'losing their grip'. It forces on them the realization that their system is not eternal, and that it may not survive – at least not in its current form.

When we first articulated this argument in 2009 and 2010, the response was largely dismissive. Capitalism was obviously in trouble, went the counterargument. But the crisis, though deep, was by no means systemic. It threatened neither the existence of capitalism nor the confidence of capitalists in their power to rule it. To argue that capitalists were losing their grip was frivolous.

But over the past year, the attitude has changed, decisively.

Nowadays, the notions of systemic fear and systemic crisis are no longer farfetched. In fact, they seem to have become commonplace. Public figures – from dominant capitalists and corporate executives, to Nobel laureates and finance ministers, to journalists and TV hosts – know to warn us that the 'system is at risk', and that if we fail to do something about it, we may face the 'end of the world as we know it'.

There is, of course, much disagreement on *why* the system is at risk. The explanations span the full ideological spectrum – from the far right, to the liberal, to the Keynesian, to the far left. Some blame the crisis on too much government and over-regulation, while others say we don't have enough of those things. There are those who speak of speculation and bubbles, while others point to faltering fundamentals. Some blame the excessive increase in debt, while others quote credit shortages and a seized-up financial system. There are those who single out weaknesses in particular sectors or countries, while others emphasize the role of global mismatches and imbalances. Some analysts see the root cause in insufficient demand,

¹ This paper was first presented at The 2nd Annual Conference of the Forum on Capital as Power, 'The Capitalist Mode of Power: Past, Present, Future', October 20-21, 2011, York University, Toronto (www.bnarchives.net/320). Shimshon Bichler teaches political economy at colleges and universities in Israel. Jonathan Nitzan teaches political economy at York University in Toronto. All of their publications are available from [The Bichler & Nitzan Archives \(bnarchives.net\)](http://www.bnarchives.net).

² See Bichler and Nitzan (2008; 2009), [Nitzan and Bichler \(2009b\)](#), [Bichler and Nitzan \(2010b\)](#) and [Kliman, Bichler and Nitzan \(2011\)](#).

whereas others feel that demand is excessive. While for some the curse of our time is greedy capitalists, for others it is the entitlements of the underlying population. The list goes on.

But the disagreement is mostly on the surface. Stripped of their technical details and political inclinations, all existing explanations share two common foundations: (1) they all adhere to the two dualities of political economy: the duality of 'politics vs. economics' and the duality within economics of 'real vs. nominal'; and (2) they all look backward, not forward.

As a consequence of these common foundations, all existing explanations, regardless of their orientation, seem to agree on the following three points:

1. The essence of the current crisis is 'economic': politics certainly plays a role (good or bad, depending on the particular ideological viewpoint), but the root cause lies in the economy.
2. The crisis is amplified by a mismatch between the 'real' and 'nominal' aspects of the economy: the real processes of production and consumption point in the negative direction, and these negative developments are further aggravated by the undue inflation and deflation of nominal financial bubbles whose unsynchronized expansion and contraction make a bad situation worse.
3. The crisis is rooted in our past sins. For a long time now, we have allowed things to deteriorate: we've let the 'real economy' weaken, the 'bubbles of finance' inflate and the 'distortions of politics' pile up; in doing so, we have committed the cardinal sin of undermining the growth of the economy and the accumulation of capital; and since, according to the priests of economics, sinners must pay for their evil deeds, there is no way for us to escape the punishment we justly deserve – the systemic crisis.

What if?

But, then, what if these foundational assumptions are wrong?

Liberals and Marxists view capitalism as a mode of production and consumption, and it is this view that determines the assumptions they make, the questions they ask and the answers they give. Now, what would happen if we departed from their view? How would our assumptions, questions and answers change if, instead of a mode of production and consumption, we thought of capitalism as a *mode of power*?³

The short answer is that they would change radically. The bifurcation of 'economics' and 'politics' would become untenable, thereby rendering the notion of *economic* crisis meaningless. The separation of the 'real' and the 'nominal' would become unworkable, thereby leaving finance with nothing to match or mismatch. And the backward-looking orientation of the analysis would have to give way to a forward-looking stance, rooting the crisis not in the sins of the past but in the misgivings of the future.

Our simple 'what-if' question – and the radical ramifications it carries – is not unlike the ones raised by Copernicus, Spinoza and Darwin, among others.

³ On modes of power in general and the capitalist mode of power in particular, see [Nitzan and Bichler \(2009a: Ch. 13\)](#).

They too questioned the old assumptions: ‘What if the sun rather than the earth is at the centre?’ asked Copernicus. ‘What if religion was created not by God, but by mere mortals who use it to impose their power on other mortals?’ asked Spinoza. ‘What if humans weren’t created by the Almighty, but evolved from other living creatures?’ asked Darwin.

And they too tried to provide answers. Their answers may have been tentative, incomplete or even wrong – but these shortcomings are entirely secondary. The important thing is that they *asked the questions in the first place*. They started from scratch. Their questions went to the very root, and this radical departure altered the entire orientation: it opened up the horizon, led to totally new findings and eventually culminated in entirely new frameworks.

The current systemic crisis offers a similar Ctrl-Alt-Del opportunity. By casting doubt on the conventional creed, it opens the door to *fundamental* questions: questions about what capitalism is, how it should be analyzed and to what end.

So let’s hit the keys. Instead of consumption and production, the framework we offer focuses on power.⁴ In our framework, capital *is* power, and more specifically, *forward-looking* power. When capitalists expect their power to increase, capitalization rises: more power equals positive accumulation. And when the outlook inverts and capitalists expect their power to decrease, accumulation goes into reverse: less power equals decumulation.

From this viewpoint, an ordinary capitalist crisis means that capitalists expect a significant decrease in their power – but that they also expect their power to recover eventually. By contrast, a *systemic* crisis means that capitalists fear that their power is about to drop precipitously, or even disintegrate, and that this disintegration might be irreversible – at least within the existing parameters of capitalism.

Pending collapse

The relevant question for us concerns the latter type of crisis: when are capitalists likely to expect their entire system of power to collapse, and what conditions may trigger such a drastic change in outlook?

Because we are dealing here not only with historical conditions, but also with capitalist expectations regarding the future development of those conditions, it is not easy to answer this question. However, there are certain extreme situations in which the answer becomes more apparent, and these situations are described by the title of our paper: *capitalists are most likely to expect their power to fall precipitously or disintegrate when this power approaches its asymptote*.

Mathematicians use the term ‘asymptote’ to denote a quantitative limit, something like a ‘ceiling’ or a ‘floor’ that a curve approaches but never quite reaches. And the same term can be used to describe the limits of power.

Capitalist power rarely if ever reaches its upper limit. The reason can be explained in reference to the following dialectical progression: capitalists cannot stop seeking more power: since capital *is* power, the drive to accumulate is a drive for more power, by definition;

⁴ Succinct presentations of this framework are given in Bichler and Nitzan ([2011](#); 2012 forthcoming). For a more detailed account, see [Nitzan and Bichler \(2009a\)](#).

however, the closer capitalist power gets to its limit, the greater the resistance it elicits; the greater the resistance, the more difficult it is for those who hold power to increase it further; the more difficult it is to increase power, the greater the need for even more force and sabotage; and the more force and sabotage, the higher the likelihood of a serious backlash, followed by a decline or even disintegration of power.⁵

It is at this latter point, when power approaches its asymptotes, that capitalists are likely to be struck by systemic fear – the fear that the power structure itself is about to cave in. And it is at this critical point, when capitalists fear for the very survival of their system, that their forward-looking capitalization is most likely to collapse.

The argument

Our claim in this paper is that the systemic fear that currently grips capitalists is well grounded in the concrete facts.

The problem that capitalists face today, we argue, is not that their power has withered, but, on the contrary, that their power has *increased*. Indeed, not only has their power increased, it has increased by so much that it might be *approaching its asymptote*. And since capitalists look not backward to the past but forward to the future, they have good reason to fear that, from now on, the most likely trajectory of this power will be not up, but down.

Before fleshing out this argument though, a few words about the method and structure of the article. Our analysis here is limited to the United States, but this limitation isn't really a drawback. The chief purpose of this analysis is methodological. For us, the important question is *how* we should study capitalist power – and in this respect the United States may offer the best starting point. First, although the global importance of U.S. capitalism may have diminished over the past half century, its recent history is still central for understanding the dynamics of contemporary capitalist power. And second, to answer the kind of questions that we'll be asking requires detailed data that are not readily available for many other countries.

With this emphasis in mind, the paper begins by setting up our general framework and key concepts. It continues with a step-by-step deconstruction of key power processes in the United States, attempting to assess how close these processes are to their asymptotes. And it concludes with brief observations about what may lie ahead.

⁵ This process is by no means universal. In certain modes of power – for example, the Megamachines of the ancient river deltas, Marx's 'oriental despotism' and Orwell's *1984* – the threat and exercise of force are so extreme that their subjects gradually lose the ability to even contemplate resistance, let alone organize it. The Indian caste system, for instance, has been welded over millennia by a power akin to the 'strong force' in the atom. There is enormous pent-up energy in that system; but once this energy has been locked in, turning it against the regime can only be achieved through a chain reaction triggered by a critical social mass.

There is no reason to assume that capitalism is immune from such a fate. It is certainly possible, at least logically, for capitalist power to eventually trump, crush and totally eliminate the opposition it elicits – in a manner anticipated by Jack London's *The Iron Heel* (1907). But this elimination would create a *new* mode of power altogether: having destroyed the will of its subjects, the new regime could no longer rely on the open buying and selling of commodified power; without vendible power, capitalization would cease; and without capitalization, the mode of power could no longer be called 'capitalistic' – at least not in the present sense of the term.

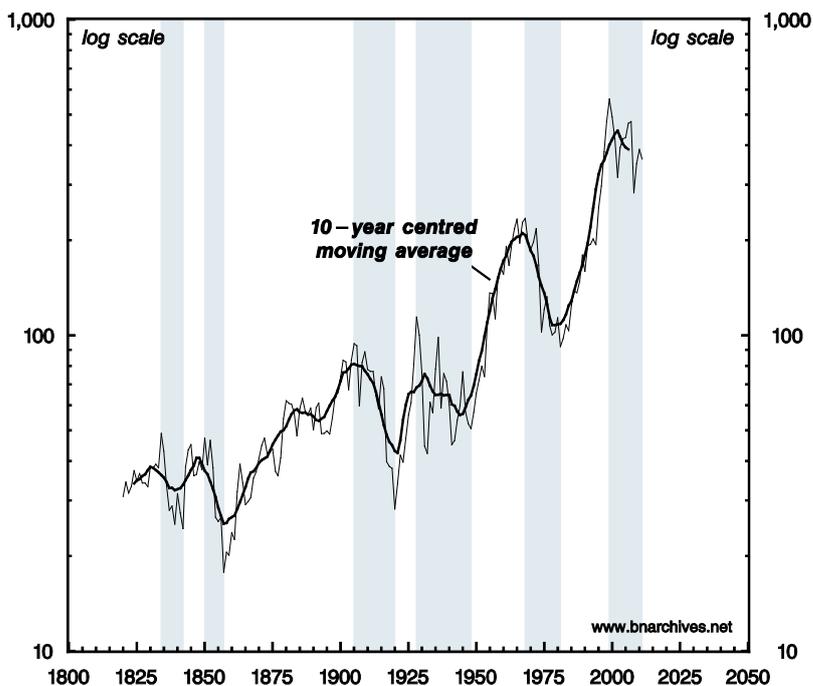
Major bear markets

Let's start with the context. [Figure 1](#) and [Table 1](#) portray the history of U.S. capitalism as seen from the viewpoint of capitalists. The ultimate interest of capitalists is capitalization: the forward-looking value of their assets. And the main yardstick for that value is the stock market.

[Figure 1](#) shows the history of U.S. stock prices. On the stock market, prices are denominated in actual dollars and cents. However, 'nominal' measures can be affected greatly by the ups and downs of the general price level, so economists like to divide, or 'deflate', them by the consumer price index in order to obtain what they call a 'constant dollar' measure. And that is what we do in [Figure 1](#): we show the stock-price index without the effect of inflation.

As we can see, the overall historical trend of stock prices is up. We can also see, though, that this uptrend is fractured by periods of sharp declines of 50-70 per cent, marked by the shaded areas. These shaded areas denote what we call 'major bear markets', whose definition is given in [Table 1](#).

Figure 1: U.S. Stock Prices in 'Constant' Dollars



Note: Grey areas indicate major bear markets, as defined in [Table 1](#). The U.S. stock-price index splices the following four sub-series: a combination of bank, insurance and railroad stock series weighed by Global Financial Data (1820-1870); the Cowles/Standard and Poor's Composite (1871-1925); the 90-Stock Composite (1926-1956); and the S&P 500 (1957-present). The constant-dollar series is computed by dividing the stock-price index by the Consumer Price Index. Data are rebased with 1929=100.0. The last data point is for October 2011.

Source: Global Financial Data (series codes: _SPXD for stock prices; CPUSA for consumer prices); Standard and Poor's through Global Insight (series codes: SP500@40.D7 and SP500.D7 for stock prices); IMF through Global Insight (series code: L64@C111 for consumer prices).

Table 1: Major U.S. Bear Markets* (constant-dollar calculations)

period	decline from peak to trough (%) **
1835–1842	–50%
1851–1857	–62%
1906–1920	–70%
1929–1948	–56%
1969–1981	–55%
2000–?	–50%

* A major bear market is defined as a multiyear period during which: (1) the 10-year centred moving average of stock prices, expressed in constant dollars, trends downward; and (2) each successive sub-peak of the underlying price series, expressed in constant dollars, is lower than the previous one.

** The peak occurs one year prior to the onset of a major bear market.

Note: The most recent sub-trough of the current major bear market occurred in 2008. It is not yet clear whether this sub-trough marks the end of this bear market.

Source: See [Figure 1](#).

Contemporary critiques of capitalism often dismiss such charts as a fetish of ‘finance’. The magnitudes of finance, they say, are no more than fictitious symbols. They distort the ‘real’ nature of capital and mislead us into the wrong conclusions. In our view, though, this fashionable dismissal is wrongheaded. The stock market is not only the central barometer of modern capitalism; it is also the key power algorithm through which capitalists *creorder* – or create the order – of their world.

To illustrate this point, consider the last four major bear markets. Each of these periods signalled a major creordering of capitalist power.

1. The bear market of 1906-1920 marked the closing of the American frontier and the shift from robber-baron capitalism to large-scale business enterprise and the beginning of synchronized finance.
2. The crisis of 1929–1948 signalled the end of ‘unregulated’ capitalism and the emergence of large governments and the welfare-warfare state.
3. The crisis of 1969–1981 marked the closing of the Keynesian era, the resumption of worldwide capital flows and the onset of neoliberal globalization.
4. And the current crisis – which began not in 2008, but in 2000, and is still ongoing – seems to mark yet another shift toward a different form of capitalist power, or perhaps a shift away from capitalist power altogether.

What is the nature of the current crisis? How is this crisis related to capitalist power? And what are the asymptotes of that power?

Capital as power

The best place to begin is Johannes Kepler, one of the key architects of the mechanical worldview. Prior to Kepler, force (or power) had two principal features: it was thought of as an *entity in and of itself*, on a par with the elements; and it was conceived of *qualitatively*, not quantitatively. Kepler inverted this view. In his method, force is not a stand-alone entity, but a *relationship between entities*; in other words, it is not absolute but *differential*. And this relationship is not qualitative, but *quantitative*.⁶

Modern science adopted Kepler's approach, and in our view the same approach should be applied to capital. Thus, when we say that capital is power, we mean: (1) that capital is not an entity in its own right, but a *differential relationship* between social entities; and (2) that this relationship is *quantitative*, measured in monetary units. Let's examine these two features more closely, beginning with the quantitative dimension.

The quantitative dimension: capitalization

Equations 1 to 5 deconstruct the basic concept of modern capitalism: the algorithm of capitalization. This concept was invented in the Italian city states, probably during the fourteenth century or even earlier; but it was only at the turn of the twentieth century that it developed into the dominant power algorithm of capitalism.⁷

The gist of capitalization is spelled out in the first line of Equation 1. In this line, the price of a corporate stock – or any other asset, for that matter – is given by the earnings the asset is expected to generate (in this case, the expected earnings per share, or expected eps), divided by the discount rate.

$$\begin{aligned}
 1. \quad price &= \frac{\text{expected eps}}{\text{discount rate}} = \frac{\$100}{0.05} = \$2,000 \\
 &= \frac{\text{future eps} \times \text{hype}}{\text{risk} \times \text{normal rate of return}} = \frac{\$50 \times 2}{2 \times 0.025} = \$2,000 \\
 &= \text{future eps} \times \frac{\text{hype}}{\text{risk} \times \text{normal rate of return}}
 \end{aligned}$$

For instance, if the expected eps is \$100 and the discount rate is 5 per cent, the asset would be capitalized at \$2,000. This result is easy to verify by going in reverse: divide \$100 of earnings per share by an initial investment of \$2,000, and you'll get the discount rate of 5 per cent.

The second line of Equation 1 decomposes each element. In the numerator, expected eps is the future eps (whose magnitude will become known in the future) times the hype coefficient of capitalists. In the example here, the future eps is \$50. But capitalists are overly optimistic, with a hype coefficient of 2. This hype means that they expect the future eps to be \$100, or

⁶ On the Kepler watershed and its importance for science in general and the concept of force in particular, see [Jammer \(1957: Ch. 5\)](#).

⁷ For a critical history of capitalization and its rituals, see [Nitzan and Bichler \(2009a: Part III\)](#).

twice its eventual level. As a rule, hype is greater than 1 when capitalists are overly optimistic and smaller than 1 when they are overly pessimistic.

Looking at the denominator, we can express the discount rate as the product of the normal rate of return and the risk coefficient. In our example here, the normal rate of return is 2.5 per cent; but this is a risky stock, with a risk factor of 2. If we multiply this 2.5 per cent by 2, we get the discount rate of 5 per cent.

So all in all, capitalization comprises four elementary particles: (1) future eps, (2) hype, (3) risk, and (4) the normal rate of return.

Now, for the purpose of the empirical illustration that follows, it is useful to build a link between future and present earnings. At any point in time, future eps can be written as a multiple of current eps (henceforth eps) and a scalar m, whose magnitude will become known in retrospect, after the future earnings are incurred:

$$2. \quad \text{future eps} = \text{eps} \times m$$

Substituting this expression back into Equation 1, we get:

$$3. \quad \text{price} = \text{eps} \times m \times \frac{\text{hype}}{\text{risk} \times \text{normal rate of return}}$$

Dividing both sides of Equation 3 by eps, we get the pe ratio, or the ratio of price to (current) earnings:

$$4. \quad \text{pe} = \frac{\text{price}}{\text{eps}} \\ = m \times \frac{\text{hype}}{\text{risk} \times \text{normal rate of return}}$$

Substituting the pe ratio for the two last elements of Equation 3, we get:

$$5. \quad \text{price} = \text{eps} \times \text{pe}$$

So as a shorthand, we can always decompose the price of a stock into two components, as shown in Equation 5: the eps and the pe ratio (which accounts for the remaining elementary particles of the capitalization algorithm and the scalar m).

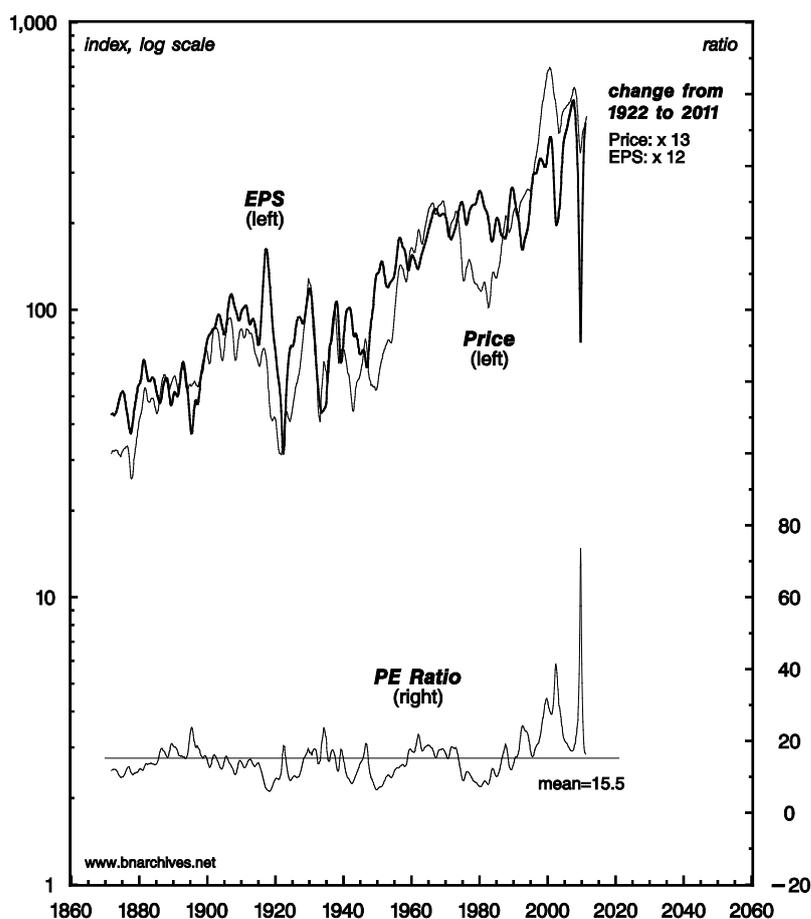
The reason for this decomposition is made apparent in [Figure 2](#). The chart shows the history of price and eps for the S&P500, an index that comprises the largest U.S.-listed companies, ranked by market capitalization. Both the eps and price series are expressed in 'constant dollars', and both are plotted on the left log scale. The bottom of the chart plots the pe ratio against the right arithmetic scale.

Recalling that price = eps × pe, we can now appreciate the effect on price of each of the two right-hand components. The bottom of the chart shows that the combined effect of hype, risk, the normal rate of return and the scalar m, measured by the pe ratio, is cyclical. Historically,

this effect oscillates up and down around a mean value of 15.5. By contrast, the effect of eps is secular. To illustrate this latter fact, note that, between 1922 and 2011, the price series grew by a factor of 13 – and that much of this growth was accounted for by the rise of eps – which rose by a factor of 12 (and probably more, since the most recent eps observations are not yet available).

This decomposition should help us focus our exposition. A power analysis of capitalization comprises all of its elementary particles. But as [Figure 2](#) makes clear, over the long haul the most important of these elementary particles is earnings, and that is what we concentrate on in this paper.

Figure 2: S&P 500: Price and Earnings per Share in ‘Constant’ Dollars, 1871-2011



Note: Data are smoothed as 12-month moving averages. Earnings per share denote net profits per share earned in the previous twelve months. Monthly earnings are interpolated from annual data before 1926 and from quarterly data after 1926. Stock price data are monthly averages of daily closing prices. Both the price and EPS series are expressed in \$U.S., deflated by the U.S. CPI and rebased with January 1929=100. The PE ratio is computed by dividing the smoothed Price series (before rebasing) by the smoothed EPS series (before rebasing). The last data points are March 2011 for earnings per share, September 2011 for price and March 2011 for the PE ratio.

Source: Robert Shiller (http://www.econ.yale.edu/~shiller/data/ie_data.xls, retrieved on October 1, 2011).

The relational dimension: distribution and redistribution

Now, recall that for Kepler, power is not only quantitative, but also relational. It is not a stand-alone entity, but a relationship between entities. So if capital *is* power, its analysis should be relational rather than absolute.

Capitalism is a system of privately owned commodities, a social order where ownership is quantified through prices. To understand the power dynamics of this system, we need to understand the way in which relative prices change over time; in other words, we need to understand distribution and redistribution.

Let us start with a hypothetical situation in which capitalist power remains unaltered: there is no redistribution, and the underlying price relationship is unchanged. To illustrate this situation, assume that corporate profits amount to 2 per cent of national income. If capitalist power remains unaltered, this ratio will not change. National income may rise and fall; but since power stays unchanged, profits will rise and fall at the same rate, leaving the profit share stable at 2 per cent.

Of course, this stability is rarely if ever observed in practice. Capitalists are compelled to try to increase their power, and the power struggle that ensues makes the share of profit in national income change over time.

This on-going change is evident in [Figure 3](#). The figure plots data for dominant capital, approximated here by the top 0.01 per cent of all U.S.-based corporations ranked by market capitalization (henceforth the Top 0.01%).⁸ The thin series, plotted against the right scale, shows the equity market capitalization of the Top 0.01% expressed as a per cent of U.S. national income. The thick series, plotted against the left scale, shows the after-tax profit of the Top 0.01% as a share of national income.⁹

Now, if we were to freeze capitalist power relative to the power of all other social groups at the level it was at in 1950, both series would look like horizontal lines. Since all groups, including capitalists, would retain their relative power, the prices of their respective commodity bundles would change at the same rate, and the ratios of these prices would remain unchanged.

But that is not what we observe in the graph. Instead, we see ongoing changes in both series, meaning that the structure of power has been constantly reordered. Moreover, the changes seem anything but random. As the figure makes clear, both series have trended upward. The ratio of market capitalization of the Top 0.01% to national income increased eightfold – from 20 per cent in the early 1950s to 160 per cent in the early 2000s, before dropping to 100 per cent in 2010. And the after-tax profit share of the Top 0.01% in national income rose threefold – from 2 to 6 per cent over the same period.

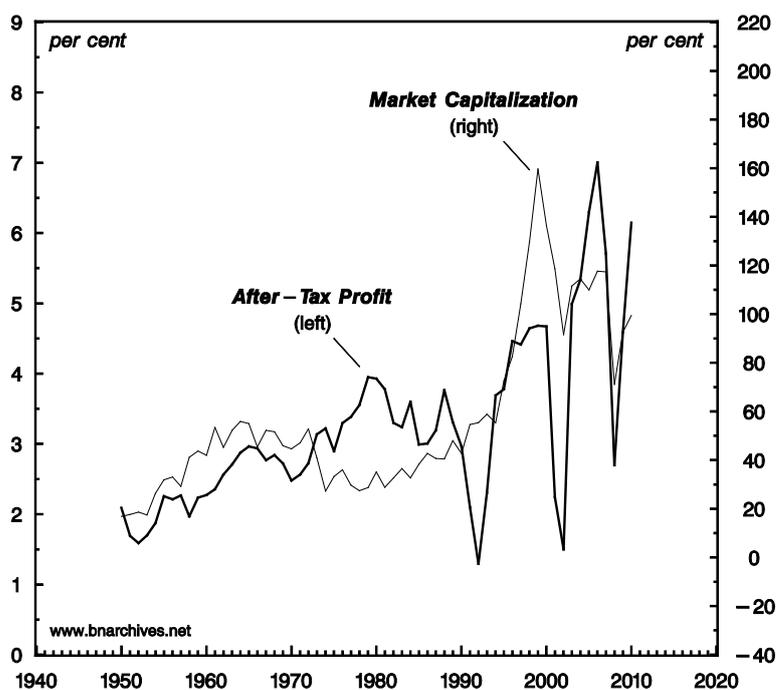
The patterns depicted in [Figure 3](#) carry three related implications. First, they indicate that, contrary to what many economists would have us believe, much of the stock-market boom of the 1990s was due not to ‘economic growth’ or ‘solid fundamentals’, but to a major

⁸ See the [Appendix](#) for a brief methodological discussion of alternative measures of dominant capital.

⁹ National income can be measured at market prices (inclusive of indirect taxes less subsidies), or at factor cost (exclusive of indirect taxes less subsidies). This article uses the former, more comprehensive, measure.

redistribution of power in favour of dominant capitalists. Second, the patterns make it difficult to attribute the current crisis to waning capitalist power: if anything, this power – measured by the profit share of the Top 0.01% in national income – has increased, and it remains at record levels despite the on-going crisis. Third and finally, the patterns suggest that dominant capitalists now realize that that their record profit-share-read-power has become unsustainable, hence the decade-long collapse of their forward-looking capitalization.

Figure 3: Market Capitalization and After-Tax Profit of the Top 0.01% of U.S.-based Corporations (Shares of U.S. National Income)



Note: The number of firms in the Top 0.01% of U.S.-based corporations changes from year to year. This number (n) is given by dividing, for each year, the number of tax returns of active corporations submitted to the U.S. Internal Revenue Serviced (IRS) by 10,000 (the number of returns for 2009-2010 is extrapolated using their recent average growth rate [1.7%]). The actual constituents of the Top 0.01% list for each year are obtained in three steps: first, by selecting from the Compustat North American dataset the subset of U.S.-incorporated firms (excluding firms with no assets, those reporting no after-tax profit or loss, and duplicates); second, by ranking these firms, in descending order, based on their market capitalization; and third, by selecting from the ranked list the top n firms. The last data points are for 2010.

Source: *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition* (online) (series codes: Ch13 for the number of tax returns of active corporations [till 1997]); U.S. Department of Commerce, *Statistical Abstract of the United States 2012*, Table 744, p. 491 (the number of tax returns of active corporations [1998-2008]); Compustat 'funda' file through WRDS (series codes for Compustat companies: NI for After-Tax Profit [net income]; CSHO for number of outstanding shares; PRCC_C for closing share price); U.S. Bureau of Economic Analysis through Global Insight (series codes: YN for National Income).

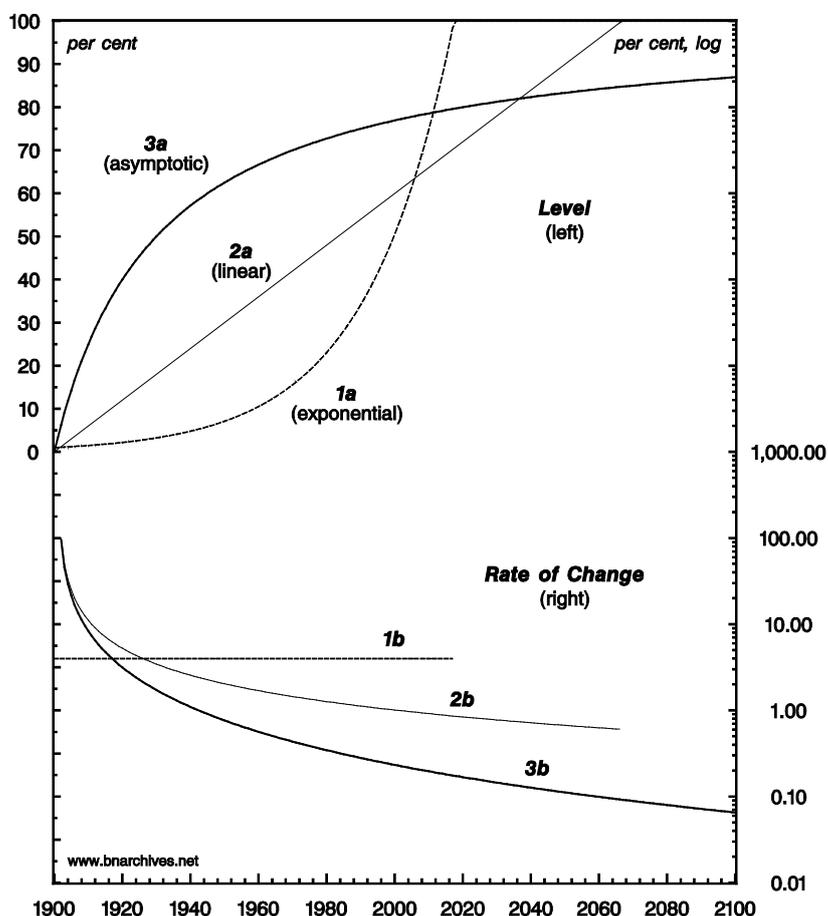
The question we need to address, then, is twofold. First, what caused capitalist power to increase over the past half century, and particularly over the last twenty years? And second, looking forward, what are the limits on that power; or in terms of the title of the paper, how close is capitalist power to its own asymptote?

Asymptotes of power

One important feature of distributional power is that it clearly bounded. Given that no group of capitalists can ever own more than there is to own in society, distributional power can never exceed 100 per cent. Similarly, since no owner can own less than nothing, distributional power cannot fall below 0 per cent.¹⁰ The movement between these lower and upper bounds, though, can follow many different patterns.

Three such patterns are illustrated in [Figure 4](#). The patterns themselves are generated by mathematical functions, but we can easily endow them with concrete social meaning. Assume that each of the lines 1a, 2a and 3a at the upper part of the figure (plotted against the left scale) represents a particular trajectory of the after-tax profit share of the Top 0.01% in national income, and that each of the lines 1b, 2b and 3b at the bottom (plotted against the right logarithmic scale) represents the corresponding rate of change for that trajectory.¹¹

Figure 4: Distributive Shares: A Hypothetical Exposition of Levels and Rates of Change



¹⁰ Although debt can be considered a 'negative' asset, a debtor cannot own less than nothing. The net debt of a debtor (liabilities less assets) is a claim on the debtor's future income. As long as the present value of this future income is greater than or equal to the debtor's net debt, the debtor's net assets are non-negative. If the present value of the future income is smaller than the net debt, the debtor is technically bankrupt, having zero net assets.

¹¹ A log scale, shown here in multiples of 10, is a convenient way of plotting series that change exponentially.

The chronological starting point in our hypothetical illustration is the year 1900, in which all three lines show an after-tax profit share of around 1 per cent. From this point onward, the patterns diverge. Line 1a, for example, shows the result of a constant, 4-per-cent growth rate per annum. This growth rate increases the after-tax profit share to 1.04 per cent in 1901, to 1.082 in 1902, to 1.125 in 1903, and so on. Since the after-tax profit share grows at an unchanging rate, the corresponding growth-rate series 1b at the lower part of the chart is a flat line. The after-tax profit share rises exponentially, and sometime before 2020 it reaches 100 per cent of national income. This is the 'glass ceiling'. From this point onward, the share can no longer increase: it either stays the same or drops. (In this figure, we left it unchanged at 100 per cent; notice that once line 1a at the top hits the glass ceiling, line 1b at the bottom, representing the growth rate, gets 'truncated', since the growth rate drops to zero.)

Now, capitalists operate against the opposition of non-capitalists (as well as of other capitalists). In order to earn profits, they need to exert enough power to overcome this resistance. As we noted earlier, though, the resistance itself is not fixed: it tends to increase as the income share of capitalists rises while the income share of others shrinks. And this growing resistance means that the higher the profit share of the capitalists, the greater the power they need to exert in order to make it even bigger.

These power relations can be traced in [Figure 4](#). The lines at the top, denoting the after-tax profit share of income of the Top 0.01%, represent the power of dominant capital operating against resistance, while the lines at the bottom show the rate at which this profit-share-read-power changes over time.

In terms of our first example, line 1a shows capitalist power growing exponentially. It trumps the opposition at an annual rate of 4 per cent (line 1b), until the resistance is totally crushed and capitalists appropriate the entire national income. The end result itself is socially impossible (the non-capitalists, having lost their income, perish) or non-capitalistic (the losers end up living on handouts from the winners; see footnote 5). But the pattern of accelerating power leading toward that end is certainly possible, at least over a limited period of time.

Another hypothetical illustration is given by lines 2a and 2b. Here, too, we see capitalist power rising, but resistance to that power rises as well. And as a result, the growth rate of this power declines: at the beginning of the process, during the early 1900s, the rate of growth is 100 per cent per annum; by the 1950s it falls to about 2 per cent; and by the end of the twentieth century it declines to 1 per cent. However, mounting resistance isn't enough to stop the increase in capitalist power, and sometime during the 2060s capitalists end up appropriating the entire national income. As in the previous example, from this point onward capitalist power can either remain unchanged or drop. And although the end outcome itself, as before, is socially impossible or non-capitalistic, the pattern of linearly growing power that leads to that outcome is perfectly plausible.

The last pattern, which we label 'asymptotic', is illustrated by lines 3a and 3b. Initially, the share of profit increases rapidly, but the growth rate tapers off very quickly. Unlike in the previous two cases, in this one resistance grows too fast for capitalists to trump it completely. And, as a result, although the profit share rises, it never reaches the 100 per cent ceiling. It merely approaches it asymptotically.

Now remember that these lines are no more than ideal types that illustrate alternative patterns. In practice, the profit share is never that stylized: it goes up or down, it fluctuates

around its own trend and its asymptote need not be 100 per cent – or any other particular level, for that matter. It can be anything. As we shall soon see with the actual data, the hypothetical patterns illustrated here combine to produce ragged and occasionally wave-like trajectories of various durations. These trajectories show power increasing at various rates, receding, rising again, approaching its asymptote, and occasionally collapsing.

The key point, though, is that these patterns of distribution and redistribution, whatever they may be, quantify underlying power processes. And this quantification of power makes distributional patterns – and the limits embedded in them – crucial for understanding capital accumulation and capitalist development.

Much of our work over the past three decades has been concerned with making sense of such historical patterns. Often, the oscillations represent variations in power with a given order. But occasionally, they point to deeply transformative moments, ones that reorder the entire mode of power. One example of such reordering is the relationship between differential oil profits and energy conflicts in the Middle East ([Nitzan and Bichler 1995](#); [Bichler and Nitzan 1996](#)). Another example is the regime pattern of differential accumulation, where dominant capital oscillates between breadth and depth as it breaks through its successive social envelopes ([Nitzan 2001](#); [Nitzan and Bichler 2001](#)). And a third illustration is the relationship between major bear markets shown in [Figure 1](#) and [Table 1](#) and the corresponding transmutations of the capitalist mode of power that accompany them ([Bichler and Nitzan 2008](#)).

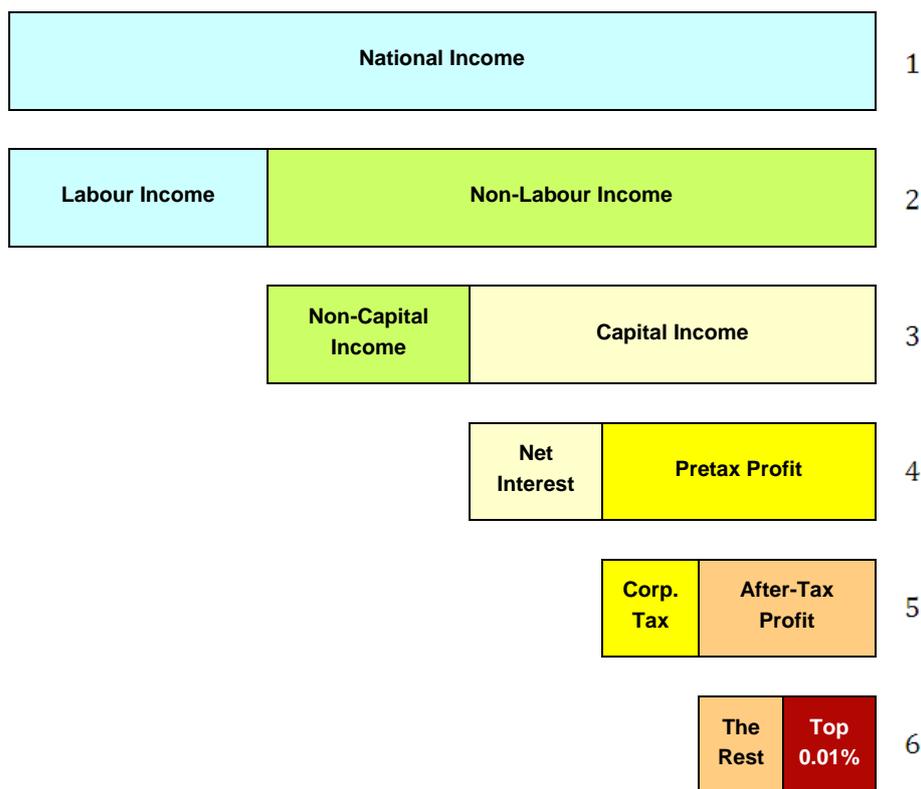
The present paper is nested in this latter relationship. Focusing on the most recent and apparently still ongoing major bear market, our purpose is to identify the power underpinnings of the crisis, to assess the limits imposed on them and to speculate on what those limits may imply for the near future of the capitalist mode of power.

National income shares

The next step in this journey is to unpack the statistical category of ‘national income’. [Table 2](#) shows the underlying components of this aggregate. Note that the table is not drawn to scale. Our concern at this point is merely the relationship between the different components, not their relative size.

Line 1 is national income. This line represents the total income, measured in dollars and cents, earned in a society during a given year. Line 2 shows that national income comprises two sub-categories: labour and non-labour income. In line 3, we see that non-labour income consists of two components: the income of capitalists and the income of non-capitalists other than employees (i.e. proprietors, rentiers and the government). Line 4 shows that capitalist income includes two types of income: net interest and pretax profit. Line 5 shows that pretax profit consists of corporate taxes that go to the government and after-tax profit that belongs to the capitalists. Finally, in line 6 we see that after-tax profit can be broken down to the profit of the Top 0.01% and the profit of all other firms.

Table 2: Deconstructing National Income



This structure offers a guideline on how to investigate the redistribution of power.¹²

Recall our starting point. In [Figure 3](#), we saw that the stock-market boom of the 1990s was underwritten not by ‘economic growth’, but by a massive creordering of power: a redistributive process in which the Top 0.01% managed to more than double its after-tax profit share in national income. The figure also showed that the crisis of the past decade or so has been unfolding with capitalist power hovering around historic highs. These observations, along with the forward-looking outlook of capitalists, suggest that the current crisis may be the result of capitalists becoming not weaker, but stronger; and that capitalist power may be approaching its social asymptote – a level too high to sustain, let alone increase.

At this point, then, the question we need to ask is twofold. First, what were the *concrete power processes* that made this massive redistribution of income possible in the first place? And, second, what might be the specific *limits* on this power to redistribute?

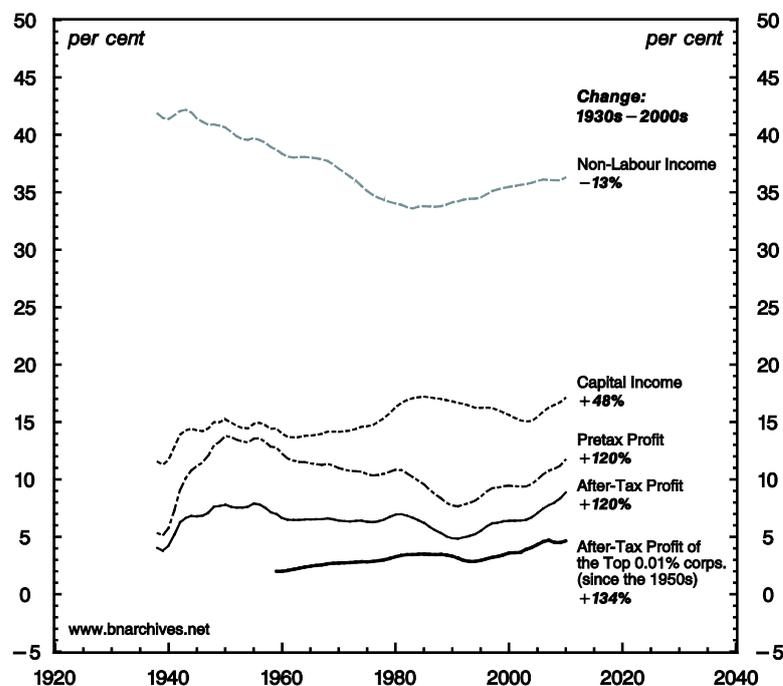
The remainder of the paper tries to answer these questions by looking at the following nested transformations. Note that, all else remaining the same, each of these transformations works in favour of the Top 0.01%:

- Within national income, the shift from labour to non-labour income (line 2 in [Table 2](#)).
- Within non-labour income, the shift from non-capital to capital income (line 3).

¹² The guideline here is very rudimentary and by no means exhaustive. Needless to say, it does not preclude different and/or more detailed analyses of power.

- Within capital income, the shift from net interest to pretax profit (line 4).
- Within pretax profit, the shift from corporate tax to after-tax profit (line 5).
- Within after-tax profit, the shift of after-tax profit from smaller firms to the Top 0.01% (line 6).

Figure 5: Shares of U.S. National Income



Note: Series are smoothed as 10-year moving averages. Non-labour income is equal to national income less compensation of employees. Capital income is pretax profit and net interest. The Top 0.01% of corporations comprises, for every year, the top 0.01% of U.S.-incorporated firms in the Compustat North America universe, ranked by market capitalization (see [Figure 3](#) for derivation and computations). The last data points are for 2010.

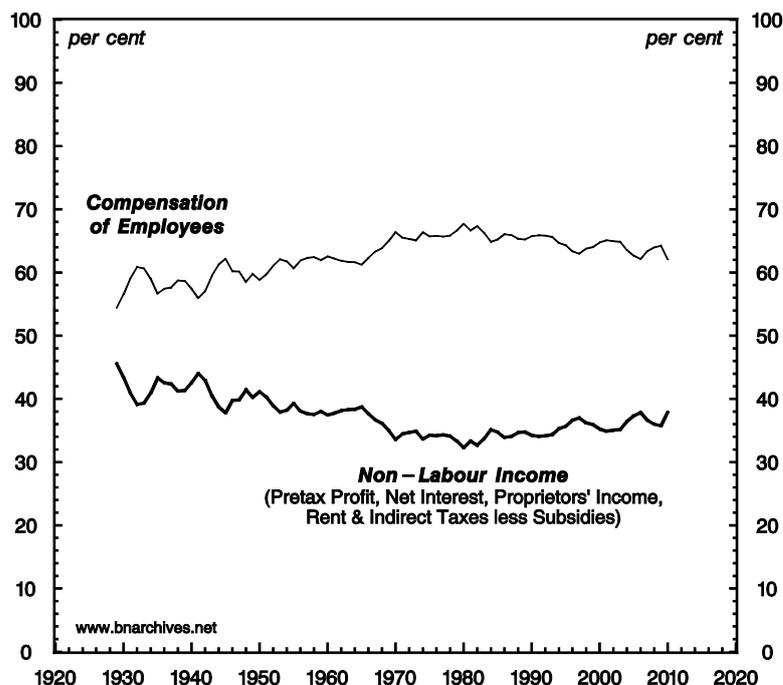
Source: U.S. Bureau of Economic Analysis through Global Insight (series codes: YN for national income; YPCOMP for compensation of employees; ZB for pretax profit [without CCAdj & IVA]; INTNETAMISC for net interest; ZA for after-tax profit [without CCAdj & IVA]); *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition* (online) (series codes: Ch13 for the number of tax returns of active corporations [till 1997]); U.S. Department of Commerce, *Statistical Abstract of the United States 2012*, Table 744, p. 491 (the number of tax returns of active corporations [1978-2008]); Compustat 'funda' file through WRDS (series codes: NI for after-tax profit of the Top 0.01% of corporations).

[Figure 5](#) provides a bird's-eye summary of these transformations, tracing the historical trajectories of the various national income shares since the 1930s (note that the data are expressed as 10-year moving averages, so every observation denotes the average of the preceding ten years). The chart shows that, despite having risen since the early 1980s, the share of non-labour income remains 13 per cent below what it was in the 1930s. However, the chart also shows that, within non-labour income, the above-listed shifts have been positive and large: the national income share of capital income increased by 48 per cent; of pretax and after-tax profit by 120 per cent; and of the after-tax profit of the Top 0.01% by 134 per cent (the last increase is measured since the 1950s). Let us now turn to a closer examination of each of these processes.

Components of national income

[Figure 6](#) provides the most basic breakdown of national income, between labour and non-labour income. The chart tells the quantitative history of line 2 in [Table 2](#) – and on the face of it, the story doesn't seem too fascinating.

Figure 6: Compensation of Employees and Non-Labour Income as a Share of U.S. National Income



Note: Non-labour income is national income less compensation of employees. The last data points are for 2010.

Source: U.S. Bureau of Economic Analysis through Global Insight (series codes: YN for national income; YPCOMP for compensation of employees).

We can see that compensation of employees, expressed as a share of national income, rose from a low of 54 per cent in 1929 to a high of 68 per cent in 1980, and that from then onward it declined gradually, reaching 62 per cent in 2010. As expected, this gradual shift is mirrored by the movement of non-labour income, whose share of national income declined from the 1930s to the early 1980s and rose thereafter.

Now, a naïve assessment of this process may lead one to conclude that the rising share of non-labour income has much more room to go. Even after a three-decade decrease, labour income still amounts to nearly two-thirds of national income. Moreover, this share remains higher than it was in the early part of the century, and that fact suggests that it could be squeezed further in favour groups other than workers, including the Top 0.01%.

But that would be a hasty conclusion to draw. In fact, looking forward, squeezing the share of labour income further is bound to prove difficult.

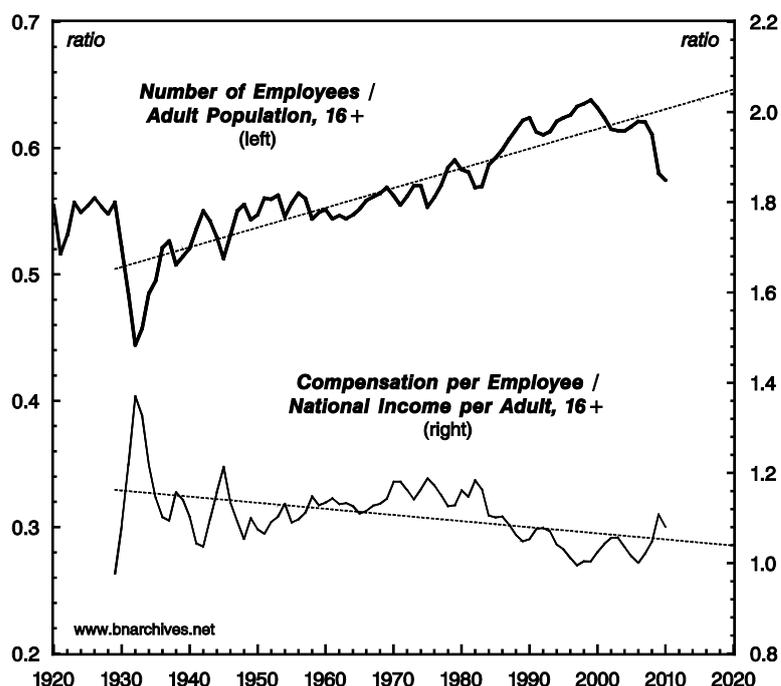
This statement may seem counterintuitive, but the reasons behind it could be explained with a simple decomposition. Consider Equation 6, whose final line expresses the share of employees in national income as a product of two distinct factors: (1) the share of employees

in the total adult population, and (2) the ratio between compensation per employee and the national income per adult. The first factor gauges the number of employees relative to all potential employees. The second factor contrasts the average income of an employee with the average income generated by the adult population as a whole.

$$\begin{aligned}
 6. \quad \frac{\text{compensation of employees}}{\text{national income}} &= \frac{\text{compensation of employees}}{\text{number of employees}} \times \frac{\text{number of employees}}{\text{adult population}} \\
 &\quad \times \frac{\text{adult population}}{\text{national income}} \\
 &= \frac{\text{number of employees}}{\text{adult population}} \times \frac{\frac{\text{compensation of employees}}{\text{number of employees}}}{\frac{\text{national income}}{\text{adult population}}} \\
 &= \frac{\text{number of employees}}{\text{adult population}} \times \frac{\text{compensation per employee}}{\text{national income per adult}}
 \end{aligned}$$

The historical data for these two components are plotted in [Figure 7](#), and, unlike in [Figure 6](#), here the picture is very interesting.

Figure 7: Number of Employees and Compensation per Employee in the United States



Note: The last data points are for 2010.

Source: *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition* (online) (series codes: Age_16AndOlder_Aa141_Number for the adult population, 16 years and over [till 1946]; CivilianLaborForce_Employed_Total_Ba471_Thousand for the number of employees [till 1947]; U.S. Bureau of the Census through Global Insight (series codes: ANPCTTGE16 for the adult population, 16 years and over [from 1947] ENS@US.M for the number of employees [from 1948]). U.S. Bureau of Economic Analysis through Global Insight (series codes: YN for national income; YPCOMP for compensation of employees).

Note that labour income can be redistributed in favour of other groups in one of two ways. The first method is to convert workers into capitalists or proprietors of various sorts, and in so doing re-designate their income. In this way, what was once called a wage becomes profit, interest, rent, entrepreneurial income, etc. – all depending on the new identity of the former worker. But as the top series in the chart shows, historically the conversion has gone the other way: over the past century or so, a growing share of the adult population has been compelled to become workers.

The second method is to squeeze the average income of workers, and in so doing increase the average income of non-workers. According to the trend depicted in the bottom series, this is exactly what has happened since the 1930s: the average worker's income, measured relative to the national income per adult, has gone down.¹³

Is this relative downtrend 'sustainable'? Between the 1970s and the early 2000s, employee compensation relative to national income per adult fell by about 17 per cent; can this ratio be squeezed by another 17 per cent in the next 30 years?

The answer is probably positive: relative wages can be reduced further. But given that this measure is already low by historical standards, squeezing it further is likely to prove increasingly difficult. It will require greater threats, larger doses of violence and the incitement of more fear. And since a greater exertion of power invites greater resistance, there is also the prospect of a powerful backlash. So all in all, it seems that the power of capitalists relative to employees is much closer to its asymptotes than [Figure 6](#) would otherwise imply.

Components of non-labour income

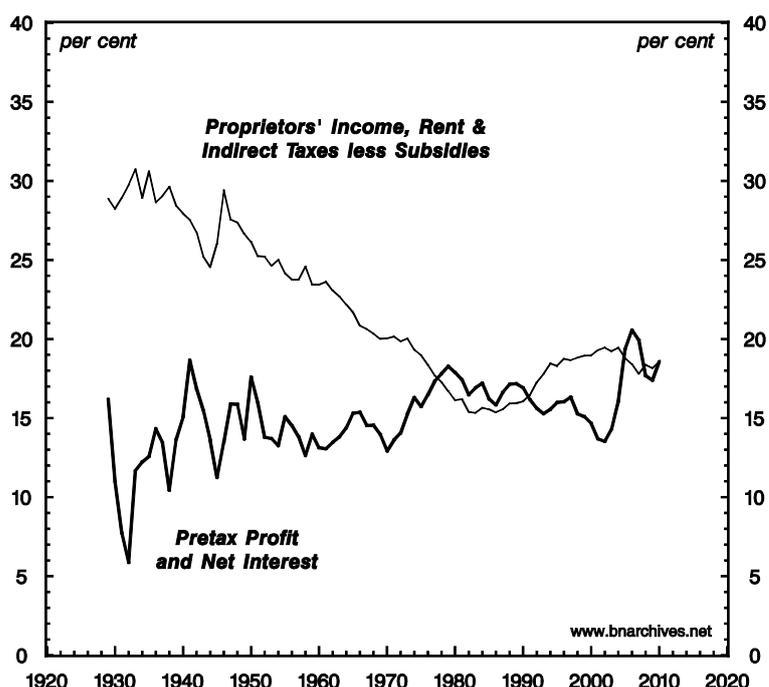
The next step in our decomposition is depicted in [Figure 8](#), which drills deeper into non-labour income.

Following line 3 in [Table 2](#), [Figure 8](#) decomposes non-labour income into two components. The first component, depicted by the thick series, is the income of capitalists, comprising pretax profit and net interest.¹⁴ The second component, depicted by the thin series, measures the income of those who are neither workers nor capitalists – namely proprietors, rentiers and the government.

¹³ Our emphasis here is on the long-term trends of the two series. The cyclical oscillations tend to correlate with the business cycle. To illustrate, consider the downswing since 2008. Falling employment during that period has caused the ratio of employees to the adult population (top series) to fall, while rising unemployment has made national income per adult fall faster than compensation per employee, causing the bottom series to rise. The same logic, only in reverse, operates during an upswing.

¹⁴ The national income accounts provide two measures of profit – with and without capital consumption adjustment (CCAdj) and inventory valuation adjustment (IVA). In this paper we use the former measure (without CCAdj and IVA), because its definition is closer to the one used in corporate financial reports. The quantitative difference between the two measures is negligible for our purposes here.

Figure 8: Capitalist and Other Non-Labour Income as a Share of U.S. National Income



Note: Pretax profit is measured without capital consumption adjustment (CCAdj) and inventory valuation adjustment (IVA). The last data points are for 2010.

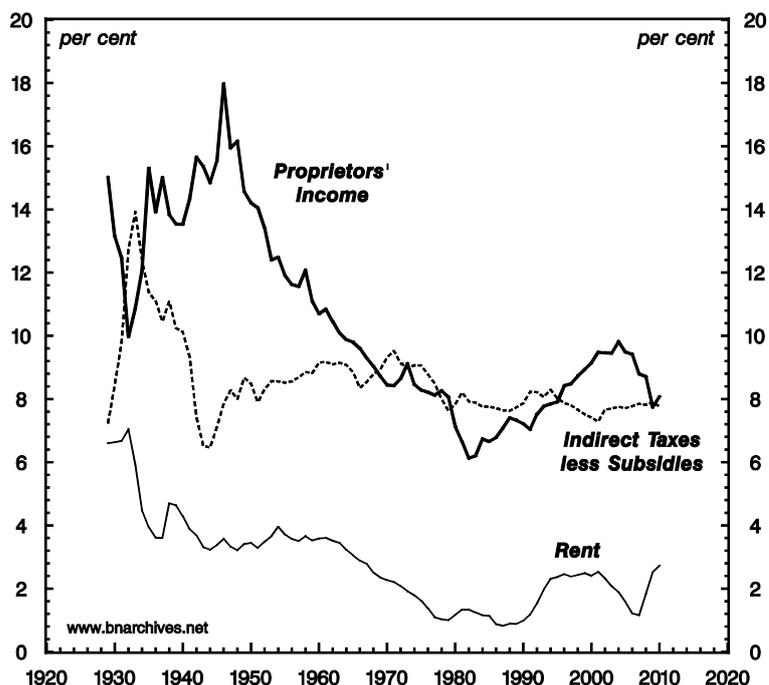
Source: U.S. Bureau of Economic Analysis through Global Insight (series codes: YN for national income; ZB for pretax profit without CCAdj & IVA; INTNETAMISC for net interest; YPPROPADJ for proprietors' income; YPRENTADJ for rent; TXIM for indirect taxes; SUBG for subsidies).

The figure shows that, over the past century, there has been a significant redistribution from those who are neither workers nor capitalists to capitalists: capitalists' share in national income has risen to roughly 20 per cent, up from 12 per cent in the 1930s, while the share of non-workers/non-capitalists has fallen to less than 20 per cent, down from 30 per cent.

Can this pro-capitalist redistribution continue? Sure it can. But as we have seen in the case of employees, here, too, the process is likely to prove increasingly difficult to continue.

To better understand the particular limitation here, consider [Figure 9](#). The chart shows the three ingredients of non-capitalist income. The dashed series represents government sales and import taxes, net of government subsidies. This net claim has remained at roughly 8 per cent of national income for much of the post-war era, and given the U.S. government's regressive bias and need for tax income, reductions in this share are not very likely.

Figure 9: Proprietors' Income, Rent and Indirect Taxes less Subsidies as a Share of U.S. National Income



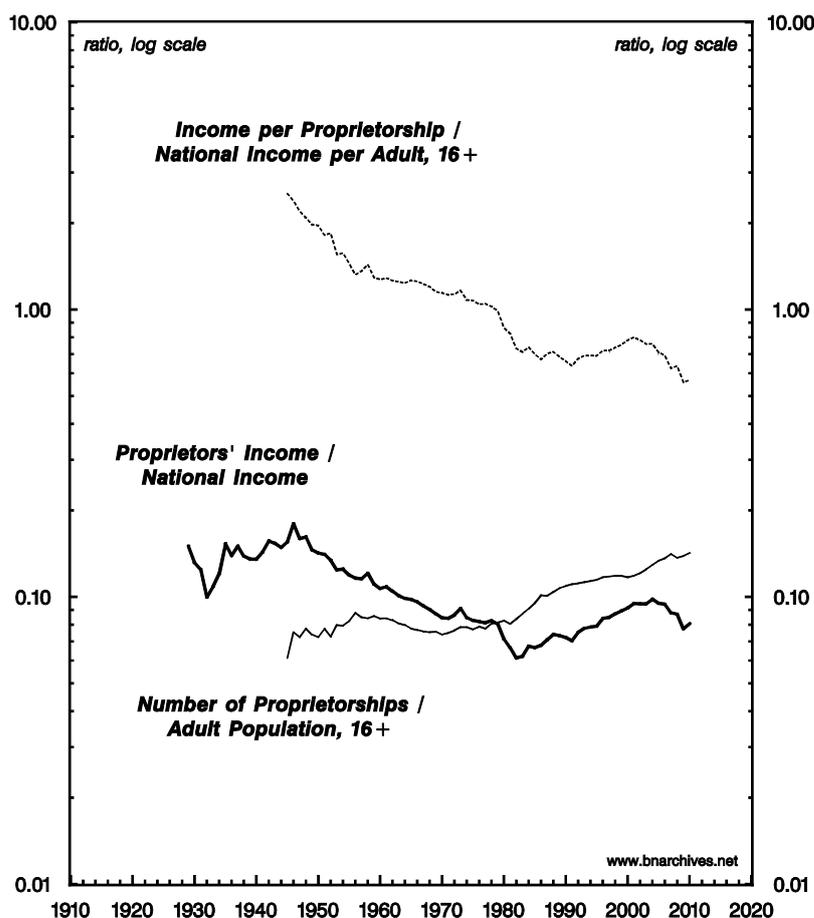
Note: The last data points are for 2010.

Source: U.S. Bureau of Economic Analysis through Global Insight (series codes: YN for national income; YPPROPADJ for proprietors' income; YPRENTADJ for rent; TXIM for indirect taxes; SUBG for subsidies).

The thin series in the figure is rent – including the amounts actually paid by tenants to landlords, as well as those imputed to people living in their own homes. This component of national income had been in a free fall till the 1980s and is now so low that a further reduction – even if it were achievable – would add little to capitalist income.

The only significant candidates for an additional redistributive squeeze here are the proprietors. It is true that their share of national income has already been squeezed from 18 per cent in the 1940s to 8 per cent presently, but that latter proportion is still sizeable. Can it be reduced further?

Figure: 10: Proprietors' Income as a Share of U.S. National Income: A Decomposition



Note: Proprietorships include sole proprietorships and partnerships. For 2009-2011, the number of sole proprietorships is extrapolated based on their average annual growth rate in the preceding 10 years (2.8%). Till 1980, the reported number of sole proprietorship includes farm and non-farm entities; after 1980, it includes non-farm entities only. To estimate the total number of sole proprietorships after 1980, the number of farm sole proprietorships is extrapolated as equal to 30% of the number of non-farm sole proprietorship (the 1980 ratio). The number of partnerships in 1950-1952 and 1954-1956 is interpolated based on adjacent observations. The last data points are for 2010.

Source: U.S. Bureau of Economic Analysis through Global Insight (series codes: YN for national income; YPPROPADJ for sole proprietors' income); *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition* (online) (series codes: Ch4 for the number of sole proprietorships [till 1980]; Ch7 for the number of non-farm sole proprietorships [till 1998]; Ch10 for the number of partnerships [till 1997]; Age_16AndOlder_Aa141_Number for the adult population, 16 years and over [till 1946]); U.S. Department of Commerce, *Statistical Abstract of the United States 2012*, Table 744, p. 491 (for non-financial sole proprietorships and partnerships from 1999 and 1998, respectively); U.S. Bureau of the Census through Global Insight (series codes: ANPCTTGE16 for the adult population, 16 years and over [from 1947]).

To see the potential for this further redistribution, consider [Figure 10](#). This chart decomposes the proprietors' income share in a manner similar to the decomposition of the wage share in [Figure 7](#) (note that here we use a log scale and that the income shares are expressed in decimals rather than as percentages). The thick series in the chart is taken from [Figure 9](#) to contextualize the process. The thin series shows the ratio between the number of proprietorships and the adult population.¹⁵ And the dashed series shows the ratio between

¹⁵ Note that a proprietorship can comprise more than one person.

the average income per proprietorship and the average national income per adult. If we were to multiply the values of the thin and dashed series, we would get the values of the thick one – the decimal share of national income received by proprietors.

The redistributive process here is very similar to – albeit much more dramatic than – the one we saw with wages. In principle, capitalist income can be increased by turning proprietors into capitalists and reclassifying their income as interest or profit. But according to the thin series in [Figure 10](#), the process has unfolded in the opposite direction: since the 1940s – and particularly since the free-enterprise revolution and union busting of the 1980s – an ever growing proportion of the adult population has been forced to join the ranks of the proprietors. And if we are to judge by the relative income of these proprietors indicated by the dashed series, the newcomers have been in for a pretty rough ride.

During the 1940s, the relative income of proprietorships was three times the national income per adult; by the early 2010s, it dropped to one half – a six-fold decrease. In other words, capitalists cannot bank on squeezing proprietors much further: these proprietors already earn half as much as the average employee (and probably less, give that some proprietorships comprise more than one member), so compressing their income even further will likely reduce them to something close to bare subsistence.

So here, too, capitalist power seems to be pushing against its own asymptotes: it can be increased a bit more – but only with plenty of violence and a lot of downside risk.

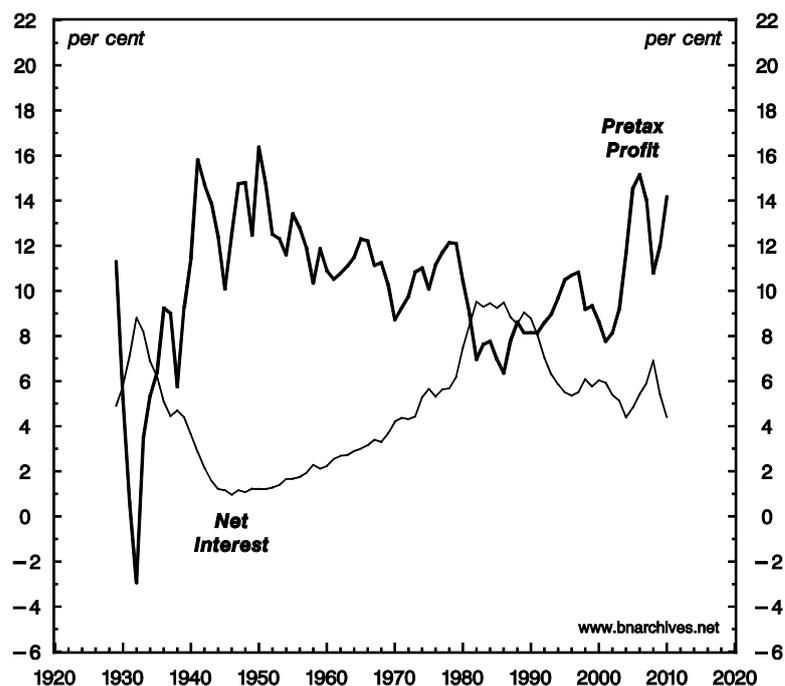
Components of capitalist income

The next step, illustrated in [Figure 11](#), is to decompose capital income into pretax profit and net interest. Before turning to the data, though, a couple of qualifiers are in order.

First, our analysis here is concerned primarily with profit, so the distinction we make between profit and interest is certainly relevant. However, we should also note that, contrary to the conventional creed, this distinction has nothing to do with the common separation between so-called ‘non-financial’ and ‘financial’ activities. Both profit and net interest are payments that businesses make to their owners: the former payment is made to owners of equity, the latter to owners of debt, and that is it. Moreover, all firms – whether they are labelled ‘non-financial’ (and by popular implication ‘productive’) or ‘financial’ (and therefore ‘unproductive’) – make both types of payments to their owners/creditors.

Second, and although it may sound strange, in the national accounts home ownership is considered an ‘enterprise’. Because owning a home is the only ‘enterprise’ that pays but does not receive interest, interest on home mortgages, although paid *by* individuals (to firms), ends up as part of the net interest payments *to* individuals (i.e., the interest paid by less the interest received from enterprises).

Figure 11: Pretax Profit and Net Interest as a Share of U.S. National Income



Note: Pretax profit is measured without capital consumption adjustment (CCAdj) and inventory valuation adjustment (IVA). The last data points are for 2010.

Source: U.S. Bureau of Economic Analysis through Global Insight (series codes: YN for national income; ZB for pretax profit without CCAdj & IVA; INTNETAMISC for net interest).

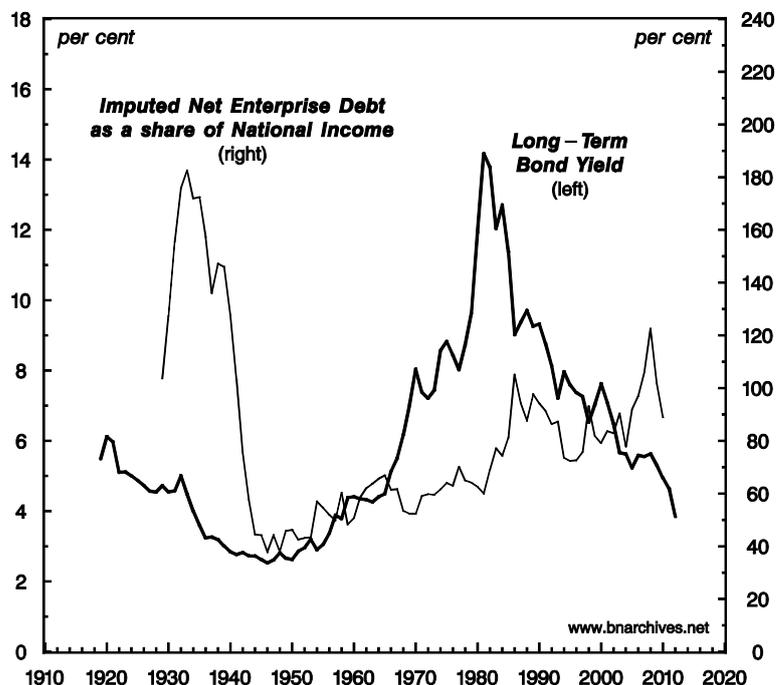
As [Figure 11](#) makes clear, variations of net interest have an important effect on pretax profit. We have already seen in [Figure 8](#) that the overall share of capital in national income has trended upward. But here we can see that the components of capital income tend to move in opposite directions: when the share of interest in national income declines, the share of profit in national income rises – and vice versa. And the reason is simple: all else being equal, the lower the interest payments to debt owners, the more there remains for equity holders. (As a side note, this pattern suggests that variations in the profit share of national income may owe more to the accounting classification of capitalist income than to the ‘class struggle’ between capitalist and workers.)

Now, a corporate strategist inspecting [Figure 11](#) with an eye to the future may ask: how far can this twin process of falling net interest and rising pretax profit go? And his short answer would probably be: not very far.

The reason for this answer is outlined in [Figure 12](#). To make sense of this chart, note that the amount of net interest paid is always a product of two components: the amount of outstanding debt and the rate of interest. The components of this product are easy to impute. If we take from [Figure 11](#) our measure of net interest as a share of national income and divide it by the rate of interest, we get an estimate of the net debt of enterprises, expressed as a share of national income. The figure plots both of these components – the long-term bond yield (thick

series against the left scale) and the imputed net debt of enterprises relative to national income (thin series against the right scale).¹⁶

Figure 12: Net Interest as a Share of U.S. National Income: A Decomposition



Note: The category 'enterprise' comprises businesses as well as mortgaged home owners. Imputed net enterprise debt as a share of national income is derived by dividing the share of net interest in national income by the long-term corporate bond yield (expressed as a decimal). The last data points are 2010 for the imputed net enterprise debt and 2012 for the long-term bond yield.

Source: U.S. Bureau of Economic Analysis through Global Insight (series codes: YN for national income; INTNETAMISC for net interest); Moody's through Global Insight (RMMBCAAANS for the corporate bond yield, AAA, seasoned issue, 20-year-or-longer maturity).

Begin with the imputed net debt of enterprises. The chart shows how the value of this debt fell from nearly 190 per cent of national income in the 1930s to about 40 per cent in the 1940s (the initial part of the decline was probably driven by bankruptcies, and the subsequent decline by rising national income). By the late 1940s, however, the trend reversed: the ratio of debt to national income started to increase, and by the 2000s it reached 100 per cent.

Next, consider the rate of interest, measured here by the yield on AAA corporate bonds with 20-year-or-longer maturity. This rate increased from less than 3 per cent in the 1940s to 14 per cent in the 1980s, before dropping below 4 per cent in early 2012 – oscillations that owe much to the rise and decline of inflation.

Now, note that since the 1980s, the ratio of debt to national income and the rate of interest moved in opposite directions, but that the decline of the latter was faster than the rise of the former, causing the overall share of net interest in national income to decline.

¹⁶ In practice, different debts carry different rates of interest over different maturities, while our computation here uses a single rate of interest for an average long-term maturity. This discrepancy makes the imputed debt inaccurate to some extent, but the general trend is probably not too far off.

What can we say about this process looking forward? A decline in outstanding debt is certainly possible – but such a decline, were it to occur, would likely be effected through a massive crisis that would also crush profit. Barring such a crisis, the likely trajectory is for the ratio of debt to national income to remain high or increase further.

In other words, any further decline in the share of net interest in national income has to come from lower interest rates. But since interest rates are already low by historical standards, the benefit for profits from such a reduction is bound to be limited. So here too we can see the asymptote.

Components of corporate profit

Now, this isn't the end of the story. So far, we have dealt with pretax profit. But for capitalists, the pretax is just a means to an end. Their real goal is the 'bottom line': the profit they are left with *after* tax. And here we come to another very interesting part of the puzzle, illustrated in [Figure 13](#).

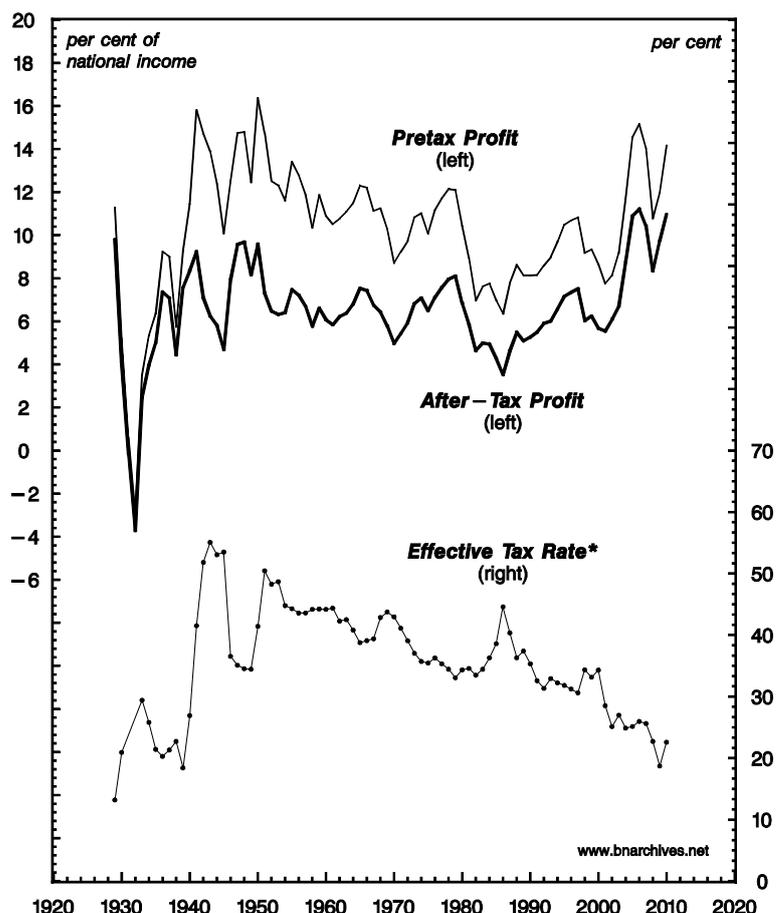
The two series at the top, plotted against the left scale, are expressed as a share of national income: the thin series measures the share of pretax profit and the thick series the share of after-tax profit. Note that the cyclical ups and downs of the two series are very similar, but that their long-term trends are not. If we take the 2000s as our reference point, we can see that although both series have risen since the early 1980s, the national income share of pretax profit is still lower than it was during the 1940s and 1950s, whereas the income share of after-tax profit is higher.

The reason for this long-term divergence is explained by the bottom series, which plots the effective corporate tax rate against the right scale. The data show that during the 1920s and 1930s corporations hardly paid any corporate taxes. But the Great Depression and the reforms that followed ended this free ride, pushing the effective corporate tax rate from 20 to nearly 55 per cent. Obviously, this was a massive setback to the power of owners. It hammered after-tax profit more than anything else – but given the political climate of the time, corporations found it difficult to protest.

Capitalists, though, weren't about to give up, and over the next seventy years, they have managed to claw back what they felt was rightly theirs. Their efforts were highly successful – so much so that by the early twenty-first century, the corporate tax rate is roughly the same as it was in the 1920s, before the welfare-warfare state had been conceived.

The impact of this reduction has been staggering: by having their corporate tax rate reduced from 55 to 20 per cent, owners have managed to boost their after-tax profit by 78 per cent. But, as we have seen, the greater the power – in this case, the power to *not* pay taxes – the harder it is to augment this power. The current political climate makes further corporate tax cuts difficult to achieve. And even if such reductions were to be implemented, their effect on the bottom line would be small. Given that the current effective corporate tax rate is only 20 per cent, the most capitalists could hope for is a 25 per cent increase in their after-tax profit – and that increase would require the elimination of corporate taxes altogether! So once again in our journey, we see capital as power approaching its asymptotes.

Figure 13: Corporate Profit as a Share of U.S. National Income and the Effective Corporate Tax Rate



* The effective tax rate is the difference between pretax and after-tax profit expressed as a per cent of pretax profit.

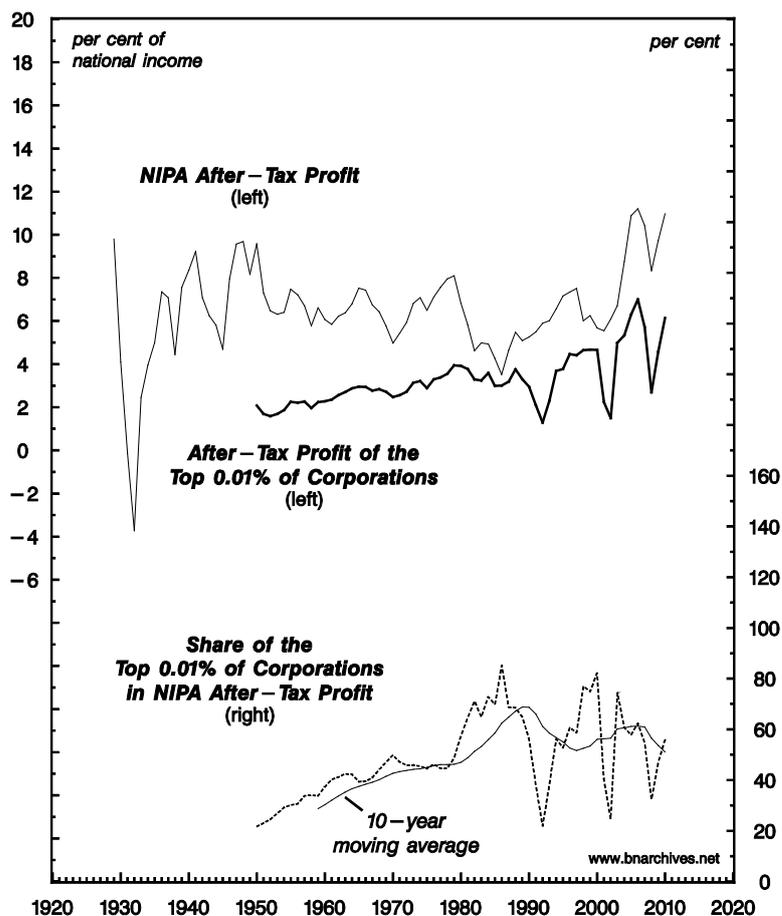
Note: In 1931, the tax was greater than pretax profit, while in 1932, the pretax profit was negative. For presentation purposes, the effective tax rate observations for these two years are omitted. Profit is measured without CCAdj & IVA. The last data points are for 2010.

Source: U.S. Bureau of Economic Analysis through Global Insight (series codes: YN for national income; ZB for pretax profit [without CCAdj & IVA]; ZA for after-tax profit [without CCAdj & IVA]).

Components of after-tax profit

Guided by [Table 2](#), we have one more step to consider, and that is the after-tax profit share of the Top 0.01%. This share is examined in [Figure 14](#). The top part of the chart shows two series plotted against the left scale. The thin series is the share of total after-tax profit in national income (we call this the 'NIPA' series, to mark its relation to the national income and product accounts). The thick series is the net profit of the Top 0.01%, expressed as a share of national income (corporate reports commonly denote after-tax profit as 'net profit' or 'net income'). The bottom of the figure shows another two series, plotted against the right scale. The dashed series is the ratio of the two top series: it expresses the share of the Top 0.01% in NIPA after-tax profit. The solid line going through this series expresses this ratio as a 10-year moving average to show the long-term trend.

Figure 14: U.S. After-Tax Profit: NIPA vs. the Top 0.01% of Corporations



Note: NIPA profits are measured without CCA_{adj} & IVA. The Top 0.01% of corporations comprises, for every year, the top 0.01% of U.S.-incorporated firms in the Compustat North America universe, ranked by market capitalization (see [Figure 3](#) for derivation and computations). The last data points are for 2010.

Source: U.S. Bureau of Economic Analysis through Global Insight (series codes: YN for national income; ZA for after-tax profit). *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition* (online) (series codes: Ch13 for the number of tax returns of active corporations [till 1997]); U.S. Department of Commerce, *Statistical Abstract of the United States 2012*, Table 744, p. 491 (the number of tax returns of active corporations [1998-2008]); Compustat 'funda' file through WRDS (series codes: NI for the after-tax profit of the Top 0.01% of corporations).

The relation between total NIPA profit and the profit of the Top 0.01% serves to historicize the process of corporate centralization. As we can see from the bottom series, during the early 1950s the Top 0.01% accounted for slightly more than 20 per cent of total after-tax profit. Ongoing mergers and acquisitions pushed this share upward, to 85 per cent by the mid 1980s: at that point, the Top 0.01% appropriated nearly all of the national profit of the United States.

But that was the peak. Since then, the share of the Top 0.01% in NIPA after-tax profit has oscillated widely, but the overall trend is no longer up, but sideways, hovering around 60 per cent of the total.

This pattern may seem puzzling. Why did the after-tax profit share of the Top 0.01% stop growing in the early 1990s? What has halted the process of corporate centralization around

60 per cent? Can the leading U.S.-based corporations reignite the engine of centralization to increase their profit share further, or are they brushing up against their asymptote?

Rest of the world

Note that so far our framework has been limited to the 'United States' proper (abstracting from the ambiguities associated with this statist category). We have focused specifically on *national* income, dissecting the various components in which the net profit of the Top 0.01% is nested. However, both the aggregate after-tax profit of the NIPA and the net profit of the Top 0.01% are earned, in part, *outside* the United States – in what the statisticians call ROW (rest of the world).

The growing importance of ROW profit is shown in [Figure 15](#). The raw data that underlie this figure are fraught with hazards of estimation and interpretation, but the overall long-term trends they portray are probably valid.¹⁷ The thick series at the upper part of the figure plots the proportion of U.S. after-tax profit (NIPA) coming from outside the United States (including both the foreign dividends and reinvested earnings of U.S.-based corporations). The data show that during the 1940s and 1950s, ROW profit amounted to less than 10 per cent of the total, but that its growth has been rapid and that its level now hovers around 50 per cent of the total!

And here arises an interesting question: what is to prevent U.S. corporations from using foreign investment (greenfield or mergers and acquisitions) to earn more and more of their after-tax profit from ROW, and by so doing push their profit share of national income above its current level of 11 per cent? Indeed, what is to prevent them from pursuing this international path until their net profit approaches 100 per cent of the U.S. national income?¹⁸ Won't this solution postpone the asymptotic day of reckoning deep into the future?

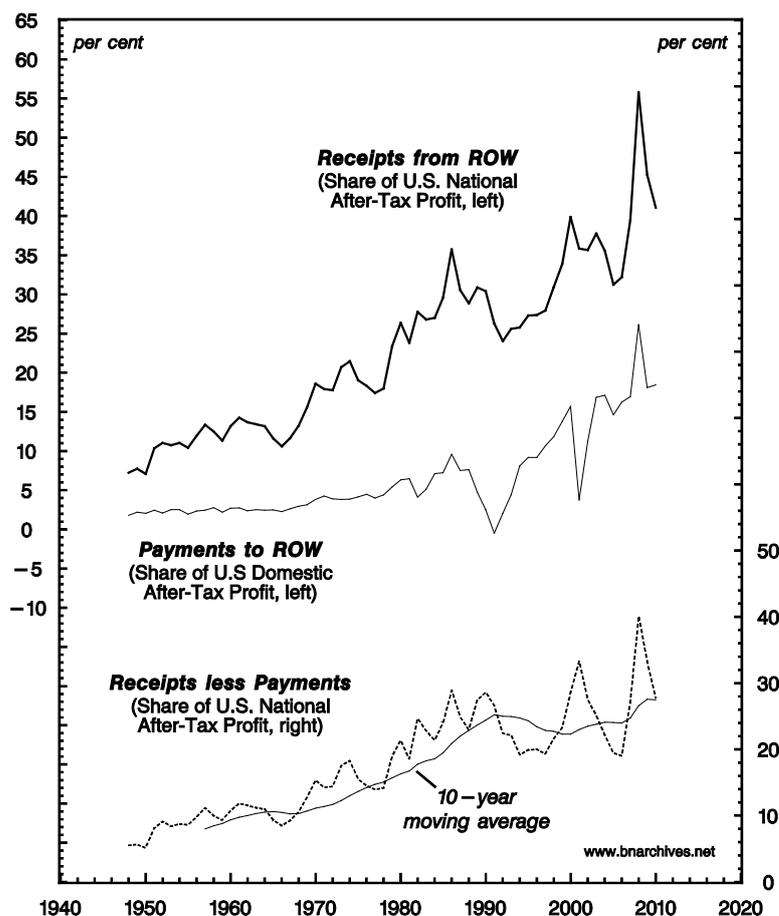
The answer is twofold. First, unlike during the first half of the twentieth century, when U.S.-based corporations reined supreme, these days they face mounting challenges from corporations based in other countries. These challenges are manifested in many different ways – for example, in the downward trajectory of the global profit share of U.S.-based corporations, which fell from 60 per cent in the 1970s to 30 per cent in the 2010s¹⁹ – and they make it more difficult for U.S.-based firms to take over foreign profit streams that were previously theirs for the picking.

¹⁷ On the difficulties associated with foreign asset and income data, see for example [Griever, Lee and Warnock \(2001\)](#), [Bosworth, Collins and Chodorow-Reich \(2007\)](#) and [Curcuro, Dvorak and Warnock \(2008\)](#). On the extensive use of tax havens by large U.S.-based firms and the accounting uncertainties caused by this use, see [White \(2008\)](#).

¹⁸ ROW profits are, by definition, part of U.S. national income (although not of domestic income), so regardless of how large they become, they can never cause overall profit to *exceed* national income.

¹⁹ See [Bichler and Nitzan \(2010a: 19, Figure 3\)](#). These data pertain to listed corporations only. Insofar as the proportion of foreign firms listed in the United States (in terms of both numbers and profit) is larger than the comparable global average, and if this differential has risen over the past half century, the numbers we report here could very well overstate the profit share of U.S.-based firms while understating the pace of its temporal decline.

Figure 15. Rest of the World: Receipts and Payments of After-Tax Profit



Note: After-tax profit is measured without CCA_{adj} & IVA. Receipts from ROW are part of national profit and income, while payments to ROW are part of domestic profit and income. Both receipts from ROW and payments to ROW comprise dividends and reinvested earnings. The last data points are for 2010.

Source: U.S. Bureau of Economic Analysis through Global Insight (series codes: ZA for after-tax profit; XFYADIV for dividends receipts from ROW; XFYAREONUSDI for reinvested U.S. earnings in ROW; MFYADIV for dividends payments to ROW; MFYAREONFDI for reinvested ROW earnings in the U.S.).

Second, and perhaps more importantly, in order for ROW to open up to U.S. foreign investment, the United States has to reciprocate by opening up to foreign investment from ROW. And that is exactly what has happened, particularly since the 1990s. The thin series in the upper part of [Figure 15](#) plots the share of domestic U.S. net profit that is paid to ROW-based owners.²⁰ Until the onset of neoliberalism, this share was very small. But the opening up of the United States to foreign investment changed this situation, causing this share to rise fourfold: it increased from roughly 5 per cent in the 1990s to 20 per cent presently.

The interaction of these inward and outward power processes is illustrated by the dashed series at the bottom of the chart. The series shows the *net* contribution of ROW to U.S. after-tax profit: it measures the difference between the after-tax profit received from ROW and the after-tax profit paid to ROW, expressed as a share of U.S. national after-tax profit.

²⁰ Whereas national net profit is earned by U.S. *nationals* regardless of the geographic territory in which they are generated, domestic net profit is earned on U.S. *territory*, regardless of the nationality of the owner.

And as with [Figure 14](#), here too it seems that U.S.-based capitalists have approached their power asymptote. The contribution of ROW to the share of after-tax profit in national income rose fivefold – from 5 per cent in the 1950s to about 25 per cent in the late 1980s – and then it decelerated sharply, or perhaps stalled. While U.S.-based firms have continued to earn more and more of their income from ROW, firms from ROW have done the same, absorbing a growing share of U.S. domestic profit (see [Appendix](#)).

This influx of firms from ROW may serve to explain the stalling share of the Top 0.01% depicted in [Figure 14](#). The share of large firms in overall profit continues to rise. But since the 1980s, the bulk of this increase is accounted for by firms from ROW, leaving the share of U.S.-incorporated firms stagnant.

Summary and extrapolation

In our previous works on the subject, we argued that this crisis is a systemic one, and that capitalists were struck by systemic fear – a primordial consternation for the very existence of their system. Our purpose in this paper has been to explain why.

In order to do so, we have set aside the liberal-democratic façade that economists label ‘the economy’ and instead concentrated on the enfolded hierarchies of organized power. The nominal quantity of capital, we have argued, represents not material consumption and production, but commodified power. In modern capitalism, the quantities of capitalist power are expressed distributionally, as differential ratios of nominal dollar magnitudes. And the key to understanding capital as power is to decipher the connection between the qualitative processes of power on the one hand, and the nominal distributional quantities that these processes engender on the other.

We have dissected, step by step, the national income accounts of the United States, from the most general categories down to the net profits of the country’s largest corporations. We have shown that, from the viewpoint of the leading corporations, most of the redistributive processes – from the aggregate to the disaggregate – are close to being exhausted. By the end of the twentieth century, the largest U.S. corporations, approximated by the Top 0.01%, have reached an unprecedented situation: their net profit share of national income hovers around record highs, and it seems that this share cannot be increased much further under the current political-economic regime.

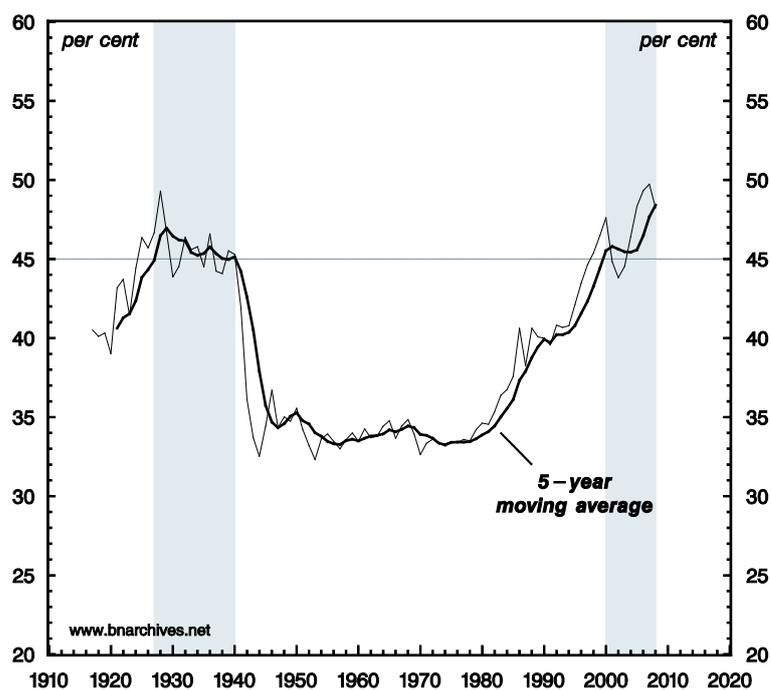
This asymptotic situation, we believe, explains why leading capitalists have been struck by systemic fear. Peering into the future, they realize that the only way to further increase their distributional power is to apply an even greater dose of violence. Yet, given the high level of force already being exerted, and given that the exertion of even greater force may bring about heightened resistance, capitalists are increasingly fearful of the backlash they are about to unleash. The closer they get to the asymptote, the bleaker the future they see.

It is of course true that no one knows exactly where the asymptote lies, at least not before the ramifications of approaching it become apparent. But the fact that, over the past decade, capitalists have been pricing down their assets while their profit share of income hovers around record highs suggests that, *in their minds*, the asymptote is nigh.

How much more force and violence are needed to keep the current capitalist regime going? This of course is a subject in and of itself. But given its crucial importance, it is worth at least a brief, closing illustration.

One important manifestation of the distributional processes we have explored in this paper is illustrated in [Figure 16](#). The figure shows the income share of the top 10 per cent of the U.S. population (note that, unlike the income share of corporate profit that focuses on organizations, this measure focuses on individuals). The shaded areas denote two historical extremes, periods in which the income share of the top 10 per cent of the population exceeded 45 per cent.

Figure 16: Income Share of the Top 10% of the U.S. Population



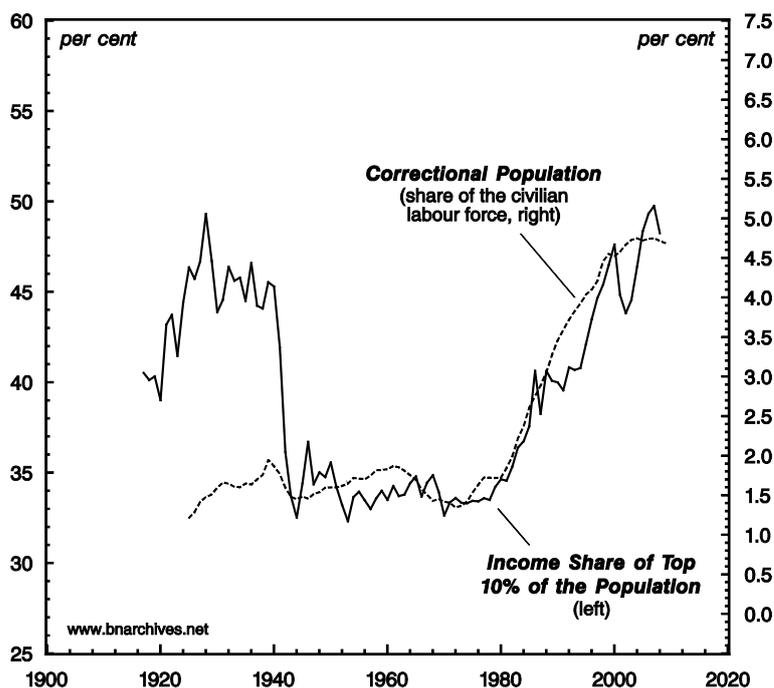
Note: Income is defined as 'market income', including capital gains; it excludes government transfers. Grey areas indicate periods during which the 5-year moving average of the data series exceeded 45%. The last data point is for 2008.

Source: Piketty, Thomas, and Emmanuel Saez. 2004. *Income Inequality in the United States, 1913-2002*. Monograph, pp. 1-92. Updated till 2008 from <http://www.econ.berkeley.edu/~saez/TabFig2008.xls>; data sheet: data-Figure1 (retrieved on February 7, 2011).

During the 1930s and 1940s, this level proved to be the asymptote of capitalist power: it triggered a systemic crisis, the complete reordering of the U.S. political economy, and a sharp decline in capitalist power, as indicated by the large drop in inequality. The present situation is remarkably similar – and, in our view, so are the challenges to the ruling class.

In order to have reached the peak level of power it currently enjoys, the ruling class has had to inflict growing threats, sabotage and pain on the underlying population. One key manifestation of this infliction is illustrated in our last chart, [Figure 17](#).

Figure 17: The Underlying Magma: Income Share of the Top 10% of the U.S. Population vs. the Correctional Population as a Share of the Labour Force



Note: The correctional population consists of adults in prison, in jail, on probation and on parole. For years prior to 1980, systematic data are available only for adults in prison and jail. For those earlier years, the total correctional population is estimated in two steps: first, by computing the average ratio between the total correctional population and the number of adults in prison and jail during the period 1980-1989 (=5.98); and second, by multiplying for each year the number of adults in prison and jail by this average ratio. The last data points are 2008 for the Income Share of the Top 10% of the Population and 2009 for the Correctional Population.

Source: For the income share of the top 10% of the population, see Figure 16. Data on the correctional population are from Sourcebook of Criminal Justice Statistics Online (prior to 1980: Table 6.28.2009 [<http://www.albany.edu/sourcebook/csv/t6282009.csv>]; from 1980 onward: Table 6.1.2009 [<http://www.albany.edu/sourcebook/csv/t612009.csv>]). Civilian labour-force data till 1947 are from the *Historical Statistics of the United States: Earliest Times to the Present, Millennial Edition* (online) (series code: Ba470); from 1948 onward, the data are from the U.S. Department of Commerce through Global Insight (series code: LFC).

The chart reproduces the distributional measure from [Figure 16](#) (left scale) and contrasts it with the ratio between the adult correctional population and the labour force (right scale). The correctional population here includes the number of adults in prison, in jail, on probation and on parole.

As we can see, since the 1940s this ratio has been tightly and positively correlated with the distributional power of the ruling class: the greater the power indicated by the income share of the top 10 per cent of the population, the larger the dose of violence proxied by the correctional population. Presently, the number of 'corrected' adults is equivalent to nearly 5 per cent of the U.S. labour force. This is the largest proportion in the world, as well as in the history of the United States.

Although there are no hard and fast rules here, it is doubtful that this massive punishment can be increased much further without highly destabilizing consequences. With the underlying magma visibly shifting, the shadow of the asymptote cannot be clearer.

Appendix: Proxies of dominant capital

This paper uses a proxy for dominant capital that is different from the one presented at the [2011 conference on the Forum on Capital as Power](#). The differences between the two proxies should be of interest to researchers, and we articulate and assess them below.

The measure used at the conference was the 'Compustat 500', an aggregate comprising the top 500 firms listed in the Compustat North America dataset, ranked by market capitalization. In the present paper, we use the Top 0.01%, an alternative measure comprising the top 0.01 per cent of firms listed and incorporated in the United States. The firms in the latter aggregate are cropped from the Compustat North America dataset by selecting from the database the top U.S.-incorporated firms, ranked by market capitalization.

The Compustat 500 differs from the Top 0.01% in two respects. First, whereas the Top 0.01% includes firms that are both listed *and* incorporated in the United States, the Compustat 500 includes U.S.-listed firms, regardless of where they are incorporated. Second, the number of firms included in the Top 0.01% has grown over time – from 271 in 1950 to 604 in 2010, in tandem with the total number of firms, which rose from 2.71 million to 6.04 million during the same period; by contrast, the number of firms in the Compustat 500 has remained constant at 500.

Note that, because we draw our data from the Compustat database, both measures of dominant capital include U.S.-listed firms only. They exclude unlisted U.S. firms (some of which are very large), as well as firms that are incorporated in the United States but listed elsewhere.

It is hard to determine which of the two measures is more appropriate for our purpose here.²¹ In the end, we have preferred the Top 0.01%, for two reasons. First, the corporate universe is constantly growing, so it is not unreasonable to argue that the number of dominant capital firms is better approximated not by a fixed *number* of corporations (for example, at 500), but rather by a fixed *proportion* of the total number of corporations (we chose the proportion of 0.01%).

Second, the inclusion in the Compustat 500 of firms listed in the United States but incorporated elsewhere presents us with a practical and conceptual difficulty. In our work here, we compare the profit of dominant capital to the *national* income of the United States – yet the 'nationality' of the Compustat 500 proxy of dominant capital isn't entirely clear. As it stands, we don't know how much of the equity of foreign-incorporated Compustat 500 firms is owned by U.S. nationals; and that ignorance means that we don't know what proportion of these firms' profit is (or should be) included in U.S. national income. By including the entire profit of these firms in our measure of U.S. dominant capital, we overstate the ostensible 'U.S.' size of that group by an unknown amount equal to these firms' *foreign*-owned profit. To sidestep this difficulty, we have limited our Top 0.01% group to U.S.-incorporated firms only (although we should note that ignoring the foreign ownership of U.S.-incorporated firms introduces a similar overstatement, equivalent to the portion of their profits that goes to foreign nationals. . .).

²¹ The definition and boundaries of dominant capital are always arbitrary to some extent. We have discussed some of the difficulties associated with this arbitrariness in a number of our works (see for example, [Nitzan and Bichler 2009a: Ch. 14](#)), but the attendant issues deserve a fuller theoretical, methodological and empirical inquiry.

This, though, is a makeshift solution. Domestically listed 'foreign' firms per se are not a new phenomenon. But now that they have become so common, it is no longer clear how they should be separated from 'domestic' firms, or what that separation actually means. In 1950, foreign-incorporated firms constituted a mere 4 per cent of the Compustat 500, and although by 1980 this proportion had already risen to 14 per cent, the resulting inaccuracy was still tolerable. At the time, most foreign-incorporated firms were majority owned in their country of incorporation, and they used their U.S. listing primarily as a platform for raising minority capital. In that context, one could still treat the Compustat 500 as reasonable proxy for 'U.S.' dominant capital.

But that was the watershed. By 1990, with neoliberal globalization in full swing, foreign-incorporated firms already constituted 26 per cent of the Compustat 500 total. And as the ownership and operations of the world's largest corporations became increasingly transnational, this share rose to 41 per cent in 2000, and 48 per cent in 2010. These transformations mean that, today, the top firms in the Compustat universe represent not *U.S.* dominant capital, but an important segment of *global* dominant capital. This is a foundational shift, and, as such, it calls for a new system of global accounting to match the globalizing nature of capital as power.

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The Greek financial crisis and a developmental path to recovery: Lessons and options

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Abstract

The purpose of this paper is threefold: to contribute to the heated debate taking place in Europe about how to deal with the Greek (as well as a similar) financial crisis; to describe the methods for addressing the problem and to examine possible scenarios for resolving the Greek crisis; and, finally, to propose feasible, realistic and effective developmental strategies for future economic growth in Greece.

Key words: financial crisis, developmental policy, macroeconomic policy, Greece

1. Introduction: The political economy context of modern Greece

Since its inception in the early nineteenth century, the governance of the Modern Greek state has been dominated by rent seeking and corruption. The influence of the Orthodox Church on Greek nationalism and the patrimonial legacy of the Ottoman Empire have resulted in a rather weak civil society. Rather than wealth producing activities, the central organizing principles of the Greek society have been political patronage and rent seeking. The result has been a crony capitalist country with a disproportionately large state bureaucracy.

A few socio-political elements have changed overtime but the patron-client basis of Greek society remains intact. Since the 1930s, political parties have evolved from loose coterie of personalities heading extended patronage networks to centralized organizations. Their rhetoric legitimizing the redistribution of benefits has evolved too. Client groups receive benefits in the name of “social justice” or “national necessity” or “acquired rights.” Political patronage has been disbursed through increases in public sector employment, regulations that limit competition, and the imposition of levies on transactions for the benefit of organized groups that are not part of the transaction. Providing a job in the civil service continued through the years to be one of the main instruments used by politicians to ensure voters’ loyalty. Political parties in power continued to staff the civil service with their supporters, so the Greek bureaucracy grew enormously. Approximately two-thirds of the electorate lives partly or wholly on government handouts, which significantly affects the popular ideological narratives in the country.

The resulting governance system has encouraged corruption, discouraged wealth creation, and affected popular ideologies.¹ Social and political elites seek to capture resources for personal benefit. The view that the state is good and markets are bad is widespread, yet understandable in a rent-seeking society where all activities, including market transactions, are seen as wealth redistribution. The same perspective applies also to the activities of the Greek entrepreneurs, which are seen not as wealth creating but as a form of redistribution of existing wealth, leading to a pervasive wealth inequality (Pagoulatos, 2003; Agrawal, 2011).

The effects of “pork barrel politics” on Greek society have been adverse in regards to the faring of the state [economy](#), political affairs and [civil rights](#). Pork barrel government action often vitiates prospects of foreign direct investment, drastically weakens the domestic market, and significantly restrains production and trade expansion. A favoritism-based political system

can easily embezzle money from its citizens by misusing or misappropriating funds derived from [tax payments](#). These funds could otherwise be spent on improving both the economic and social infrastructure of the nation. Furthermore, the popular narrative of “putting people above markets” has deepened clientelism and contributed to the current national crisis.²

The following sections present an overview of Greek economic development and its impediments to growth (Section 2), examine the country’s recent macroeconomic environment (Section 3), describe the methods for dealing with the financial crisis (Section 4), present possible scenarios for Greece (Section 5), and provide feasible development strategies for economic recovery (Section 6). Some final thoughts conclude the paper (Section 7).

2. Economic development overview and impediments

The period from 1950 to 1973 was one of miraculous growth for the Greek economy. With both World War II and the Greek Civil War (between Nationalists and Communists) behind it, the Greek economy undertook a massive reconstruction effort. Similar to other European countries, the Marshall Plan was instrumental in the rebuilding of Greek cities and the construction of new infrastructure projects. There was an urban renewal that replaced the country’s pleasant urban landscape of mostly low-rise buildings and homes with a monotony of characterless concrete blocks in most big towns and cities. The rapid growth of the economy was also facilitated by a drastic devaluation of the currency (drachma), an influx of foreign investment, the development of the chemical industry as well as the development of tourism and the service sector in general. Greek governments devoted themselves principally to expanding agricultural and industrial production, controlling prices and inflation, improving state finances, developing natural resources, and creating basic industries. During this period, the economy grew by an average of 7% per year, second in the world only to [Japan](#). Industrial production also grew annually by 10% for several years, mostly in the 1960s ([Maddison](#), 1995; OECD, 2010). Until 1973, Greece enjoyed high growth and low inflation, yet the growing economy initially widened the economic gap between rich and poor, and intensified political divisions.

The high growth period ended abruptly in 1974 with the collapse of the [military junta](#) (1967-1974), when the country recorded its worst annual contraction in GDP (about 5%) in its post-war history. In 1975, with democracy restored in Greece, the Karamanlis Conservative government undertook a series of austerity measures designed to redress the balance-of-payments deficit and curb inflation. Increased efforts at import substitution were undertaken in all sectors. A new energy program included plans for stepped-up exploitation of oil and lignite reserves, along with uranium exploration in northern Greece. Great emphasis was placed in the effort to admit Greece in the European Economic Community (the precursor of the European Union, EU), which was achieved by 1980.

The Papandreou Socialist government that took office in 1981 promised more equal distribution of income and wealth through “democratic planning”, as well as measures to control inflation and increase productivity. It imposed controls on prices and credit, and began to restructure public corporations. The government was cautious however, in introducing what it called “social control of certain key sectors” of the economy, and commissioned studies for each sector. Its development policies emphasized balanced regional growth and technological modernization, especially in agriculture. The Papandreou government also

introduced the “National Welfare State” for Greek citizens (especially the working classes and farmers) and “National Reconciliation” policies, which provided state pensions and benefits to repatriated Greeks, who had lived in exile since the end of the Greek Civil War in 1950. These new and unfunded state liabilities, without a significant arrest of tax evasion, and the black economy, contributed to the significant deterioration of the public finances, but were deemed necessary to bridge the schism between Nationalists/ Democrats and Communists that had divided the Greek people since the end of World War II.

The Mitsotakis Conservative government of the early 1990s adopted a two-year “Adjustment Program” that called for a reduction in the public sector deficit from 13% to 3% of GDP, the privatization of twenty eight state enterprises, and a reduction of price and wage increases. The Simitis Socialist government of the late 1990s was mainly focused on the policies necessary for Greece to gain admission to the European Monetary Union (EMU). As a consequence, his government instituted an austerity program aimed to tackle the chronically high inflation, and the bloated public sector. By 1998-99, these policies showed significant progress. Greece gained admission to the EMU in 2001, and adopted the euro as its new currency in 2002.

Despite achieving such politico-economic successes like admittance to the European Union, adaptation of the Euro, and inclusion in the group of the thirty highly developed countries by the Organization for Economic Cooperation and Development (OECD), Greece shows pronounced signs of a transition country. It has a high level of regulation leading to a significantly higher incidence of bribery, high taxes and fees on economic activities, and a large discretionary framework of regulations leading to a large shadow economy. Schneider (2000), and Schneider and Enste (2000) estimate the size of the Greek underground economy to be almost one third of the officially measured Gross National Product.³ While high corruption levels can act as an incentive for underground activities, in general, it is when regulations are costly –in terms of money and time– that the “exit option” (i.e., the decision to go underground) becomes more attractive.⁴ Three factors are considered particularly important for the size of the underground economy in a country: the tax and social security contribution burdens; the number of laws, regulations, license requirements, labor restrictions and trade barriers, which substantially increase costs in the official economy; and unsatisfactory public sector services. Katsios (2006) suggests that the bigger the shadow economy is, the lower the state revenues are, which in turn reduce the quantity and quality of publicly provided goods and services, reinforcing the motive to participate in the underground economy.

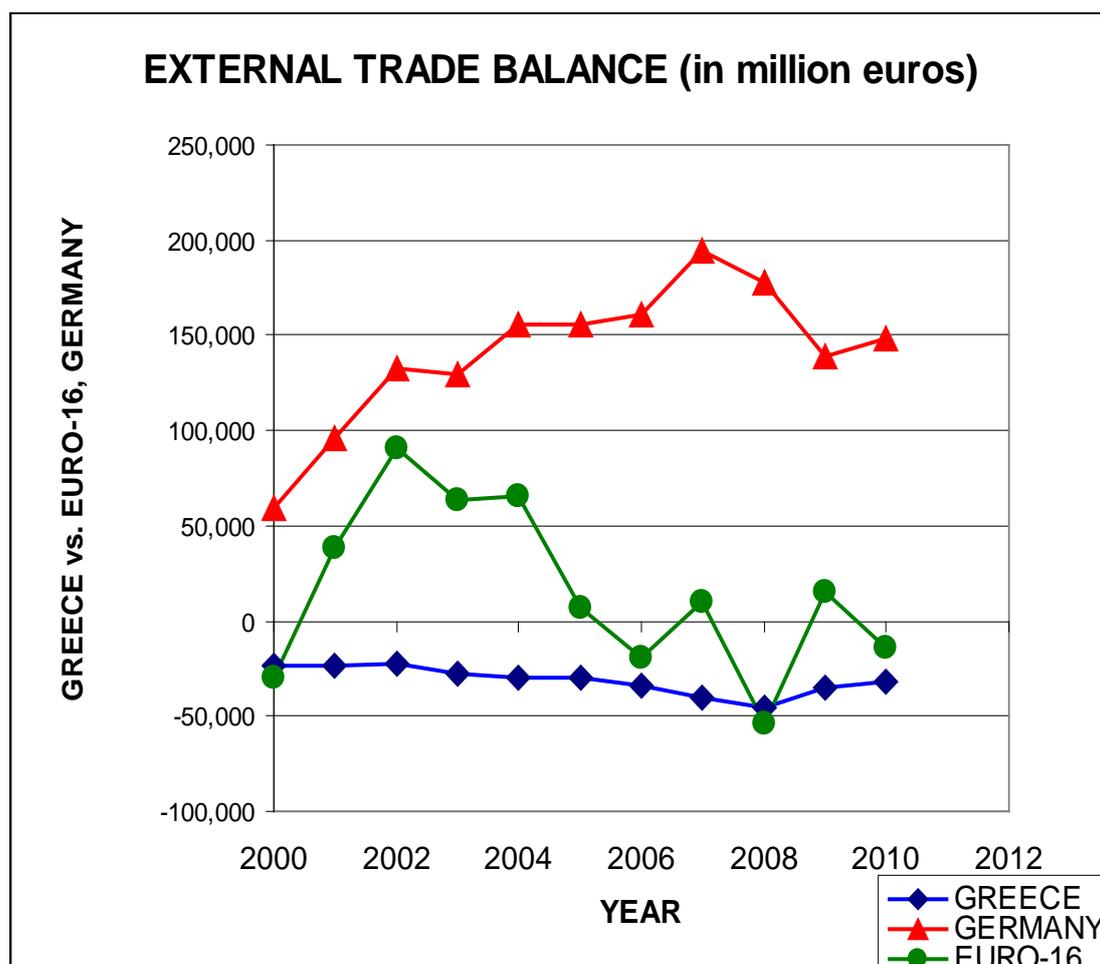
In addition to the large size of its underground economy, there are less developed and economically depressed regions in Greece, where the growth of resources, especially, capital equipment, machinery and new technology, has been slow. Various higher level activities have been seen to gravitate to Athens. Traditional policy making has neither been able to achieve substantial regional/local growth and industrial regeneration nor a significant improvement in competitiveness. Greek development policies do not seem to have addressed adequately and successfully problems like the short-term perspective in decision-making, the technical inefficiencies and failures to develop and promote new products and processes, and the lack of inter-business cooperation. There is a serious lack of research and development (R&D), innovation, on the job, and institutional training and retraining. Greek governments have tended to place little emphasis on government investments on the accelerators of industrial competency and competitiveness, while placing too much emphasis on financial

incentives. And, as mentioned earlier, pork barrel intervention has had harmful effects on Greek economic policies (Karagiannis, 2002).

Bitzenis, Marangos et al. (2011) examine both the motives and the barriers for Foreign Direct Investment (FDI) affecting the level of competitiveness, entrepreneurship, and the business environment in the Greek economy. In terms of motives to enter the Greek market, and in order of importance, the authors conclude that the prospects for market growth, political stability, economic stability, the size of the Greek market, social stability, and the Olympic Games of 2004 were the most decisive factors for a preferable business environment that favored sound entrepreneurship and competitiveness. On the other hand, the primary barriers for FDIs in the Greek market and in order of importance were bureaucracy, followed by the taxation system, corruption, corporate tax, the unfavorable labor market structure, and the unstable legal system. It appears that the banking services sector is not affected by corruption, as the regulatory framework is mostly determined by the European Commission, the ECB, and the EMU. At the same time however, the European regulatory framework creates inconsistencies with the Greek legal system, producing an unstable legal environment which negatively affects banking (and other sectors).

3. Recent macroeconomic environment

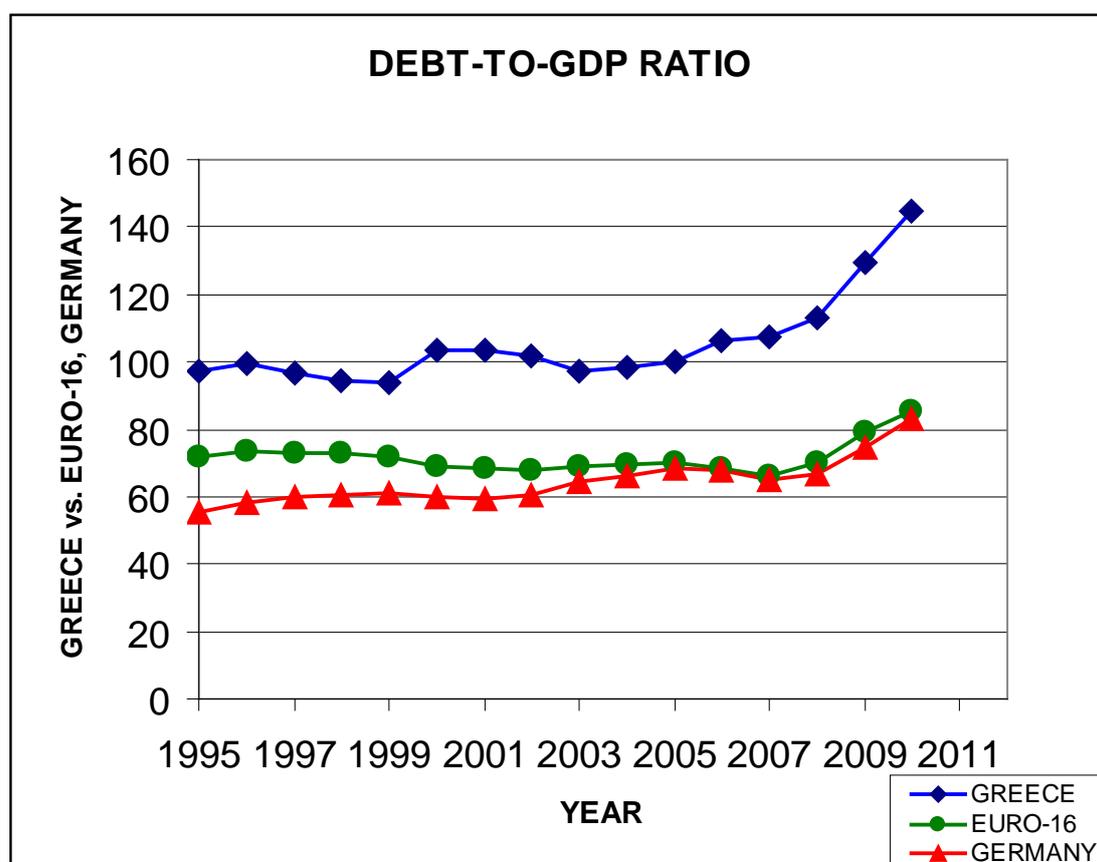
Graph-1



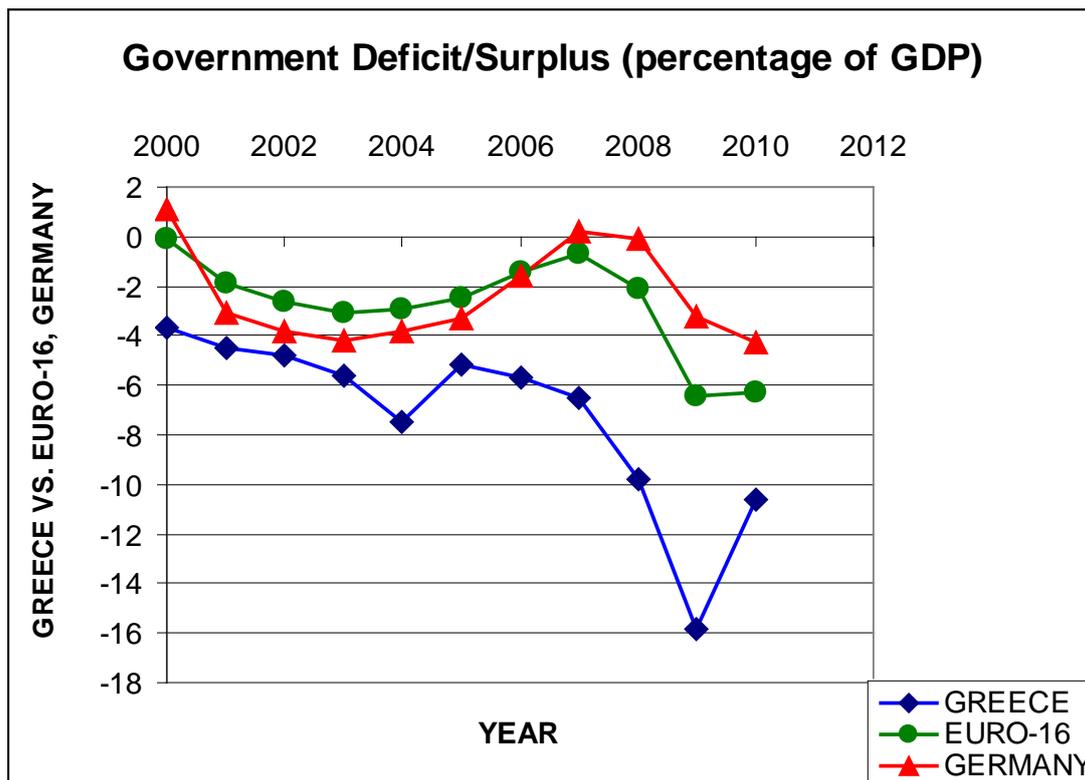
Greece is a predominately service economy. The service sector, including tourism, accounts for over 73% of GDP. Almost 9% of the world's merchant fleet is Greek-owned, making it the largest in the world. Other important sectors include food processing, tobacco, textiles, cement, glass, chemicals (including refineries), pharmaceuticals, telecommunication and transport equipment. Agricultural output has steadily decreased in importance over the last decades, accounting now for only about 5% of total GDP. More than half of all Greek two-way trade is with EU countries, making the EU Greece's major trading partner. Greece runs a perennial merchandise trade deficit and rising current account deficits (Graph-1). Tourism and shipping receipts together with EU transfers make up only for part of this deficit (Giannitsis, 2008; Alogoskoufis, 2009; Hellenic Statistical Authority, 2010).

Greece adopted the Euro (€) as its currency in January 2002. The euphoria and optimism of a new era of economic growth and financial stability, from joining in a monetary union with a group of larger and more developed economies, overshadowed some lurking and persistent imbalances of the Greek economy. The Greek debt-to-GDP ratio was larger than that of other EU members (Graph-2). The budget deficit had only recently approached the euro zone Stability and Growth pact limit of 3 percent of GDP (Graph-3). The ever widening trade deficit was raising questions about the country's international competitiveness. Yet, in a triumph of politics over economics, Greece was deemed ready to compete with the much more developed northern European economies (Kondeas, 2011).

Graph-2



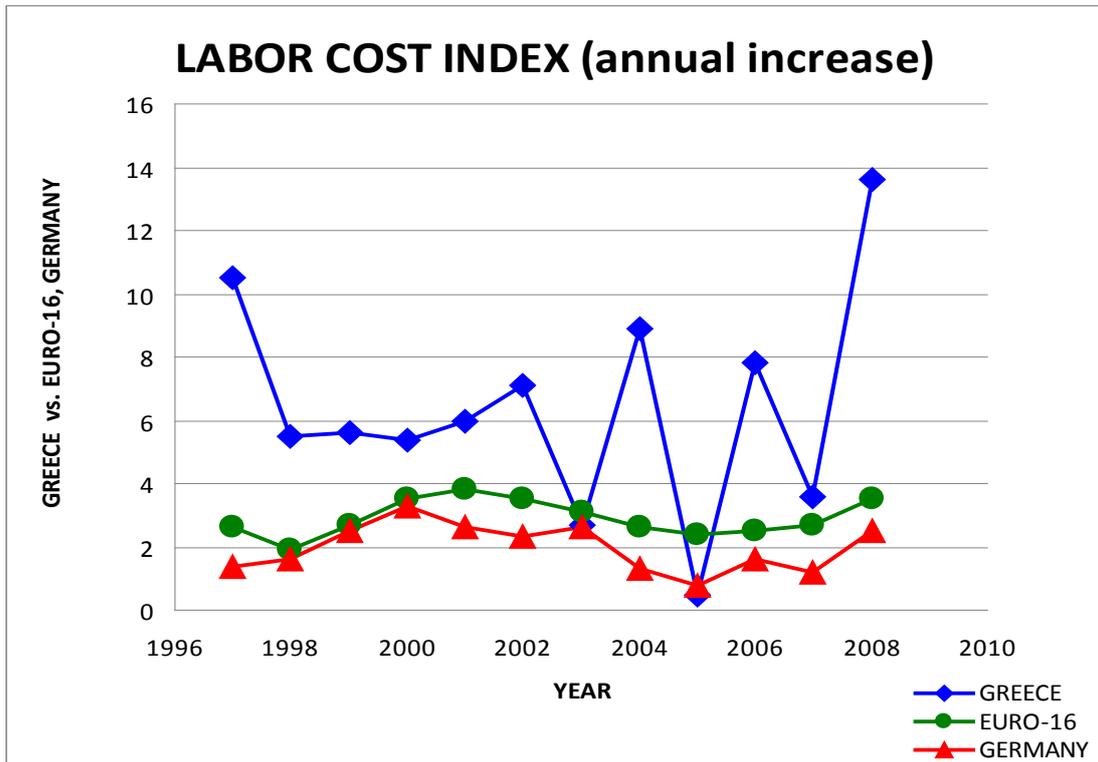
Graph-3



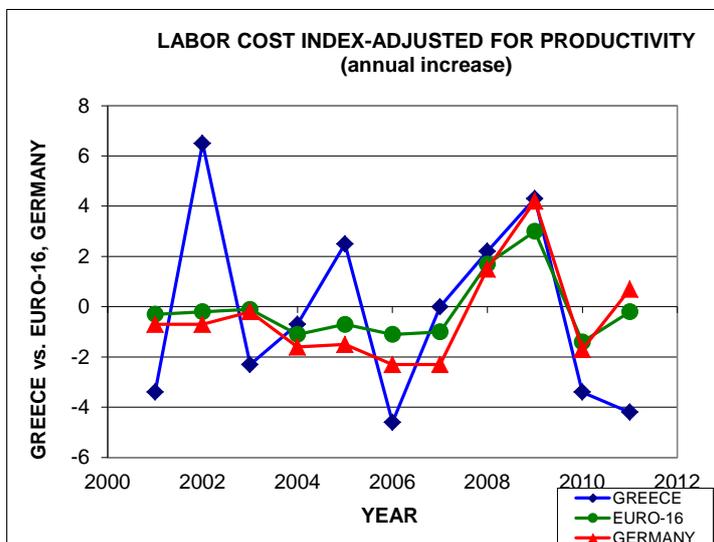
As it turned out, monetary union was very successful in eliminating currency risk within the euro-zone, making the movement of capital between member countries free, fast, and safe. The ensuing euro zone-wide drop in interest rates, down to German interest rate levels, helped many of the member countries finance their growth and deficits. Greece however, did not take advantage of the access to cheap capital to build productive capacity and become internationally competitive. Whether there were unsuccessful efforts to build productive capacity, due to the lack of a developmental policy, or there was not enough productive capacity built to make the economy more competitive, is a matter of debate. The cheaper capital was used instead to fuel consumption spending, which nonetheless provided a significant boost to economic growth.

The new found economic growth was accompanied by an increase in wages and salaries, and Greek labor costs increased by 33% during the period 2001 to 2009. Meanwhile, during the same period, Germany adopted a very aggressive competitiveness strategy,⁵ which led to an increase of German labor costs by only 6% during the same period (Graph-4). Even when the labor costs are adjusted for productivity gains (Graph-5), Greek competitiveness was eroded significantly during this period. As a result, Greece found itself priced out of international export markets (Kondeas, 2011).

Graph-4



Graph-5



Moreover, the conservative fiscal targets that were agreed upon with the Stability and Growth pact were soon forgotten. For most governments, the tax and spending decisions tend to serve primarily domestic politics as opposed to international considerations. The Greek governments not only granted the above mentioned wage increases through the Greek National Collective Labor Agreements, but also approved generous pension benefits at earlier ages than other countries. As the debt crisis was unfolding in 2009, the legal retirement age for all workers in Greece was 61 years, while the German retirement age stood at 67 years. Greek civil servants hired before 1992 could even retire earlier, at the age of 58 (as long as they have served for 35 years).

None of the above was a surprise to the European Union officials. The European Commission had placed Greece under its supervision between 2004 and 2006, as the Greek budget deficit had violated the Stability and Growth pact limit of 3% of GDP. Under the European Commission's scrutiny, the Greek government was able to reduce the budget deficit from 7.2% of GDP (2004) to 2.6% of GDP (2006). This improvement however proved to be illusory and, when the Greek economic data were revised, the new figures revealed the budget deficit was reduced but not as much as originally thought (from 7.4% in 2004 to 5.7% in 2006). But by the end of 2009, the structural weaknesses of the Greek economy, aggravated by the global financial crisis, pushed the budget deficit to 15.8% of GDP, the government debt to 300 billion euro, the debt-to-GDP ratio to 129.3%, and both Standard & Poor and Fitch credit rating agencies downgraded the country's credit worthiness. In April 2010, Greece requested the support of the EU in securing credit at "reasonable" interest rates. Since no such scenario had been anticipated at the onset of the monetary union, there was no framework for handling such a "bailout" request from a member country. With some deliberations, the European Financial Stability Facility (EFSF) was established, and the EU in coordination with the International Monetary Fund (IMF) agreed to extend a credit line to Greece to keep servicing its debts. Specifically, the Greek parliament, Euro-area leaders, and the IMF Executive Board approved a 3-year €110 billion (about \$145 billion) adjustment program to be monitored jointly by the European Commission, the European Central Bank, and the IMF. In exchange for the credit line, the Greek government agreed to implement painful fiscal austerity policies mandated by both the EU and the IMF. Under the program, Greece has promised to undertake major fiscal consolidation and to implement substantial structural reforms in order to place its debt on a more sustainable path and improve its competitiveness so that the economy can re-enter a positive growth trajectory. The 3-year reform program includes measures to cut government spending, reduce the size of the public sector, tackle tax evasion, reform the health care and pension systems, and liberalize the labor and product markets. Greece has committed to reduce its deficit to less than 3 percent of GDP (the ceiling under the EU's Maastricht Treaty) by 2014. The ability of the Greek government to keep drawing quarterly installments from the established credit line has depended on both the EU and IMF approving the progress of the implementation of the austerity policies as well as the implementation of any other structural changes these international facilitators deem necessary for the Greek economy.

4. Methods for dealing with the crisis

Despite the efforts to address the Greek financial crisis, Greece entered 2012 with an estimated GDP of €217 billion and government debt of €360 billion. These figures point to a remarkable debt-to-GDP ratio of about 166%. This means that even with the EU/IMF loans, which carry 4.5% to 5.5% interest rates, and assuming no more declines in GDP, Greece will

need to be spending 8.3% of its GDP ($€360 \text{ bn} \times 5\% = €18 \text{ bn}$) and 28.5% of the government revenues ($€18 \text{ bn}/€63 \text{ bn}$) each year just for coupon payments. Clearly such a debt level is unmanageable, and it will have to be addressed sooner rather than later. Typically, there are four methods dealing with excessive debt levels. In order of political desirability, these methods are: growing the economy out of debt, monetizing the debt, saving and paying down the debt, and defaulting or restructuring the debt.

A. By far the most preferable method will be to grow the GDP much faster than the debt, so the Debt-to-GDP ratio would shrink over time, seemingly without much pain for the country. Historically this was achieved by the US after WWII, UK after the Napoleonic wars, and more recently Indonesia after the 1997 Asian financial crisis. The problem with this method however, is to correctly identify and pursue the source(s) of economic growth. It would be really helpful if Greece could export its way out of the five year long recession that started in 2008 (-0.2%, -3.3%, -3.5%, -5.5%, -2.8% drop in GDP expected for 2012) and return to a vigorous pace of economic growth. Unfortunately, due the lack of competitiveness described in the previous section, Greece has a persistent current account deficit ranging from 10% to 15% of GDP. Without its own currency to devalue to gain some artificial competitive edge for its exports, Greece can only count on an internal devaluation or a miraculous reversal of trade flows within the EU to grow its exports. Both ways however require time in order to be materialized. The internal devaluation implies lower labor costs in the form of lower wages, lower pensions, and/or longer work hours per week for Greek workers. It also implies the relaxation of job security laws and the opening of “closed” professions (attorneys, engineers, pharmacists, etc.) to bring more competition and lower costs in all these economic activities. All these measures are currently pursued by the Greek government, and despite fierce resistance by labor unions and professional organizations, there is actual progress in this front. Greek labor costs declined 3.4% in 2010 and another 4.2% in 2011. Still, according to Eurostat, Greece is looking at another double digit current account deficit and another economic contraction this year.

Another problem with the growing out of debt method is that once the government Debt-to-GDP ratio becomes excessive, this method becomes less effective. For instance, if the fiscal debt was equal to the GDP (100% Debt-to-GDP ratio), then the GDP would need to grow annually by the average coupon rate of the debt (assume 5% the current average of the EU/IMF loans) to generate the coupon payments, without imposing any pain to the private sector in the form of higher taxes, or needing to generate current account surpluses. But now that the Greek Debt-to-GDP ratio is 166%, the GDP would have to grow by 8.3% ($5\% \times 1.66$) annually to generate the coupon payments to service the public debt. This is a very high growth rate, realized only by a handful of developing nations around the world. So, unless the Greek private sector suddenly improves its productivity remarkably, or the double digit current account deficit suddenly turns out to be a sustainable surplus, Greece will not be able to grow itself out of debt and will not be able even to stabilize the Debt-to-GDP ratio at the current level; not from this size debt, and not with any reasonably attainable economic growth rate.

B. Creating inflation reduces the real value of debt and makes it easier for debtors to pay back their debts, all at the cost of domestic consumers who suffer a loss of purchasing power and declining living standards. Japan with a Debt-to-GDP ratio of more than 200%, and both the US and UK with Debt-to-GDP ratios of more than 100%, all manage to finance their debts with the assistance of their Central Banks, who effectively monetize the government debt with Quantitative Easing (QE) schemes. Unfortunately, Greece does not have this option available for dealing with its debt, as it does not have its own currency anymore. Monetizing EU

government bonds is in the purview of the European Central Bank (ECB), which under the pressure of some EU members (mainly Germany and Austria) had resisted taking any such actions until right before the December 2011 EU summit.

A policy of monetizing EU government debts would certainly ease the burden of debtor nations like Greece, Italy, Spain, Portugal, Ireland, and maybe even Belgium and France, but it runs against a deep philosophical divide with fierce proponents on either side of the argument. The issue here is none other than the nature of money itself. The debtor nations, either because of belief or circumstance, view money as tool which could and should be manipulated to meet economic or political goals like fighting unemployment, creating economic growth, etc. This end-justifies-the-means approach in effect suggests that destroying (some of) the value of the euro, by monetizing government debts, is justified in order to save the union and the euro itself.

On the other hand, the surplus nations view money as a common good, which does not belong to governments to use as they wish with it. Instead it belongs to people, who use it to store their wealth. It is precisely for this reason that debt monetization is explicitly prohibited by EU treaties and ECB by-laws. Any such debt monetization would violate EU laws, and violating the law would be dangerous for the stability of the union and the euro. No one would want to be part of a union, whose members don't follow the union rules. No law should be broken to salvage a currency which does not seem to work for many of the union members. Surplus nations simply argue the solution is not to debase money but to adhere to the fiscal discipline treaties that the member states have signed.

While the debate will probably continue for as long there is money in some form or another, and while the ECB official rhetoric is that it does not plan to engage itself in broad scale programs to buy up government debts, the ECB, under pressure to provide support for European banks it introduced a three-year Long Term Refinancing Operation (LTRO) three days before the December 2011 EU summit. Under this LTRO, the ECB in effect introduced a form of a carry trade for European banks, which can borrow from the ECB at the core rate of 1% for a three-year period, and use the funds to purchase government bonds yielding upwards of 5%. While 523 EU banks used the LTRO during the first two weeks of the program to borrow €490 billion, by the first week of January 2012 €458 billion had been re-deposited back to the ECB to earn a 0.25% annual return. Apparently EU banks seem to have no desire to load up on EU periphery government debt, particularly after spending two years and two stress tests getting rid of such debt, which according to Basel III does not count anymore as zero-risk-weighted assets. It seems therefore unlikely that Greece will be benefiting significantly from any indirect ECB attempts at debt monetization.

C. Saving and paying down the debt is always a painful option for an indebted state. The EU/IMF assistance loans however, are dependent on the implementation of some severe austerity measures by the Greek government. The budget deficit (15.8% in 2009) will have to be eliminated, more than 150,000 civil servants will have to lose their jobs, and the remaining ones will have to accept severe (20%-40%) salary cuts. All state pension benefits will have to be permanently reduced, and the welfare state will have to be curtailed. State enterprises will have to be privatized, which will probably require Greece to first downsize its labor force to make them lean and attractive to private investors. But in a three-sector economic model, comprised by the private (households and businesses), public (government), and foreign sectors, deleveraging of the public sector can only come at the expense of the other two sectors (Parenteau, 2010). Since Greece has a double digit current account deficit, the whole

burden of the government budget cuts will have to fall squarely on the shoulders of the Greek private sector. Higher unemployment and lower incomes tend to yield lower tax revenues and ascending Debt-to-GDP ratios. Indeed, the Greek economy has been shrinking (-3.5% in 2010, -5.5% in 2011) since the implementation of the EU/IMF austerity plan. The current unemployment rate, 19.2%, has more than doubled between 2009 and 2011, while youth unemployment escalated to 47%. At the same time, the Debt-to-GDP ratio has climbed from 126.8% before the plan, to 166% at the end of 2011, and the IMF is expecting it to reach 187% in 2013. Continuing the austerity plan will cause a further deterioration of the economy with severe and prolonged income losses, which will increase loan defaults and bank losses, causing bank failures. To prevent any further credit contraction, and to preserve a functioning banking system, the Greek government will be forced to bail out and recapitalize domestic banks. That will require even more government debt issuance, which will make the value of the government bonds slide closer to the abyss. That will also cause the erosion of the asset value of the Greek banks, which are heavily invested in government bonds (€50 billion) and will require higher recapitalization, creating, therefore, more government debt. Clearly, austerity alone pushes the Debt-to-GDP ratio to the wrong direction.

D. Defaulting or restructuring the debt for either the private or the public sector is merely a financial tool, and a necessary one for heavily indebted parties. Despite being portrayed by financial media as catastrophes, history is full of examples of sovereign debt restructurings and defaults. Reinhart and Rogoff (2008) report 238 such incidents since 1800. Spain alone has done so 13 times during this time period. More recently, Russia defaulted on its foreign debt in 1998, and Argentina followed suit in 2001. It was not the best of times, but certainly it was not the end of the world for these countries.

The original 2010 EU/IMF assistance plan for Greece had no provisions for any debt restructuring. EU leaders considered any debt relief as posing a great moral hazard problem for all debtor EU members, who could violate the fiscal discipline treaties they have signed knowing their debts could be erased too. Austerity alone was deemed sufficient to put the Greek public finances in order. The deterioration of the Greek economy that ensued during the following twelve months forced the July 21, 2011 EU Summit, to contemplate a 21% Greek debt restructuring. It involved no reduction in the face value of debt, just delay of debt repayment. Soon after the Summit, the IMF voiced its concerns about the effectiveness of such a minimal restructuring in dealing with the Greek problem and called for further measures to be negotiated. The October 26, 2011 EU Summit resulted in the Brussels Agreement, which was centered on a voluntary 50% reduction of the face value of the Greek debt issued before May 2010, and held by private investors (Private Sector Involvement – PSI). The loss apparently had to be “voluntary” to avoid the activation of Credit Default Swaps (CDSs), which could destabilize the issuers of these contracts and spread the financial losses to counterparties around the world. Furthermore, to protect the EU and the IMF from losses on their assistance loans to Greece since May 2010, the agreement excluded these Institutions’ funds extended to the country.

The much heralded Brussels Agreement left many critical details unresolved. For instance, there was no obvious reason to expect private investors will “voluntarily” accept a 50% loss on the face value of their Greek bond holdings, at least not from those holding CDSs which would be made whole if the CDSs were triggered. Another issue with the Agreement was that the ECB was placed over and above other private or public bondholders of Greek debt, since it was excluded from the 50% restructuring of its €55 billion Greek debt holdings. Finally, and perhaps more important, even if the agreement was fully implemented, it would only provide

an insignificant relief for Greece. The Agreement officially would shave off around €100 billion of the Greek debt. But to entice private bondholders⁶ to accept the “voluntary 50% PSI, the Agreement offered them a €30 billion collateral payment in case Greece failed to repay the remaining 50% of the bonds’ value. The €30 billion would have to be borrowed by the Greek government, unless the privatizations of Greek state enterprises were finally to materialize and yield this amount. Therefore, the PSI would reduce the Greek public debt at most by €70 billion. Given the October 2011 face value of the debt (€360 billion), the PSI would effectively reduce the Greek debt by 19.44% (€70 bn/€360 bn) leading to a 134% Debt-to-GDP ratio (€360 bn-€70 bn/€217 bn). Obviously, any further deterioration of the Greek GDP would easily send the Debt-to-GDP ratio above 150% once again.

The omissions and vagueness of the Brussels Agreement necessitated the December 11, 2011 EU Summit to kick start a new round of negotiations for the solution of the Greek problem. Several proposals dealing with the shortcomings of the Brussels Agreement were considered. First, Greece was to retroactively introduce a Collective Agreement Clause (CAC) to its bonds to force minority investor holdouts to accept the “voluntary” PSI the majority of investors will accept. Second, the ECB could sell its €55 billion of Greek bonds to the EFSF, or back to the Greek government which would receive EFSF financing. This would prevent the ECB from realizing any losses it could ill-afford, in case it became legally obligated to participate in the PSI. At the end of 2011, the ECB had €6.36 billion paid-in-capital against €2,733 billion assets. This yields a 430-to-1 leverage ratio (assets/capital), or alternatively a 0.23% capital ratio. Simply put, the ECB was not (and still is not) sufficiently capitalized to handle any losses in its asset portfolio. Third, the proposed “voluntary” haircut had reached a magnitude of 70%-90% (PSI+). Moreover, it seems that EU leaders were now the ones pushing the private bondholders to accept larger losses in order to make the Greek debt viable, so their governments would not be on the hook again for more assistance in the future. The EU leaders seemed to have come to the realization that it would be preferable to eliminate the systemic risk and unpredictable losses from a panic caused by a possible Greek default, even if the EU governments had to bear the cost of recapitalizing some of their banks subjected to the PSI+ and suffering some very predictable losses. As a result of this pressure on the banking sector by the EU leadership, the final participation rate in the PSI bond exchange program reached 96.9% by April 2012, according to the Greek Debt Management Office. However, even with the PSI bond exchange the Greek government debt remains at €266 billion, resulting in a 122.58% Debt-to-GDP ratio, which is still high and risky for the country’s economic stability (Greek Secretariat General of Information, 2012).

It is perhaps ironic that within the two years since Greece asked for the assistance of the EU and the IMF, the EU leaders have shifted their position from the moral posturing of no-debt-relief to the arm-twisting of their banks to accept 70%-90% losses on their Greek bonds, in the hopes of ring-fencing the systemic risk of future defaults. This is however what happens when politics hit the wall of economic reality, and it is a step in the right direction for solving the Greek problem. It is a formal recognition that austerity alone cannot address the problem sufficiently. While the EU leaders wasted two years relying on only one of the methods of dealing with debt, the Greek financial situation has deteriorated. It is finally time to employ all methods available to find a viable solution to the Greek financial crisis. The future of Greece and perhaps the future of the European Monetary Union depend on the policy steps or missteps the EU leaders will take attempting to stabilize the Greek economy.

5. Possible scenarios for Greece

Realistically, there are only two main scenarios possible for Greece:

A. Under the first scenario, the EU leaders, having learned from the policy mistakes of 2010-2011, will deploy all four methods described in the previous section to bring stability and growth back to the Greek economy. The Greek economy will be revived, the monetary union will be saved, and the dream of a political union will remain intact. The following policy proposals can provide evidence that the EU is committed towards this outcome: the Greek government debt, after all negotiation iterations, will be restructured to a size that will bring the Debt-to GDP ratio to a more manageable level of no more than 100% of GDP. The ECB will monetize part of the Greek debt by acting as a lender of last resort to Greek banks, which will continue borrowing from the ECB placing government bonds as collateral.

Furthermore, to increase liquidity and maintain a functioning banking system, the EU leaders will create (sooner rather than later) a European Deposit Insurance Corporation (EDIC) to guarantee EU bank deposits and prevent bank runs. Currently, there are only national deposit insurance schemes, which have no credibility with depositors in countries in financial distress. Greek banks have lost more than 26% of their deposits in two years (from €238.5 billion at the end of 2009 down to an estimated €175 billion at the end of 2011). Depositors have come to realize that a government unable to borrow to pay its bills will certainly be unable to guarantee depositors' funds. Once deposits in Greek banks are deemed safe again, the Greek banks will regain the necessary liquidity to lend and jumpstart the economy.

The structural changes in the Greek economy will certainly be continued, but the austerity program will slow down to avoid suffocating economic activity and shrinking GDP. For instance, balancing the government budget will probably have to be postponed until 2015, instead of 2012, which was originally demanded by the EU/IMF plan. Policy emphasis would be placed towards growing the economy again. This preferred method for getting out of debt has been completely ignored thus far. However, with the Greek public and private sectors starved for investment funds, this task will have to fall on the shoulders of the EU. In coordination perhaps with the World Bank, the EU will create and oversee an investment fund for the "reconstruction" of the Greek economy. The fund will target areas of the economy that will increase the country's international competitiveness. Such strategies are presented in Section 6.

For policies like the ones listed above to take place and this scenario of European unity to prevail, EU leaders will have to come to realize and accept that all EU members will never be equally competitive. Therefore, some members will always be richer and some will always be poorer. But to the extent that the participation of the less competitive members in the Union provides benefits to the more competitive ones, the latter should be willing to transfer some of these benefits to the less competitive members to keep them in the Union. This is not unlike the wealthier US states subsidizing the poorer states through their federal taxes. This argument does not imply that the less competitive members are absolved from the responsibility of keeping their public finances in good order. It only argues that it is impossible for all EU members to run current account surpluses with each other at the same time. The less competitive members will be experiencing persistent current account deficits, which unless they are offset by transfer payments from the surplus members, they will eventually end up in financial crises.

B. Under the second scenario, EU leaders having failed to learn from their previous policy mistakes will insist on austerity, and other half measures which will prove to be grossly insufficient to stabilize the Greek economy. Greece will be in effect pushed out of the Euro-zone and forced to default on its debt. The following developments will provide evidence that this Euro-breakup scenario prevails: the debt restructuring will leave more debt than taxpayers can service. The continuous austerity policy will further depress economic activity. Private loan defaults and bank failures will drain any liquidity from the markets, and unemployment will increase to socially intolerable levels. In December 2011, Greek youth unemployment was already at 47%, and it will deteriorate further. In other words, this scenario will result in pain and suffering for the Greek people, with no end in sight and no hope for re-entering a growth trajectory any time soon.

Without the needed liquidity from the ECB, the credit crunch will cripple the banking industry and therefore the economy. To maintain a functional liquid banking sector, the Greek government will have to abandon the Euro and re-institute its own currency. The “new” Greek currency will be devalued immediately in currency markets, making the Euro-denominated debt unserviceable. Defaulting on all foreign-held government debt will be the next logical step. Domestically-held debt by banks, pension funds, and private investors will still have to be honored to avoid any more disruptions in the domestic market, but it will be redeemable using the new currency.

Certainly these transitions will not be without political and economic costs. Greece will be blamed for casting doubts on the feasibility of the monetary union and the much-desired hopes for political union of Europe. The transition to the new currency will require a bank holiday to re-configure hardware and software requirements, to convert all loan and deposit balances from Euros to the new currency, and to sufficiently recapitalize the banking institutions. Capital controls will have to be imposed initially to prevent the flight of Euros to other countries, while incentives will have to be provided for the private sector to convert their Euros into the new currency. For instance, discounts could be offered to those choosing to pay their taxes in Euros instead of the new currency. The devalued new currency will cause the prices of imports like oil, machinery, pharmaceuticals and other necessities to go through the roof, causing an unpredictable inflationary environment (Kondeas, 2011).

The transition will be painful in the short run, and the Greek people will undoubtedly be confounded by the shift from the depression of the EU/IMF plan to high inflation associated with the new currency. But there will be light at the end of the tunnel. Without foreign debt payments, the Greek government will have an easier time balancing its budget without resorting to extreme austerity measures, which have been choking off the economy. Inflation will lift asset prices again creating more tax revenues from transactions. The weak currency will boost tourism and exports and result in job creation. With its own currency, the government could create the funds to initiate a domestic investment program to grow the economy, and at the same time increase the country’s competitiveness.

At this point in time, Greece does not fully control its own destiny, like any independent sovereign nation should. It simply awaits decisions from Brussels to signal which of the two scenarios will prevail. If the EU leaders decide it is in the best interest of the EU to keep Greece in the monetary union, they will have to use all possible methods to help the Greek economy stabilize and grow out of its predicament. If they decide not to provide the necessary support now and in the future, then Greece will have no choice but to cut its ties with the Euro

and pursue its own path to economic growth. In either case, the goal should be the growth of the economy and the prosperity of the people.

6. Developmental strategies for economic growth

Based on the previous analysis, there are two main policy frameworks to promote growth and development for the Greek economy:⁷

A. The first one is a market-based framework, which is fully compatible with the current EU orthodoxy. This policy framework, better known as the “Washington Consensus”, has dominated much of development theory and practice since the 1980s. The Washington Consensus can be summarized as macroeconomic prudence, domestic market liberalization and outward orientation. Other key aspects include minimal government intervention, the elimination of government subsidies and welfare payments, fiscal and monetary austerity, trade liberalization, privatization of state-owned businesses, and well-defined property rights (Williamson, 1989). Businesses and the economy benefit from long-term efficiency gains resulting from the liberation of market forces from the “straight jacket” of government controls. Economic growth under this framework is achieved from the allocation of resources and private investments in accordance with global market signals.

Unfortunately, under its current condition, Greece cannot reasonably expect that a wave of private investments will lift its economy out of the four-year recession it is undergoing. The Greek private sector is shrinking, industrial production is collapsing, and unemployment is expected to climb above 20% in 2012. Within such a dismal environment which is not conducive to private business initiatives, it is unrealistic and infeasible to expect that an influx of Foreign Direct Investment (FDI) will soon lead Greece to higher levels of economic growth. The labor costs are not yet competitive (Section-3), the corruption problems have not yet been resolved (Section-1), and the overall financial and political chaos that ensued from the financial crisis do not portray the country as a favorable and stable destination for international investments to take place. Perhaps in the future, once the structural reforms of the economy (Section-3) are fully implemented, Greece could be an attractive destination for private investment initiatives. Until then, the private sector alone cannot be expected to take Greece into a path of sustainable economic growth.

B. Whether the Euro zone decides it is in the best interests of the Union to keep Greece in its ranks and provides the necessary assistance and development funds now and in the future, or it decides not to do so and, consequently, Greece leaves the Monetary Union and prints its own currency to get access to funds, it becomes clear that for the foreseeable future the majority of potential investment funds will be coming from a government source. In the first case, the EU will have to allocate more investment funds for the purpose of arresting the free fall of the Greek economy and eventually jump start it. These funds would have probably been allocated to newer EU members to assist them with their integration to the Union, but now will have to be diverted to existing member countries facing financial problems. While this may delay the EU expansion plans, it will be necessary to be done in order to ensure the cohesion of the Union. In this case, the Greek government and EU entities will have to oversee the allocation of funds to the most productive domestic investments. In the second case, where Greece has to print its own currency, the government will still have the role of formulating new plans and introducing new investments to return the Greek economy to

growth. This clearly implies that a strategic partnership of public and private sectors as well as new state-societal alliances will be necessary to turn the Greek economy around.

Since both EU and state government funds have been allocated to the Greek economy in the past without any significant improvement in the country's international competitiveness, the solution cannot be just about more funds. The allocated funds will have to be invested smarter and will have to go to the most and best uses so that they will have the greatest economic, social, and developmental impact. First, to dispel concerns that the new investment initiatives will be hijacked by vested interests, the government must provide a "national purpose" framework which will bring together social and political forces in the interest of an economic development agenda. This growth-oriented restructuring of the Greek economy must lead to a strategic partnership between government agencies, forward-looking industries, and various social segments. Second, a prudent fiscal management will reorient government functions to achieve a "crowding-in" of productive investments that contribute to endogenous growth and competency. With a rigorous priorities formation, such a policy will ensure that the public purse is not wasted and that all investments are in alignment with the strategic objectives of economic development. Third, a system of accountability will be required by the Greek government, as the two forms of accountability, political and managerial, not only are closely related but, more importantly, they have been consistently problematic in Greece. Consequently, improving accountability should be a specific goal of the move towards a purposeful development policy.

Since investment funds may largely come through EU and government sources,⁸ the market and the state will have to successfully coexist and act as partners with one another to carve out their own spheres of competency and influence, and share in the benefits from their mutual collaboration. In fact, the public and private sectors can cooperate in a range of different arrangements, each contributing what they do best, and both participating in the financial returns. A modern and intelligent Greek government that has learned from the wasteful mistakes of the past should find ways to ensure that the best business practices of dynamic and propulsive industries benefit the national economy. Such a government should take proactive measures, which require that dynamic firms use the allocated funds to invest in modern factors of industrial growth or *accelerators*, such as new production facilities, skills training and upgrading, and critical kinds of science and technology initiatives. Hence, particular emphasis needs to be placed on production-increasing and productivity-increasing investment spending on the accelerators of endogenous development, which will substantially improve industrial capability and competitiveness. State policy, on the other hand, should focus on technically proficient initiatives that allow industries to craft responses to changing market circumstances and translate industrial applications into commercial products.

In formulating policies for economic restructuring and diversification, it is critical that the policies are components of a long-term strategy. Failure to do so could lead both to short-run highly partisan considerations dictated by socio-cultural impediments and pressing problems (e.g., job creation, fiscal crisis, unsteady growth, balance-of-payments constraints), as well as the adoption of an *ad hoc* approach to development which is in conflict with the goal of a stronger economic fabric (Karagiannis, 2002). An industrial modeling and targeting plan requires a rigorous discussion of industrial planning and a detailed analysis of the selection process that clearly specifies benefits from certain economic engines that provide effective stimulus for industrial growth, rejuvenation, repositioning and overall competitiveness. Decisions relating to particular industries tend to have broader implications for the national economy as a whole, and require a clear delineation of the interacting influences between the

promising sectors from the point of view of endogenous competency, and those that may provide short-term benefits but offer little hope as a secure basis for future national well-being.

Therefore, it is imperative to aggressively pursue advancement of certain dynamic sectors of high potential and feasibility such as solar, renewable and alternative energy, biotechnology, pharmaceuticals, information technology and engineering, tourism, hospitality, entertainment, and food and beverage, as there is potential to market opportunities for their growth, and these open up possibilities and set up incentives for a wide range of new economic activities. Targeting and support of these selected sectors, however, require detailed information on the quantity (*how much*) and quality (*what type*) of accelerators needed by these “economic engines” in order that the quantitative and qualitative parameters of planned industrial investment are thoroughly taken care of.

Clearly, targeted industries will boost the structural transformation, production diversification and strategic repositioning of Greek economic sectors, and will develop and promote stronger inter-sector linkages with multiple short and especially long-run productive effects, resulting from investments in infrastructure and the industrial accelerators. Industrial targeting can be a realistic and feasible policy suggestion which will only require employment of existing resources in different ways, a rigorous system of checks and balances, a “wiser” public finance, and different government policy choices which are free of corruption and favor.⁹ Industrial growth is expected to lead to a widening of the local market, which will bring about industrial competency upgrading and competitiveness improvement. After local resources are developed and put to use, changes in technology and production techniques will broaden the Greek production base, induce investment and effectively use resources to boost economic growth. Furthermore, inter-firm cooperation and coordination will help develop sector strategies and promote R&D and innovation, which will further encourage firms to learn to cooperate. The success of this developmental policy proposal, however, will depend on the quality of such policy intervention.

7. Conclusion

The Greek GDP grew for 54 of the 60 years following WWII and the Greek civil war. From 1950 until the 2008 economic crisis, with the exception of the relative economic slowdown of the 1980s, Greece consistently outperformed most European nations in terms of annual economic growth. Yet, social, cultural, and political factors have negatively affected the country’s economic and business performance. The end result is the current financial crisis and debts of enormous proportions. However, the situation can be reversed if necessary social, political, and institutional reforms alongside prudent macroeconomic policies are aggressively pursued in a thorough and pragmatic way. Whether Greece leaves the Euro zone or remains a part of it, these reforms will require a focused policy framework with a strong developmental dimension and market-augmenting industrial targeting. It is ironic that the Greek government, which has played a major role in the current financial crisis, will also have to be the agent that will initiate a new developmental agenda for the renewal of the Greek economy.

Notes

¹ It seems that Greek people's consciousness is influenced by their economic mode of existence. Also, culture, and in particular religion, exerts a causal effect on politics and the economy (whether the causality runs both ways is the subject of a long-standing debate in the social sciences, with Karl Marx and Max Weber among its most famous proponents).

² Some use the vulgar term "kleptocracy" (alternatively, "cleptocracy" or "kleptarchy", from the [ancient Greek](#) words κλέπτης (thief) and κράτος (rule): "rule by thieves") to describe a form of political and [government corruption](#) where the government exists to increase the personal wealth and political power of officials and the [ruling class](#) at the expense of the wider population, often without pretense of honest service. This type of government corruption is often achieved by the [embezzlement](#) of state funds (<http://en.wikipedia.org/wiki/Kleptocracy>).

³ Surveys by Schneider and Enste (2000) and Schneider (2000) give existing evidence of the sizes of underground economies around the world and serve to indicate approximate magnitudes of the size and development of the underground economy, using the narrow definition. According to these estimates, two southern European countries, Greece and Italy, have an underground economy almost one third as large as the officially measured GNP, followed by Spain, Portugal and Belgium, with a shadow economy between 20-24 % of official GNP. The Scandinavian countries also have an unofficial economy between 18-20% of GNP, which is attributed mainly to the high fiscal burden. "Central" European countries like Ireland, the Netherlands, France, Germany and Great Britain have a smaller underground economy (between 13-16% of GNP) probably due to a lower fiscal burden and moderate regulatory restrictions. The lower underground economies are estimated to exist in countries with relatively low public sectors (Japan, the United States and Switzerland), and comparatively high tax morale (United States, Switzerland).

⁴ According to Transparency International, Greece is ranked in the 49th place out of 146 countries in the Corruption Perceptions Index 2004, scoring 4.3. Although personal or other relationships should play no role in economic decisions, in societies like Greece this would conflict with generally accepted norms.

⁵ The German government's deal with the labor unions to keep wages stable in exchange for job security increased productivity. In 2007, the German value added tax (VAT) was increased by 3%, while employer contributions for worker benefits were reduced. Such a policy of taxing domestic consumption, coupled with labor cost reductions further improved German competitiveness inside the EU and around the world. Germany's 2010 trade surplus of 7% of GDP exceeds the Chinese trade surplus of 4% of GDP.

⁶ €70 billion EU institutional investors, €50 billion Greek banks, €40 billion EU banks, €30 billion Greek pension plans, €15 billion EU insurance companies.

⁷ An old-fashioned state-led development framework is only a theoretical option but not a feasible and realistic proposal given the power of the EU supranational and other international institutions and the fact that the national government has lost significant policy space during this challenging era of globalization.

⁸ To be more precise, investment funds can come through EU sources, from EU and Greek banks, from private business (local private initiatives and FDIs) and, perhaps, to a lesser extent, from the Greek government and public sector.

⁹ A "new look" Ministry of National Development (or Ministry of Investment, Industry and Trade) is absolutely necessary to thoroughly formulate and effectively implement development policy in Greece. Such a powerhouse should be free of corruption, dedicated to raising both the quantity and quality of investment and boosting industrial growth, endogenous competency and competitiveness. Its core planning staff should consist of a small, entrepreneurial team rather than a vast bureaucracy – squandering resources over a whole range of bureaucratic activities must be avoided. The team should be recruited partly from within the Greek executive administration but also from business, professionals, and the academic and scientific world: a "new look" Ministry would need some well-educated, well-trained, and efficient technocratic planners. With the participation and assistance of consultants, advisors and experts from the EU, the government forms a consensus on the best policies to pursue. Economic policy should be built in close coordination between the Ministries of Finance and of National Development: the former with a relatively short-term demand perspective; the latter with a longer-term supply perspective. The new Ministry will have to be organized around the requirements of an accountable strategic planning agency with a long-term commitment and the powers and determination to intervene decisively and take the necessary policy action.

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Abstract: This paper discusses the ‘academic spring’ in terms of two parts: the changes towards Open Access and the changes from traditional Peer Review towards a system of Open Peer Review. The openness of the latter is seen in terms of two characteristics: no anonymity of either authors or reviewers; and inclusivity: i.e. the potential involvement of many reviewers from different communities and paradigmatic views. The discussion and critical analysis is developed in the context of a discussion of the traditional Peer Review system of research evaluation. In doing so the paper reviews the Report on Peer Review by the UK House of Commons Select Committee on Science and Technology. The analysis leads to a consideration of economics in the context of Open Access and Open Peer Review, as well as to an analysis of problems of the latter system.

Key Words: Peer review; Research evaluation; Open access; Open peer review; House of Commons Science and Technology Committee; Scientific publications; Dissemination and publication of research.

1. Introduction

It has been hailed in the media as an ‘academic spring’. The world mathematics community has been uniting around a call for the boycott of powerful publishers (The Sunday Times, 2012; <http://thecostofknowledge.com/>). Harvard University is encouraging its academics to find alternative dissemination channels to the very expensive traditional ones (The Guardian, 2012a). The British Minister for Universities and Science wrote about a ‘seismic change’ and is planning policies towards the establishment of national digital repositories (The Guardian, 2012b).

What is it all about? Access to the results of research and its funding; this is what it is about. Currently, universities throughout the world pay twice for their staff research. First they pay academics to develop their research whose results are later published in academic journals. Then their libraries pay the publishers hefty sums in order to acquire the journals needed by their researchers to do their scientific work.

This business model is quite profitable for the big international publishers but presents many serious flaws for the research community and for society. First, because it is very expensive for taxpayers and other funders of universities. Second, because it is very inefficient owing to duplication of expense for journals on the part of the university community. Third, the system is highly undemocratic and discriminatory. Researchers who do not belong to a university or other research institutions (such as retired academics) cannot easily access published works. Moreover, the scientific work of researchers in developing countries is made extremely difficult by the prohibitive cost of access to publications that their institutions cannot afford. This last element represents a loss not only for academics in poorer countries but for the world research community: potential different perspectives on scientific issues, specific to different communities and traditions, are lost. In other words a potential source of pluralism in science is lost or greatly undermined. This is particularly problematic for the social sciences in

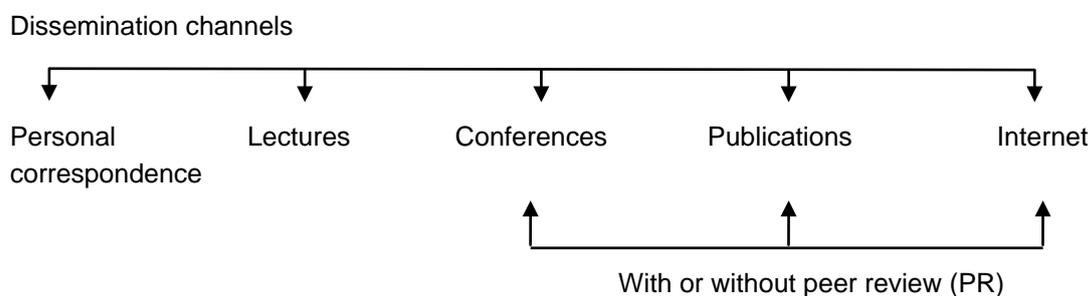
¹ I would like to thank the following people for reading earlier drafts and offering useful comments: Nabyla Daidj, Edward Fullbrook, Donald Gillies, Emily Grosholz, John Latsis and Carlo Milana.

general and economics in particular where the loss of pluralism in theory and policies is costing the economy and society very dearly.

Thus we cannot but welcome the move towards *Open Access* to the results of research. I also hope that these pronouncements by academics, their institutions and a Minister in charge of them in the UK will herald the beginning of both a national and global spring. However, we should also note that this spring, important though it is, is only part of what is going on and only the beginning of what is needed in terms of potential revolution in scientific research: it relates to the dissemination part of research. The other part – no less important – is a revolution in the *validation side* of research results. The two parts are closely interconnected and a full spring will not come to the research community till the blooms in both parts are further advanced.

Let us now explore more closely these two parts of a possible ‘academic spring’ by considering some phases in the life of research. We start with the phase of research that Open Access is concerned about: the dissemination phase. Once a piece of research is completed and written up, the next important step in its life is its dissemination within the research community and beyond it to the wider society. Dissemination is very important for the development of research and knowledge in general because: (a) it allows the community to criticize it; (b) it allows other researchers to build on it and develop it further; and (c) in some cases it allows the technologists, business and wider society to develop - and or use - it for practical purposes.

Figure 1 The dissemination of research results



Dissemination takes various avenues whose relevance has been changing throughout the history of science in correspondence with changes in the technologies and costs of communication and transportation as well as with the change in the size of research communities. Researchers can disseminate their work through (Fig. 1): direct correspondence with fellow researchers; lectures and seminars; conferences; publication in journals and/or books; and increasingly via the internet. Nowadays all these dissemination mediums are used by researchers. However, in the history of science we have witnessed the dominance of different mediums and a shift in their relative importance. In the seventeenth century Newton and his fellow scientists in Europe were disseminating their results mainly via correspondence and exchange of manuscripts: publication was possible though costly and the research community was small. Publication in journals and books acquired prominence in the XIX and

XX century though dissemination via lectures² and conferences were also relevant. The latter medium – conferences – has acquired more importance after WWII with the improvement in the technology of transportation and the decrease in its cost.

In the last 30 years the digital technologies have brought to prominence a new dissemination medium: the internet. Its appeal is enormous because of low or zero costs and speed of dissemination. Moreover, the internet is seen as the most democratic medium of dissemination because anyone with access to a computer can put their works in the public domain. A paper can be widely disseminated before - or without ever - being published in a journal. Increasingly this is what academics do³.

This profusion of dissemination mediums raises the issue of what – if anything – is special about hardcopy publication. From the point of view of the scientific community as a whole, hardcopy publication has advantages over personal correspondence, lectures and conferences⁴: the dissemination process can extend wider in space and time. However, from the point of view of the efficiency and effectiveness of dissemination, hardcopy publication is an inferior medium compared to the internet: it is much more expensive. Moreover, because of its cost, it discriminates against research communities in poor countries who cannot afford its journals and books.

But dissemination is only one of the functions of publications. An additional, very important function is '*quality assurance*': the research community and the wider society believe that when a piece of research is published by a reputable publisher in a journal or book, this certifies the 'good quality' of the work. This belief is connected with the peer review process. Thus it can be claimed that, though the dissemination function can be taken over by country or international digital repositories, the traditional publishing companies still have a major role in delivering well edited papers and, particularly, in securing quality assurance for the published works.

Peer review (PR) systems have been used for decades if not centuries to check the quality of scientific works. However, dissatisfaction with the system has been lingering on for a long time and it has accelerated more recently. As in the case of criticisms of the main existing dissemination method, the current dissatisfaction with the traditional peer review (TRP) system is connected with the fact that there is now a way out. The digital technologies are making possible alternatives to both systems: i.e. moves towards open access (OA) in dissemination and towards open peer review (OPR) systems in quality assurance are now possible because of the digital technologies. It is an indication of wider concerns over the PR system that the House of Commons Select Committee on Science and Technology (2011) has seen the need to conduct an Inquiry into the process and issued a lengthy report⁵. A

² It is interesting to note that the mathematician Andrew Wiles chose to reveal that he had proved Fermat's last theorem at the end of a series of lectures (on 23d June 1993) given at the Isaac Newton Institute in Cambridge.

³ This is what Harvard University is inviting its researchers to do in order to cut down library expenses.

⁴ I here refer to conferences whose proceedings are not published; if they are, then the characteristics of publications would apply.

⁵ In the US an extensive Report (Harley and Acord, 2011) was developed at the UC Berkeley's Centre for Studies in Higher Education on 'The Future of Scholarly Communication Project' funded by the A. W. Mellon Foundation.

review of the Report will be conducted in this article in the course of an analysis of the wider issues around peer review systems in quality assurance.

This article continues in the next section with a presentation of the Report. Section three and four are devoted to an analysis of the traditional peer review (TPR) system and the main criticisms of it. Section five presents an alternative system of peer review: the Open Peer Review (OPR) system. Section six discusses the position of economics in the context of OA, TRP and OPR. The last section concludes.

2. The report: methodology and scope

In January 2011 the Committee invited evidence on Peer Review (PR). After receiving written submissions the Committee took oral evidence and later issued the Report⁶. Peer review (PR) processes can be used in a variety of academic activities from applications for grants to application for jobs and promotion, to book proposals, to papers submitted for conferences, and to papers submitted to journals. The Report deals with the last of these.

The Report consists of seven chapters⁷ the first of which sets the scene by stating that 'Peer review is no more and no less than review by experts' and its primary function is seen by one witness as improving 'the process and the coherence of scientific knowledge and its utility'(p.5). The second chapter discusses the peer review process; the common criticisms of the system; and innovations in peer review listed as: pre-print-servers, open peer review process and online repository journals.

Chapter three discusses the role of editors, authors and reviewers in the peer review process. It includes issues of training and other support systems for editors and reviewers as well as the possible burden of work on reviewers and editors. Chapter four deals with data management including evidence on the reviewing process. Chapter five considers post-publication review and commentaries. Chapter six deals with publication ethics and – given the topic – it has a wider scope than just peer review. However, the review process comes into the ethics debate partly in terms of assessing the ability of the process to detect unethical behaviour.

The Report is based on the written and oral evidence of experts. There were 96 written submissions by self-selected individuals⁸ and institutions: some people wrote in an individual capacity, others as representatives of institutions, be these universities or Government or publishers or journals. The Committee then invited oral evidence from a subset of these people, all of whom were in position of responsibility/authority within institutions. The Committee appointed a specialist adviser for the inquiry. There is evidence that the Report was written largely but not exclusively on the basis of the oral evidence. Views present in written-only submissions are cited here and there.

⁶ The web site published also two responses to the Report: one by the Government and one by the Research Council UK (RCUK).

⁷ At the end of the Report additional information is published on the following: 'Formal minutes'; List of abbreviations'; Witnesses; List of printed written evidence; List of additional written evidence; List of Reports from the Committee during the current Parliament.

⁸ I do not know whether some of the submissions were invited.

Though we know that this is not a Report based on a random sample, it is still interesting to see the composition of the submissions (table 1) in order to analyse the extent to which the methodology used may have affected the results and recommendation.

Table 1: Breakdown of written and oral evidence by type of institutions and subject areas

	Written evidence	Oral evidence
Institutions		
Publishers	6	4
Universities	5	1
Governmental/public	8	8
Learned societies	23	3
Research Institutions	7	4
Subject areas		
Medical/Health care	22	5
Natural science (general)	4	3
Biology and biochemistry	8	0
Physics	5	1
Chemistry	1	1
Mathematics	3	0
Environment/Climate	11	0
Social Sciences ⁹	13	0
Technology, engin., info systems	8	1
Education	2	0
Science communication	2	0
Humanities	2	0

Note: The allocation to subjects and institutions is not always straightforward and therefore figures must be considered as approximate. The evidence of people in an individual capacity is taken account of in the subject but not in the institutions list.

Source: The data derives from the Report 'List of printed written evidence' (by those who have given oral evidence) and 'List of additional written evidence'.

The scope of a thorough analysis of the PR system in publications is multidimensional and involves issues of subject cover, of type of publications and of the national versus international dimension. Regarding the matter of academic subjects the boundaries of the Report are set in the title: Peer review in *scientific publications*. This means that the use and impact of peer review in the humanities is not considered. In fact, I could only spot two written submissions from the humanities (see table above). However, one of these is from a philosopher of science and mathematics (PR 22) and therefore, to a large extent, he can be considered as part of the scientific community or, at least, as someone with knowledge of the sciences. The second is from a historian (PR 85), the editor of a prestigious journal. He touches on pluralism, a particularly important issue in the humanities as well as in the social sciences.

Though the title mentions 'scientific publications', the Report concentrates mainly on scientific publications in journals, thus excluding scientific works published in books – authored or edited – and in conference proceedings. The latter as well as edited collections of papers are

⁹ Of these only a maximum of three could be ascribed to economics.

a very common vehicle for the dissemination of scientific research. Most conferences in the sciences scrutinize the submitted papers very closely via PR systems.

Regarding the geographical scope, most journals in English language are now fully international in terms of the nationality of authors, editors and reviewers. The team of editors is often an international team which draws on specific skills from many countries. However, there may still be significant location-bound patterns in the choice of reviewers. The Report notes the geographical imbalances in terms of contributions to authorship and to reviews (p. 43-4). It is reported that while the USA 'produces about 20% of the output of papers, its researchers are responsible for approximately 32% of the reviews in the world, whereas China is producing something like 12% to 15% of the output of papers but is probably only conducting about 4% to 5% of the reviews.' (p. 43, para 125). The information for the Report comes mainly from British institutions with the possible exception of publishers who are international ones. All but two of the written submissions are British-based. The exceptions I could spot are: a submission from the American Meteorological Society (PR 48) and a joint submission from two educationalists from the University of California at Berkeley (PR 88)¹⁰.

Most submissions are from academics or people connected with institutions linked to academe. There are two exceptions: a non-academic engineer (PR 30) and the defence contractor Thales, Defence and Mission System Domain, UK (PR 83). Both of these consider the technological and business implications of having the results of research reliably evaluated.

3. Peer Review: what is it about?

I agree with the very first line of the Report that in the most general terms PR is review by experts. However, this simple definition covers a variety of systems with different characteristics specifically with respect to the following issues.

- Who are the reviewers and how are they selected?
- What are the ultimate aims of reviews by experts?
- Is the review single-blind? Double-blind? Or open?
- Time: is the review done pre- or post-publication?

In the traditional peer review system a paper is submitted to a journal; the editors read it, and if they think it passes an initial threshold in terms of competence and adherence to the scope of the journal, the paper is sent to reviewers; usually three reviewers are involved though fewer as well as more are known to be consulted at times. The reviewers are asked to send a full anonymous report to be disclosed to the author(s) as well as confidential recommendations for the editor(s)¹¹. The threshold for publication – how many positive reviews and recommendations are needed – varies with the journal or conference. It is this type of review that most people in academe, media and wider public have in mind when they/we talk of peer review. Yet this is not the only possible type of review process by expert, there are others and we shall consider them by analysing the issues raised in the five bullet

¹⁰ They are the authors of the already cited Harley and Acord (2011) and are, therefore, writing as experts in PR rather than as educationalists.

¹¹ The traditional procedure for acceptance of papers at conferences is very similar. Book proposals - and sometimes the full manuscript or selected chapters - are reviewed by experts selected by the publishers.

points above. I shall refer to the traditional peer review system as TPR and will label PR the peer review system in general i.e. any process in which papers are considered by expert(s) before or after they are put into the public domain.

Who are the *reviewers*? As far as I know all the people who review papers for publication are *experts* in the general field. They are selected by the editors. Some journals accept suggestions by the authors among the possible reviewers. In a few journals or conferences the papers are reviewed by the editors only and they decide whether to publish or not. The degree of scrutiny is less than in the TPR but it is still an expert-led process: the editor is usually an expert in the field. Occasionally s/he may consult others. Among the advantages of this system are speed of decision, consistency and transparency. However, there are downsides to it. A big problem with this system is that the decision is taken by a single individual and thus the probability of detecting errors, fraud, or the ground-breaking contribution may be low. Correspondingly, there may also be a low degree of trust in the reliability of the research by the readership.

Let us now consider what the *aims* of peer review are. There are several and specifically the following.

(a) Quality assurance. The editors want to know whether the paper falls within the field and scope of the journal; whether it makes a contribution to knowledge and whether it represents, generally, a competent and novel piece of research. Ideally the editor would want the reviewers to detect errors and/or fraud.

(b) Help in improving the research paper. Referees are expected to – and often do – make positive suggestions for the advancement of the research topic.

(c) Guidance to editors in the allocation of limited journal space. This is probably the most important function of the TPR system. Most journals – particularly the prestigious ones – receive far too many applications for the available journal space and they need an allocation mechanism that scales down the supply of papers to the demand by editors (constrained by the journal's space). In the TPR system the reports from reviewers are the filtering mechanism for such allocation. The Report notes that in allocating space the editors consider the quality of the paper according to the reports as well as its potential impact factor (IF). The impact factor that a paper can make to the journal depends on its contribution to the citation of the journal. The IF may derive also from media interest in a particular article.

Blind versus open PR? In double-blind systems the names of the authors of papers and those of reviewers remain undisclosed to each other. Some journals operate a single-blind system in which only the names of the reviewers are undisclosed to the authors but those of the authors are given to the reviewers. Blind systems are seen as being less prone to bias and to the creation of problems at the personal level between authors and reviewers. The Report (p. 11-12) considers these various options and one expert, the Chair of the Committee on Publication Ethics (COPE) is reported to have expressed the view that it all depends on the discipline. 'With a discipline as big as medicine, where there are hundreds of thousands of people all around the world you can ask and they probably don't bump into each other the next day, open peer review seems to work. In a much narrower and more specialized field, it perhaps does not, and the traditional system of the blinded review is perhaps better' (para 19). There is a problem here: in small fields, people know who is working on what and thus identifying the reviewer may be easier than in a large field. The air of suspicion and of knives put in under cover of anonymity, possibly by friendly colleagues, may poison the profession much more than open discussion. Open peer review (OPR) systems are also based on

experts' comments¹²; however there is no anonymity of either authors or reviewers as we shall discuss in Section 5.

The *timing* of peer review: pre- and post-publication reviews and commentary. TPR usually refers to ex-ante, pre-publication review. There are, however, currently many initiatives aiming at the review of papers already in the public domain. They fall into various categories partly depending on their aims. Many traditional journals publish comments on previous articles. The Report mentions that the *British Medical Journal* encouragement of readers' letters is very successful. However, it is reported that the Royal Society encouragement of letters had a low take-up rate (p. 66).

For those papers disseminated via posting on web sites or in special repository such as Xiv for physics (Ginsparg, 2002) the functions of post-dissemination PR is twofold. (i) To contribute to the development of a research paper; (ii) to alert the scientific community of new research in a specific field; and (iii) to help potential readers: reviews of papers in the public domain – whether disseminated by publication or through other processes – may also have the aim of guiding readers through a large and increasing mass of research papers. The latter function is behind the development of the Faculty of 1000 in the biomedical sciences.

4. What is wrong with TPR?

The Report lists the following criticisms of the TPR. (a) it stifles innovation (p. 15); (b) it is biased in terms of the gender of authors, their geographical provenience and ideas; (c) it discriminates against multidisciplinary work; (d) it is very expensive and burdensome and it delays the appearance into the public domain of research results; (e) there is little evidence of its efficacy. The Report gives testimony in favour and against these criticisms. It ends by recommending some minor improvements and specifically to: give support for editors and reviewers via training (particularly of young academics) and via the development of relevant packs¹³; give recognition to the work of reviewers as an incentive to perform the task; use reviewers from various fields in multidisciplinary research; and play down the assessment of impact factors in favour of concentration on the assessment of technicalities and coherence.

The criticisms of the TPR system on the basis of efficiency (point d) – use of resources and their cost - and effectiveness (point e) - how good it is at achieving its aims - have been going on for some time¹⁴. Many authors have criticized the high and increasing social costs for the academic community and the length of the publication process (Campanario, 1998a and b; Ginsparg, 2002; Frey and Osterloh, 2007). Several authors have also criticized the low effectiveness of TPR in terms of quality assurance such as the detection of errors or of plagiarism or the weeding out of very poor research (Campanario, 1998a; Bedeian, 2004). The imposition of the reviewers' views on the authors have been criticized by Frey (2003).

¹² An extensive discussion of various systems of OPR is in Harley and Acord (2011, background paper 2: pp. 41-53)

¹³ The publisher Elsevier states that it provides a Welcome Pack introducing new editors to '...its policies, procedures, the editorial and publishing teams which support the journal, the peer review process including tools to find reviewers, ethical guidelines, as well as support tools.' (p. 37-8).

¹⁴ These issues are discussed at greater length in Ietto-Gillies (2010).

The Report discusses the Public Library of Science (PLoS) initiative which aims to reduce the lag between submission of papers to journals and publication. The PLoS manages commercially seven academic journals in the biomedical sciences. The PLoS 'uses peer review to determine whether a paper is technically sound and worthy of inclusion in the published scientific record'. The system has advantages and problems. The Report cites the Wellcome Trust as stating that because the PLoS approach 'focuses solely on whether the findings and conclusions are justified by the results and methodology presented, rather than on assessment of the relative importance of the research or perceived level of interest it will generate [it] has both reduced the burden on the reviewer and the time it takes to get a paper published' (p. 29, para 79). Among the problems mentioned in the Report is the fact that the system relies on a fee to be paid by the author and this may introduce an element of suspicion in the process. Moreover, there are, in the Report, comments to the effect that the editing work may not be always carried out to a high standard.

As a way of cutting the cost of reviewing for the research community, the Report discusses (p. 49-50) and recommends cascading of reviews from journal to journal: i.e. editors who reject a paper send the reviews to editors of a sister journal with the agreement of the author(s). However, it was noted that authors are reluctant to accept cascading. I would also like to note that the system would favour large publishers with a range of journals in each specialized fields. If widely adopted, it might lead to further concentration in the industry and further power to those publishers who already have considerable market power.

TPR and ground-breaking research

The most damaging criticism of TPR relates to its alleged inability to detect ground-breaking research. The literature discusses many examples of this (Horrobin, 1990; Gans and Shepherd, 1994; Campanario, 1995). The Report gives some examples – from medicine (p. 16) - of innovative research which was not recognized by the TPR system. But, on the whole, the interviewees in the Report do not seem over concerned about this issue. One interviewee is reported as stating that 'conservatism is not a bad thing in science or medicine in terms of making sure that what we publish is robust, relevant and properly quality controlled' (p. 17). It is unclear to this reader how failing to publish ground-breaking original research can be seen as good for science and medicine and why quality control should necessarily be associated with conservatism in science.

Sir James Black, the 1988 Nobel Prize winner for medicine, did not mince his words on his views regarding the impact of TPR system on innovative research. In a Financial Times (2009) interview he is attributed the following statement: 'The anonymous peer review process is the enemy of scientific creativity....Peer reviewers go for orthodoxy...'. Another example is given in The Guardian (2011). It is reported that the discovery of Daniel Shechtman - the 2011 winner of the Nobel Prize for Chemistry - was, at first, rejected by peers and he was asked to leave his research group to which he was, allegedly, bringing disgrace by his theory and findings.

Gillies (2008) gives a philosophical reason – based on an application of Kuhn to the research evaluation field – of why it should be so. He claims that the TPR system is likely to favour orthodox research, the type of research that operates competently within a well established and majority paradigm rather than research which is ground-breaking. Yet, the history of science shows that, while the former type of research may be relevant, it is the ground-

breaking research that gives science, the economy and society the best returns in the long run.

It could be claimed that failing to spot the *very innovative paper* can happen under any PR system and, moreover, that it is not that drastic a mistake since, in the end innovation will prevail anyway. The last point can be dismissed by noting that delays in the publication of fundamental results delay their further development by other researchers. They may be life-saving innovations or major innovations for business and the economy. Moreover, it may lead to a serious disillusionment of top researchers who see their work rejected while competent but hum-drum research is published and receives accolades.

Let us now deal with the first point: any system can go wrong. Let us see whether failing to spot ground-breaking research is just a matter of incompetence or poor work on the part of the reviewer. If that were the case, then better selection and training of reviewers would go a long way towards reducing the problem. However, this is not the case. The problem arises because of the nature of research. In order to support these statements, I will here make use of Gillies (2012) philosophical approach to the problem. His argument is that we all work under a specific paradigm and see all the work we read through the spectacles of that paradigm. In this perspective it becomes difficult – though not impossible – to spot work that does not conform to existing paradigms and may be the beginning of a new one. So, how do we overcome this problem; after all, as reviewers, we are all involved. We can all make mistakes and fail to recognize the innovative research paper simply because we look at the issues through the spectacles of the paradigm we are working under. Yes, the problem is intrinsic to research. However, it can be made more acute when there is lack of pluralism in the discipline because this raises the probability that all or most reviewers adhere to the same paradigm. In order to limit this problem, it is important to open up the reviewing process to researchers belonging to different schools of thought, communities and countries. We shall discuss these points further in the next section.

Impact factor (IF)

The dreaded IF is everywhere these days: from academe to media. It affects the type of paper published and the rating of research projects, output and institutions. But what is it? What does it refer to? Who benefits from its measurement and assessment?

Impact factor can signify (a) the effect/impact that a particular paper may have on the journal that publishes it via: effects on the readership; on journal' subscriptions; on possible increase in citations of the journal and on the journal's media visibility. So the quality of a paper and the reputation of its authors will have an impact on the journal. (b) Similarly a high impact journal will enhance authors' reputation, their job and promotion prospects as well as their prospects in grant applications. The Report writes: '...publication in a high-impact journal is frequently used as a proxy measure for assessing both the work of individual researchers and research institutions.' (p. 54). However, in the same page the representative of the UK Research councils (RCUK) states that: 'there is no absolute correlation between quality and place of publication in both directions'.

Those mentioned in (a) and (b) are the type of IFs that the Report mostly concentrates on. They are impacts which remain within the confines of academe: they are in the realm of citation, journal and authors' reputation within academe. However there is a wider meaning to impact: (c) the effects of a piece of research on business, society and governments. Journals'

editors may sometimes be interested in these types of impact. In the latest version of the UK research assessment systems – the Research Excellence Framework (REF) in which the whole of a country's research output is assessed using rating scales – the applicants are encouraged to specify this type of relevance of their work.

There are two further issues in relation to impact factors. First, the timing. The IF can be ex-ante and thus related to the assessment of the possible impact of the research: this is done in grant applications and in the editor's decision on whether to publish or not. IF can be seen also as ex-post assessment. After the research has been done and published, what impact has the work had on society? Some research brings effects shortly after its results are disseminated. Other types of research take longer. Fundamental research sometimes takes decades to show its full impact. In fact, the more innovative the research, the more likely it is for its impact on the research community as well as on society as a whole to manifest with a long delay. Yet innovative research is often the one that brings most benefits; but it brings them with a lag, often a long lag. Moreover, as noted above, very innovative research is the one most difficult to detect in the TRP system.

5. For an Open Peer Review system

The current TRP system developed gradually during the pre-internet era. However, the digital technologies have brought many changes and opened up immense opportunities not yet fully exploited. In Section 1 we briefly discussed the opportunities to the dissemination function of research via Open Access (part one of the academic spring). Digitalization has also been extensively used in the administrative and editorial work of journals and their review process. Moreover, the same technologies are also bringing major changes in the very process of evaluation via OPR systems: the second part of the academic spring. Such major changes would greatly diminish some of the faults of the TRP highlighted in the previous section.

What are the characteristics of an OPR system? It is a system open in two respects. First, because both the authors and the reviewers' names are disclosed. Sir James Black puts the emphasis of his criticism on *anonymous* TPR. What are the pro and cons of anonymity? Some of the pros have been discussed above; they boil down to the fact that in the end TPR has to do with allocation of space and with helping editors to weed out papers; it is largely about how to exclude papers from publication in a specific journal. The general culture under which TPR operates is one of helping the editors to exclude papers because of the scarce space available in a specific journal: being a culture of exclusion the tasks are more easily performed under anonymity. However, given that journal space may no longer be a limiting factor, are we in danger of continuing with the wrong attitude? Shouldn't the intercourse/dialogue between researchers be on how to further develop research rather than on exclusion? It is claimed that, if identities are disclosed, the reviewer will be less likely to be critical and criticism is essential to the development of research. However, when we review books we are not averse to being very critical¹⁵. Why should we not use the same standards in reviewing papers?

So far concerns about the quality of work placed into the public domain has centred on preventing poor quality papers reaching readers. While not denying that this must be a concern of the research community, there is a much more serious quality problem being

¹⁵ Battles between authors and reviewers are known to have raged in the columns of newspapers and occasionally even in the law courts.

ignored: the rejection of ground-breaking work to which the TRP is more likely to lead compared to an open system. In other words the TPR is obsessed with avoiding Type II errors and not with Type I errors. Yet, the consequences of the latter may be very serious and long-lasting (Gillies, 2008: Ch. 4).

Moreover, concerns about misconduct in research and publications tend to centre on authors. Yet there can be serious cases of misconduct by editors and/or reviewers, as mentioned also in the Report (p. 77-8). They include the following: sloppy and incompetent reports with hastily developed arguments; promotion of the reviewer's own works; support for a friend's paper or damning a competitor's paper (and worse still preventing/delaying publication with a view to publishing similar ideas); rejection of papers which are clearly inspired by a paradigm alternative to the one in which the reviewer is working¹⁶. Lack of anonymity may be a deterrent to such cases.

Moreover, if the reviewer is allowed to disclose her name and to get credit for the contribution she makes, she will be more likely to come out with novel points knowing that they will be attributed to her. What I am saying is that the move from a culture of exclusion to one of research development would enhance the quality of debates between authors and reviewers and lead to the improvement of research work. The disclosure of identities of authors and reviewers would form part of that cultural shift. All the above are some of the reasons why OPR is a more rigorous reviewing system than TPR.

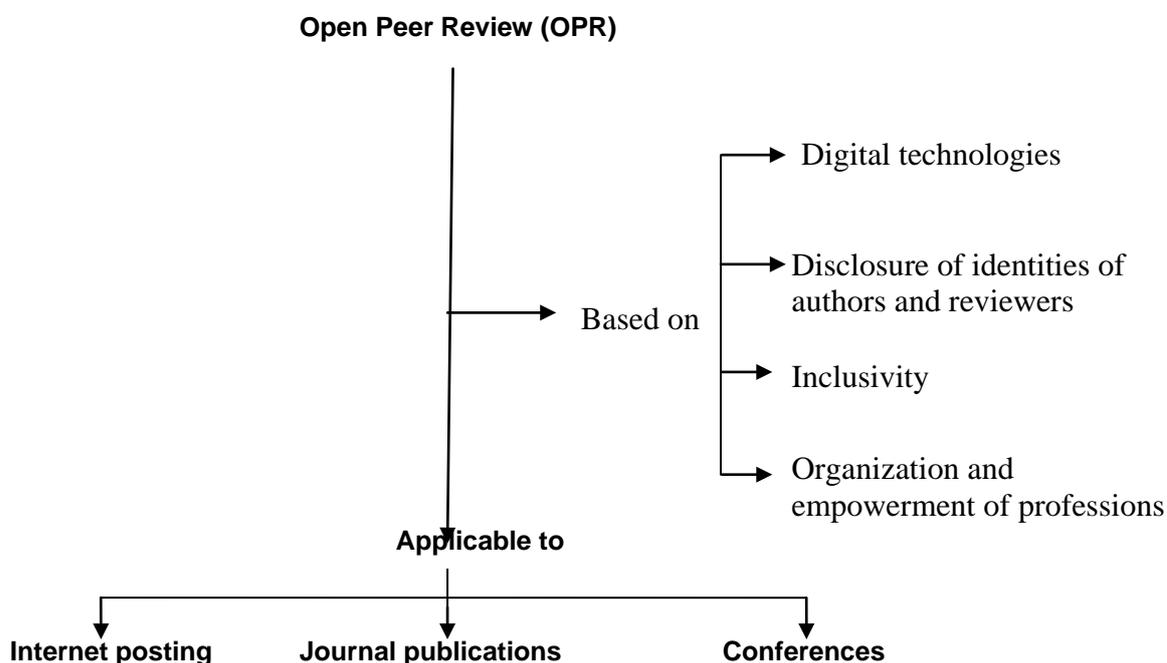
Second, the system is open because the reviews are *inclusive* of views from different theoretical and paradigmatic perspectives and with respect to views from different communities, countries, cultures. To achieve the latter type of openness the process must be open to many, many potential reviewers from different countries and communities and belonging to the many theoretical perspectives that enrich each discipline. This is now possible through the use of digital technologies and this is what I mean by saying that the digital technologies can and must be used in the very process of reviewing. It is only by opening up to the large number of researchers in each specialized field within disciplines that we can reach the experts from different theoretical perspectives and communities. In order to achieve this two conditions are necessary: (a) the professions must be empowered to take charge of the PR process; this involve among others, releasing resources for the organizational work to be carried out; and (b) researchers must slowly shift the focus from reviewing to exclude research results from being published to reviewing for the development of research. The process can be self-reinforcing. Suppose that one reviewer – among the possible many – spots the ground-breaking work or the data fraud or plagiarism. If her comment is posted, it can be read – potentially – by many researchers in the field and some of them may join in with arguments for supporting or rejecting the claims. The author of the paper can, of course reply openly to the criticisms

Open peer review systems can be applied to journals, to internet posting and to conferences (Fig 2). They are gradually being developed in several disciplines and mainly for journals. Koop and Poschl (2006) discuss a successful OPR system – based on a mixture of anonymity and disclosure of names - for the journal *Atmospheric Chemistry and Physics*. The

¹⁶ All these cases are known to occur with a variety of frequencies. The instances of reviewers recommending their own work may increase in line with a move towards citation-based assessment of research at the level of countries. The same move may increase the pressure on authors to cite papers from the journal in which they aim to publish thus increasing the IF of that journal and pleasing the editor. The latter may also be a self-serving strategy: authors know that, often editors choose reviewers from experts who have already published with them.

British Medical Journal has been using an OPR system successfully for more than a decade (Report, p. 26, para 23). *Nature* has run an experiment in OPR for four months; however, in its case the take up rate from both authors and commentators was low and the experiment was stopped. The editor comments that in his view ‘...scientists are much better motivated to comment on an interesting paper when directly requested to do so by an editor’ (p. 27, para 74). It should be pointed out that this case raises two different issues: (a) whether the review process should be carried under anonymity; and (b) whether editors should rely only or entirely on spontaneous comments or should solicit them for specific experts in the field. A system that is based on disclosure of reviewers’ names does not exclude the soliciting of reviews as the editor of *Nature* seems to imply.

Figure 2 Open Peer Review. Characteristics and applicability



An OPR system for economics has been developed by the World Economics Association (WEA). The WEA was established in May 2011 (www.worldeconomicsassociation.org) with the aim to develop and manage academic activities in the field of economics entirely online and in a pluralistic – from the point of view of approaches to economics - and inclusive way. Its activities include online journals and online conferences. Its two new journals apply an OPR process at the pre-publication stage; they have also a Post-Publication Commentary as a standing feature of each journal. Following an initial screening by the editors, the papers are posted on a *Discussion Forum* and reviews are invited. At the end of the process the editors decide on whether to publish the paper following possible amendments to take account of the reviews. At the discretion of the editors, some reviews may also be published. All the WEA activities are run for the benefit of members. Conferences are not location-bound but internet based. Members are invited to register and to contribute papers as well as text-based comments to posted papers. The comments are posted with the names of contributors. Membership of the WEA – currently at c. 10,000 and from over 150 countries - is free and donations are encouraged. Most work is done by volunteers from all over the world. Some

volunteers are retired¹⁷ and some are working academics. Software and technical expertise are currently paid via voluntary contributions by members.

There are, of course, problems with Open Peer Review systems; two in particular. The first one is that some authors and reviewers are reluctant to have their identity disclosed. The second problem is almost the opposite of what one might have expected. It would not have been unreasonable to expect a flood of reviews/comments when the number of potential reviewers is so large. Yet, these early experiments – including the one from the WEA - indicate the opposite: people are reluctant to come forward with reviews. Both these problems may be due to difficulties in shifting the culture of reviewing from one of secrecy to one of openness and from one aiming at exclusion to one aiming at scientific development. It will require time to overcome these problems. Meanwhile the editors can take several steps to continue their valuable work: from accepting anonymity of reviewers in special cases to soliciting reviews from known experts.

6. Open Access, Open Peer Review and economics

The issues under discussion are – or should be – of special interest to economists for various reasons. First, because when – and it is now a matter of when not if – the academic spring turns into academic Summer there will be major economic consequences. Open Access will cause the collapse of an industry already under threat; or at least of the industry as we know it. There are, in fact, within the publishing industry, very valuable skills that will still be needed. What sort of industry structure is likely to emerge from a move towards full utilization of digital technologies in the dissemination function of research? And what policies can be recommended to secure the best utilization of existing resources – and indeed their development – in the emerging new structures? How might the resources released from moving to a less expensive dissemination system be better utilized within the academe? Funds saved from the move towards Open Access in the dissemination process can very usefully be allocated to the development of OPR systems in the various disciplines and their specialized fields.

Second, economics has, recently, been in the paradoxical situation of being the highest rated subject in a national evaluation process (the UK Research Assessment Exercise 2008) just at the time when the world economy was collapsing and when there started a considerable amount of questioning of the economics profession from within itself and from outside the discipline. The British Queen, when visiting the London School of Economics in November 2008, asked the now famous question about why nobody – in the economics profession – had noticed that things were wrong. This raises further questions and issues for our profession and for society at large in particular the following.

- (i) Why the few who did notice and speak were ignored.
- (ii) What is the connection between (i) and the lack of pluralism in the discipline.
- (iii) Are there causal links between the TPR system and the lack of pluralism¹⁸.

¹⁷ Such as the present author.

¹⁸ The questions in (ii) and (iii) are explored in Gillies (2012).

(iv) What is the connection between research evaluation via TPR and the antiquated, inefficient and expensive dissemination system which is now crumbling in favour of Open Access? It can be claimed that, were it not for the intense competition for high ratings in the research race, the academic publishing industry might have already entered its final stage. As it happens, the research rating institutions, such as the British Research Excellence Framework – REF - with their effect on the rating of journals and of research papers sustain the publication of journals and indeed they have led to its huge increase in the last few decades. TPR plays a big role in this because it helps to keep alive the hierarchy of journals.

(v) In economics the links between economic theories/ analyses and policies are very close. Policy action towards Open Access on the part of the UK Minister for Science and Technology would have big implications for the industry. So would a move towards OPR systems of evaluation of research.

(vi) The research community and the publishing industry are largely international. What will be the repercussions of moves towards OA at Harvard University or in the UK universities on other countries?¹⁹

The last thirty years have seen the gradual marginalization of minority paradigms in favour of the neoclassical paradigm with emphasis on the supremacy of the market. This was not always the case. Economics had been a more plury-paradigmatic subject for a long time. The decades after WWII have seen the coexistence of several paradigms with heated debates among its exponents: I witnessed and remember the strong exchanges between economists of Cambridge, Massachusetts and those of Cambridge, Britain on approaches to theory, analysis and policies. From there we have moved more and more toward the dominance of a single paradigm. To what extent has the TPR system contributed to this? To what extent is this state of affairs leading to preference for the TPR system? To what extent has this contributed to the current economic crisis?

There may be a strong link between TPR, the hold on the subject by orthodoxy and the power of large publishers. Thus the need for a full academic spring in economics is even higher than in other disciplines. Economics had a low profile in the Report: only three identifiable written submissions. One was from this author who, however, wrote not qua economist but qua researcher interested in the reviewing process in general. The other one – more specifically from economists and about economics - was from the Association of Heterodox Economists (AHE); the third one - from the Regional Studies Association - is not strictly an economics only input. It is a pity and a surprise that neither the long-established and prestigious Royal Economic Society nor any other association of economists felt it necessary to lodge a submission²⁰. To what extent is the low profile of economics in the process leading to the Report and in the Report itself the result of the turmoil in the profession? I have no answer to these questions; just a sadness about the poor state of economics and its near absence from the Report at a point in time when much is needed from it.

¹⁹ Question (v) figure in a list of issues considered in Fullbrook (2012).

²⁰ The submission by the Academy of Social Sciences (ASS) states that it is the result of consultation of societies within the group and that some of these societies may be lodging their own submissions. It is not disclosed which societies may have contributed to the input by the ASS.

7. Conclusions: two parts of the academic spring and the report

The introduction pointed out how there are two parts to the academic spring: one related to Open Access (OA) and one to Open Peer Review (OPR). Following a critical analysis of the TRP system the paper presented a general version of an Open Peer Review system. The latter is seen to be *open* in two respects: because the names of both authors and reviewers are disclosed; and because the system is inclusive and thus relies on large number of potential experts in the specific field, belonging to diverse discipline paradigms, cultures and countries. OA and OPR are closely linked. First because they are both made available and are bound together by the digital technologies; and second because it is the existing and now antiquated dissemination process involving large private publishing companies that has most interest in maintaining the TRP system. The research community's interest rests with the OPR system. A proper functioning of the latter requires (Fig 2): (a) full utilization of the digital technologies in both the dissemination and evaluation phases of research; (b) disclosure of identities of both authors and reviewers; (c) inclusivity of researchers both in terms of paradigmatic appurtenance and communities/countries; and (c) the full involvement and empowerment of the professions in the evaluation process.

This makes the more glaring what is, possibly, the biggest fault in the Report: the missed opportunity to explore the links between the OA and OPR including an exploration of the implications for both the research communities and the publishing industry. Analysing the interconnections between OA and OPR would have turned out useful to the Minister in charge of Science and Technology, the very one who has announced the 'seismic change' in the dissemination function of research. Is this failure linked to the fact that several big publishers made submissions and that most of them were invited to make oral submissions? Might this have biased the content of the Report even if only indirectly? Might this affect the policy action by the Minister towards maintaining an antiquated quality assurance process in the interest of publishers and in the misconceived belief that TRP is the only way to assure quality?

This fault emanates directly from the main problem of the Report: it is, in my view, a rather backward document; looking more at the XXth than at the XXIst century. Though there is a great deal about open systems, digitalization and experimentation most of the pronouncements refer to the traditional peer review process. The full potential of digitalization on research processes – in both OA and OPR, the two parts of the academic spring – has not been explored. Neither have the full implications of the internationalization issue touched on. If Chinese or Brazilian scholars are not much involved in PR and if authors from these countries feel that they can only get published by becoming co-authors with researchers from the US or Britain, we do not have just a problem of equity. The world research loses the benefits of alternative approaches. Pluralism is very important in all sciences; in the social sciences and humanities it is essential. The TRP militates against pluralism and we have seen the disastrous consequences of economics moving more and more into the status of prevalent-paradigm discipline in the last three decades.

Nonetheless a full evaluation of the Report must take account of two provisos. First, as with many political documents it is possible to read many things into the Report. There are enough ambiguities to satisfy almost everybody. Second, the Report is not – and must not be read as – a piece of research. It is a Report based on expert witnesses who are mostly self-selected; they do not represent a random sample of researchers or of people affected by the review system. The ones that the Committee chose for oral testimony are not a random sample of those who sent in submissions: most interviewees are people in position of power and

responsibility; moreover, those who made submissions are not a random sample of the research community. A major missing element are the *direct* views of junior and middle rank researchers whose problems were reported only indirectly by more senior people. The direct views of more junior researchers would have given the Committee a better feel for what it is like to be at the coal face of research both as a passive receiver of reviewers' reports and as an active reviewer.

Sampling techniques and representative testimony was not what one should have expected. However, there are problems arising from the evidence partly due to the chosen sample and partly to the set scope. Peer review is a general process used in research independently of the subject matter. The exclusion of the humanities from the evidence is a great pity because of their relevance to society in general and because the issues and problems present in the humanities have affinities with other disciplines (for example the social sciences including economics). Moreover, given the size of the field, humanities publications have also a big impact on the publishing sector.

Nonetheless, the Report is an important document. As expression of the engagement of Parliament with the research community and its problems, the Report is most welcome. Its potential relevance derives from the possible political impact on government and on various other public institutions such as the research funding bodies or the institutions in charge of research assessment at the country level.

As regards the dissemination and evaluation functions of research my own view is that the incoming spring in both OA and OPR is most welcome. Together they are really seismic changes requiring changes in organization of various research functions, in the funding of research and, indeed, in the culture of research evaluation. We need a shift in the focus of PR function from exclusion – no longer necessary given the removal of space constraints from journals – to the development of research. The full acceptance of this shift requires a change in the culture or reviewing. This is not an easy change. Both authors and reviewers may feel challenged by the removal of anonymity. Potential good reviewers may be slow in coming forward and expose themselves to the full glare of many readers of their reviews. This accounts for the slow take-up opportunities when editors first move into an open system. Nonetheless, the cultural shift is happening though gradually: we must embrace it, develop it and solve its related problems as they arise; not fear it. The academic spring is now well under way and full Summer will eventually be with us.

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Limits to growth and stochastics

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Introduction

The aim of this article is to use probabilistic ideas to study predictive reasoning based on hypotheses and models, but without using Itô calculus, without writing any stochastic differential equations, in fact without writing any formulas at all. The aim is to extract from the study of stochastic processes those qualitative traits that have significant philosophical implications for the political decision-making process.

Indeed, we need to acknowledge that the impact of the economy on the environment is not a result of temperance or mitigation of natural variations but rather that the economy itself – in addition to the underlying trends due to growth – is a major source of perturbations arising from the random fluctuations in prices or values that are caused by the anticipations made by the agents. Consequently we need to understand the additional effects that randomness superimposes on arguments based on the finiteness of the world and its flows of energy.

I intend to conduct this discussion without technicalities since they only obscure the issues. However, while I have tried to limit the mathematical background required from the reader, I cannot avoid assuming a certain level of knowledge, since the concepts arise from that subject.

We begin by reviewing the analysis of the Club of Rome to provide the context for our main discussion.

1. On the Rome report: simple models and their refinements

The issue of perfecting models is a classic trap. On the one hand, simple models have the disadvantage of being far from the laws of physics, biology and economics, but the advantage of being easy to calibrate. On the other hand, complex models seem to better reflect our knowledge of the phenomena being studied, but they have so many parameters that it becomes impossible to fine-tune them properly. Furthermore, their perfectionism gives an illusion of completeness: one can never be sure that they have taken everything into account. Ultimately, the most appropriate choice of model depends on the social use to which the model is being put, the sort of knowledge available, and the possible actions that can be taken¹. The case of the Club of Rome is here typically a global reference, something for “everyone”.

The philosophical value of the work of the Club of Rome.

After the appearance of the first version of the report [Meadows et al. 1972] numerous critics highlighted various weaknesses in the style of reasoning it used. Firstly, it was too simplistic: how could the reality of the world be captured in an algorithm whose equations comprise

¹ Cf. [Bouleau, 1999] Partie III.

merely a few hundred lines of code? Next, and above all, it was closed: it could not take into account innovation, progress arising from science or technology or, more generally, human creativity. All of this may change *completely*, even the meaning of the words used in the model, yet the projections are based only on current knowledge. For example, concerning nuclear power, it only takes into account the nuclear fuel resources, the difficulty of storing waste and the problem of areas rendered uninhabitable by accidents. It does not consider the success of fusion technology whose advantages and disadvantages are still not well understood².

The new version of the report, published 30 years later [Meadows et al., 2008] argued that the first version had not been contradicted by subsequent facts [Turner, 2008], and maintained, in the new model World3-03, the same methodological principles. Balance sheets drawn up by the Meadows team are relatively independent of subjective economic interpretations because they are based on measurements of quantities: energy received from the sun, quantity of arable land, population etc, which allows the authors to express themselves in terms of specific indicators: “human welfare” and “ecological footprint”. Several scenarios are studied under different assumptions of economic policies. The general conclusion is well known: unless politicians are very vigilant, we will always get an “overshoot-collapse” situation, i.e., excessive growth followed by collapse.

The truth value of this report does not lie in the details but in the thesis – which offends most philosophies and many religious beliefs – that one may take seriously and scientifically the fact that the finiteness of the world and its resources means radical changes are required to prevent collapse. This is a change of scene from that in which economics and politics usually take place, and can be seen as a turning point for civilization. It allows us to see that many old ideas about progress are based only on a desire for instant power without taking into account the limits, which is then turned into a rational theory. At this level, obviously only a simple line of argument can persuade.

The power of simplicity applies to all models where there are conflicting interests.

Let us now consider climate change and the IPCC with its three groups studying the physical phenomenon, the impact and politics of reduction and adaptation, and economic models for mitigation. Although the work of the third group is *a priori* the most delicate and the furthest from the objectivity of the natural sciences, it is the conclusions of the first group about human responsibility for climate change that have been attacked by climate skeptics. There remains an on-going conflict between the wider scientific community and protestors who claim to be adhering to scientific principles in challenging the hypothesis that the increase in greenhouse gases is due to human activity.

Human responsibility cannot be proven with absolute certainty because one cannot state with mathematical precision what would have happened without human intervention. What the IPCC says goes against the economic interests of energy consumers. This case is epistemologically delicate and has shaken several recent philosophical doctrines. The 20th century has emphasized the links between knowledge and interest, already highlighted by Nietzsche, reworked by Habermas³ on the one hand and by Feyerabend⁴ on the other. A new

² Cf. the discussions about the ITER (*International Thermonuclear Experimental Reactor*) project.

³ J. Habermas *Erkenntnis und Interesse* (1968).

conception of knowledge has now emerged, one that is definitely non-positivist, in which reality does not speak without being questioned and where the communities of researchers (Thomas Kuhn) and interest groups (Callon) are the ones who construct the concerns, representations and, ultimately, reality. Also the popularity of Science Studies (Latour, Callon, etc.) and its link with the mainstream of pragmatism that one can trace through Bentham, Mill, Bain, Dewey, Peirce, William James and Rorty, suggest that knowledge is a social construct and draws its relevance from social issues. The confrontation with the universalist and quasi-positivist collective discourse of the IPCC is not simple. Many texts of the new trends suggest – or at least do not rule out the idea – that economic negotiation is ultimately the key to the most positive patterns of behavior, i.e., those which are most efficient, persuasive and peaceful.

Yet, even without absolute proof, reason affirms the human responsibility claimed by the IPCC, even though this clashes with and opposes economic logic. Why? Is it because of the seriousness of the work by various teams around the world, based on different models? Is it because of the fact that among those who have contributed to the work there are many researchers based in rich countries whose interests are not well served by raising these issues and that many leading climate skeptics are linked to powerful economic interests? It certainly is not an argument of authority (the number of renowned scientists or the prestige that some of them have) or a return to a positivist view of truth. But the relativism of knowledge – which relates to the issues discussed – seems too subtle a concern, a second-order effect. Ultimately, what is most important is the simplicity of the argument: On the one hand, the graph of CO₂ emissions as a function of time, on a historic scale, with its clear sign of the post-industrial period, combined with the physical fact of the effect of CO₂ on the absorption of different wavelengths and, on the other hand, the graph of lower-atmosphere temperatures, with its step-change in order of magnitude just after the industrial age.

It is a mistake to complicate models of the environment.

Excess mathematization is a natural path in the academic world, as a result of numerous institutional factors⁵. It is the most convenient way, in the academic world, of avoiding any *commitment*. One speaks of self-organization, of complex systems that are sensitive to initial conditions and, by talking of multi-agent models and other possible thesis topics⁶ ... the ethical conclusion gradually, without anyone noticing, evolves into the belief that it is only scientific research that needs to be perfected. The productivism and selfishness of the privileged classes are forgotten. The economy is hit hard by this tendency.

Keeping the simplicity of the Club of Rome's arguments while reasoning probabilistically.

⁴ P. Feyerabend *Dialogues sur la connaissance* (1991), Seuil, coll. "Science ouverte", 1998.

⁵ I've gone into this in more detail elsewhere: on the philosophical level of "On Excessive Mathematization, Symptoms, Diagnosis and Philosophical bases for Real World Knowledge " *Real World Economics* 57, 6 September 2011, 90-105 (<http://www.paecon.net/PAEReview/>) and on the financial level "Mathématiques et autoréférence des marchés" (<http://cermics.enpc.fr/~bouleau/publications.htm>).

⁶ In this way one talks of "complex adaptive systems", "critically self-organized" systems, the "agent-based" or "self-generated" complexity, or of "highly optimized tolerance" etc. cf for example [Rosser, 1999], [Harris, 2007].

In the most recent version, the Meadows team considered several different scenarios (11 scenarios are discussed). In some ways this already represents the start of a probabilistic line of reasoning, but without considering the consequences of stochastics on current dynamics. In these scenarios we find the general idea of an evolution first in exponential growth (30 pages in Chapter 2) which, after a certain time, becomes tempered by constraints arising from limits in material and energy in the planet (80 pages in Chapter 3). What happens after the peak is only sketched, the authors emphasizing that this time of decline causes social changes so great that they cannot be modeled sensibly. Simplifying to dimension 1, one could say that there is a logistic equation, more or less refined, that leads to certain horizontal asymptotes for the combined balance sheets of minerals and fossils, and certain bell curves, with a peak and then a decline, for the marginal trends and quantities, i.e., for the derivatives.

Our plan will naturally be the following: first we describe the new features of stochastic processes with regard to deterministic trends (part II), and then we review the consequences of uncertainty for the vulnerability of the environment subject to an economic rationale (part III) and we conclude by highlighting the most important points.

2. Qualitative aspects of stochastic processes

While a deterministic quantity is completely described by the evolution of a number as a function of time, a stochastic process is, in some way, a piece of music for multiple voices.

Probabilistic "reasoning"

For all evolutions (growth, decline, convergence) we should specify whether we are arguing in distribution, in mean or path-by-path.

Arguments "in distribution" or "in the mean" (quadratic mean, or in spaces of summable p-th power), also arguments "in probability" introduce compensations that probabilistic calculus allows between the events where there is an increase and those where there is decrease. The evolutions thus described are in general fairly regular because the causes that attribute certain probabilities to certain phenomena usually have some degree of permanence.

But we are also interested in what happens for each trajectory that chance produces, because it is one of these trajectories that describes what actually occurs, or at least what the model suggests will occur. And the most fundamental information that the study of stochastic processes has given is that the behavior of trajectories can be very different from that which dynamics depicts from the distributions or mean.

Trajectories in stochastic processes are erratic, often very erratic.

There are stochastic processes that are smooth, but only where chance applies to only the derivatives or higher derivatives of the quantity. In general stochastic processes are very irregular. A good image is given by share prices, or the silhouette of a mountain crag.

What happens in financial markets – forgetting for the moment the economic role of these institutions – is interesting because it shows how uncertainty, and the imperfect knowledge that agents have of the future, result in the frantic movement of the quantity on which they act. Where the evolution of a currency or an action is not certain – and thus financiers do not

agree on the likely outcome – the quantity will not take a medial path that would represent some sort of averaging of the opinions. Instead it will become erratic, and much more erratic when the uncertainty is large. This wildness, which financiers call volatility, is considered to be the most objective measure of the uncertainty affecting the economic quantities being studied [Bouleau, 2004].

In other words, in general, a stochastic process doesn't possess any clear trend (no speed or derivative in the mathematical sense); from one moment to the next it will increase or decrease.

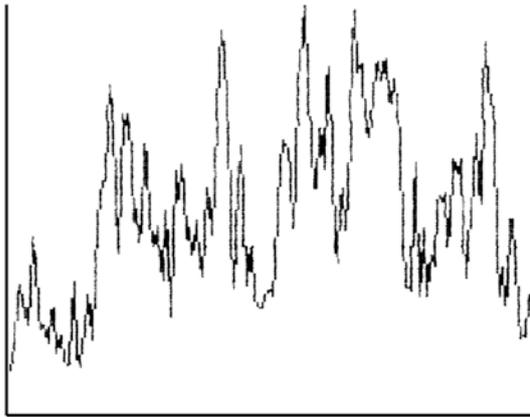


figure 1

Phenomenology of the exponential family.

The heart of the argument of the Club of Rome is to consider phenomena with relatively constant growth rates and to show that, sooner or later, they “go to the wall”. These are quantities whose rate of change is proportional to their actual value, with a positive coefficient. In the case of many variables these can be put in a matrix calculus and the signs of the eigenvalues indicate which linear combinations of variables will vanish and which will increase explosively. This exponential growth cannot last and will necessarily be interrupted by some phenomenon whose role as a brake will increase progressively. Hence the appearance of an additional term in the equation which leads, in the simplest case, to a logistic equation or similar, and results in a saturation and, for the Club of Rome models, to a collapse.

One fundamental phenomenological point is that this is completely different in the case where the quantity has a random element to it. If a quantity showing an exponential character is subject to some randomness that is constant proportionally to the quantity's size, then one of two things will happen. If the randomness is small, the general path of the trajectory will be as one would expect: an exponential curve with fluctuations, above and below, that gradually become larger; this case is illustrated by figure 2. But if the randomness exceeds a certain threshold (as often occurs in financial markets, for example) the behavior of the paths will be completely different from what our intuition suggests: they all end, after some oscillations, by tending to zero; this case is illustrated by figure 3.

This phenomenon is well known in the case of martingales, which are processes in which the mathematical expectation is constant⁷. There exist positive martingales for which all trajectories tend to zero (figure 5). In this case the study of phenomena "in distribution" or "in the mean" do not at all match what happens in reality. And this is not just some sort of mathematical pathology; such cases are extremely common, particularly in economics.

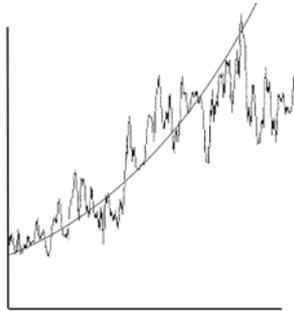


figure 2

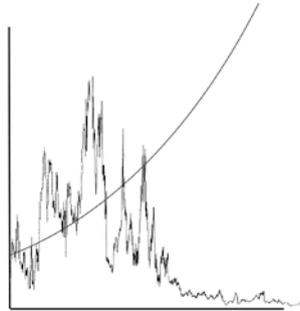


figure 3

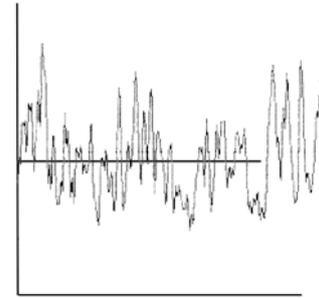


figure 4

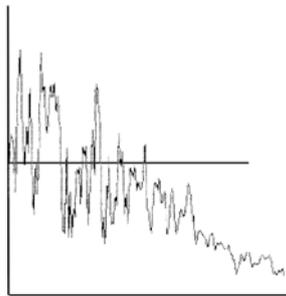


figure 5

For example, if you put your money in a fund that pays 4.5% and you reinvest your dividends constantly, you will achieve exponential growth. If, however, there is some uncertainty which increases the volatility, and this volatility exceeds 3%, the oscillations are such that one will frequently approach very small values, and in the long run you are certain to be ruined.

As another example, if you put your money in at 10% and each year you gamble half your money, the cumulative effect of the gain and the uncertainty will lead you inevitably to ruin. The positive martingales which tend towards zero are typical in fair games and have major significance in terms of collapse.

The same remarks obviously also apply if we consider situations where there is some limit on the exponential dynamic which causes some braking, leading to an equation of the logistic type, with a bell curve instead of something that increases indefinitely.

The most important philosophical point of this phenomenology is that in the case where there is randomness, and it exceeds the threshold we discussed, *it is impossible to tell from the trajectory what would have happened without that randomness*⁸. In other words, *exponential*

⁷ Figure 4 is how one intuitively expects a martingale to behave. It's the special case of a "uniformly integrable" martingale.

⁸ The general question of knowing if one can understand the deterministic trends underlying a stochastic process has been written about at length. The negative response is a consequence of the theorem attributed to Girsanov, cf. [Bouleau, 2004] p37., and for a precise mathematical formulation cf. [Lamberton et al., 2008].

behavior cannot be detected in what is objectively observable. Thus an observation such as figure 1 does not allow us to infer an underlying exponential dynamic.

Stationarity does not mean “always the same”.

A somewhat similar remark needs to be made about stationary processes. In most cases, and especially in the normal (Gaussian) case, they exceed, after a certain period of time, all levels given in advance⁹. Thus a situation which appears to be “sustainable” when considered “in distribution” may turn out not to be so for every trajectory. This is because the size is unbounded (its marginal distribution has no compact support) and that chance makes it “walk” everywhere.

One would think, then, that this phenomenon cannot occur in a finite world. However, we will see later that economic logic requires us to consider that prices are unbounded.

In an uncertain world there are rare events, and their probability is generally unknown.

We now turn to issues that are less descriptive, and more semantic in nature.

If knowledge comes from statistics obtained from experiments, then distribution tails are poorly known; this is obvious and frequently noted. If the quantity represents a level (of water, or of temperature, etc.) then extreme events are badly probabilized.

But we must go further than this. We must consider the role played by *meaning* in the concept of rarity; this is linked to the unprobabilizable uncertainty that was so dear to Keynes. What does it mean to talk of a “rare event”? An event is simply a (Borel) subset of the real numbers. Events whose description is complicated generally have a poorly understood probability, for the same reasons as those related to extreme events. And the central philosophical point is that our interest (in the most general sense of that which attracts our attention) is governed by the *meaning* of the event, i.e., by the impact of this event on the rest of the world. This impact is not in the model studied but in, precisely, that which is not modeled. Translating this concern into the probabilistic language of models is a difficult operation that usually we do not know how to achieve.

To precisely describe the mathematical form of events that we fear is particularly difficult for a stochastic process. An event is a region in path-space. Why talk of this one or that one? One speaks of those which are interesting, those that mean something in terms of consequences for what matters to us, on the economy or on the environment. But the interest that we bring to such and such phenomenon is not at all objective and is usually highly subjective. That is why the *forms* of families of temporal trajectories that have some meaning, that can be interpreted, generally have poorly understood probabilities, because the rarity ascribed to them is usually subjective, at least in part. It is linked to the fact that the event matters to us, or to others.

Let’s clarify this tricky but important point. How does an event, which is perceived as rare by some people but not by others, come to have a poorly understood probability? The model is a summary and we extrapolate from it by different interpretations. The model’s output is

⁹ This is true even for processes that are *strictly* stationary, i.e. when their marginal distributions of order n are invariant under translation.

accurate about the things that are common to all these various interpretations, because the model only “speaks” clearly about this common ground. Except for some purely physical phenomena (emission of alpha particles, Brownian motion, etc.), for most of the interesting situations that we are concerned with (in the environment, in economics, etc.) the element of chance in probabilistic models is a way of representing our ignorance, some sort of convention that we stop at a set of facts and interpretations, and we do not go beyond this point, because that is where opinions start to diverge¹⁰.

3. Vulnerability of the environment when subject to economic “rationality”

Does this collection of striking features of the phenomenology of random processes have any consequences for our understanding of the Club of Rome and, more generally, the question of the limits to growth?

The first issue is to determine whether or not there is randomness and, if there is, what creates it.

It is the economy that adds randomness.

All rated quantities – raw materials and prized materials, sources of energy, lands and real estate – all fluctuate in our liberal economy. We will go deeper into the reasons for this in a moment. But let’s note already that to reason as the Meadows team did, without using monetary value, is to build a model that is disconnected from the forces that represent the interests of agents (or at least from those forces that the agents believe represent their interests). The key fact that *the economy exists* – particularly in the globalized neoliberal period we find ourselves in – means that the link between an economic interpretation of the world, which is very random, and the deterministic curves of the Meadows report, is not made.

The mechanism for finding a market price necessarily involves randomness.

We can first ask whether price formation in markets is truly stochastic in nature, or whether it is governed by some complex, chaotic mechanism. The question might be interesting to the *quants* on the trading floors, but for our purposes it is not very important. Both representations are simply models. What matters is that it moves and that one cannot tell in advance how it will evolve.

In organized markets, for a price to be established, market makers or an exchange system must work constantly to produce the current spot price. Indeed, if the dealers are split into two groups: the bulls who think it will rise and that the current price is too low, and the bears who think the opposite, what will happen to the price if the bulls buy? The price will rise. And if we let the bears sell, then the price will fall. The organization providing the spot price will therefore sometimes let one group speak, and sometimes the other, so that both camps always have some members. Technically it will seek to maintain *good liquidity*, i.e., to minimize the bid-ask discrepancy (for details of how markets function, cf. for example [Cont et al., 2010]).

¹⁰ One can read more about this in my book *Risk and Meaning, Adversaries in Art, Science and Philosophy*, (Springer 2011), especially chapters II (Cournot's "Philosophical Probabilities") and XI (Jacques Monod's Roulette).

Thus we understand that when we say that volatility is the uncertainty in the evolution of the price of the quantity, we may as well say that this irregularity reflects the difficulty that the trading organization has in achieving the balance between buyers and sellers needed to maintain the permanence of the pricing.

The price of a scarce commodity does not follow the logistic curve of the Club of Rome; it follows a “punk hairstyle” instead

We'll now look at things in more detail. If we take the price of copper, or the price of teak, the primary characteristic of the trajectory over time is that it is jagged, and that no-one can say with any certainty whether it is about to go up or to go down, let alone predict its value in a year's time.

The best example is the price of fossil-fuel energy resources. Neo-classical economists in the nineteenth century proposed deterministic models. The best-known examples of this type of thinking are the Hotelling model and its improvements. Without going into detail about the equations, a model that takes account of randomness will give a price graph similar to figure 3. We note that the prospect of depleted resources, combined with the fact that dealers use their arsenal of futures products on the derivatives markets to anticipate future prices, render these models meaningless unless they incorporate a *significant* random component. Without that, expectations would make the price explode. For this not to happen, it is essential that the agents believe that there is a positive probability that the price may go down again. And this can only happen if the prices are randomly excited. This is what happens in financial markets for most quantities, for similar reasons. We can even understand that this is not just a little bit of randomness – a light breeze that gently shakes things – but rather *it is a massive disturbance that will completely obliterate the underlying deterministic curve*. This reinforces the need to reason as if we do not have any idea at all when “peak oil” will occur [Helm, 2011].

The “price signal” of exhaustible resources works very poorly.

The consequence of this is that the “wise response” to the depletion of resources, that of raising prices so as to encourage agents to develop alternative energy sources and substitutes for the missing minerals, will not occur spontaneously, purely as a result of the price, because there is too much variation in the price signal¹¹. The fall in the price of an energy resource, from a very high price to a low price, will kill long-term investment in new technologies.

Indeed, it is clear that the magnitude of the financial uncertainties that we face prevents us from taking new directions. Using the IPCC estimates, for a stabilization target of 550ppm¹² CO₂ equivalent, the marginal cost reduction in 2030 would be between \$5 and \$80 per ton, i.e., a spread of 1 to 16. In these conditions, a businessman interested in the carbon emissions of his enterprise must evaluate investments whose profitability, even with some subsidies, is extremely uncertain, when compared with the long-term interest rate that the

¹¹ A study [Boyce 2011] about petrol, carbon, and 78 minerals, showed no correlation between the variation in the price and the variation in the quantity extracted. The impact of the variation in the price of petrol on the economy is also complex and variable, cf. for example [Lescaroux et al. 2010].

¹² ppm signifies parts per million, CO₂ equivalent signifies the equivalent amount of carbon dioxide.

financial markets can provide today. Instead of stepping out and being the first among its competitors to begin this adventure, the business is almost obliged to wait until that spread is reduced.

This also explains why a system of tradable rights, as in Europe, or a tax on petroleum products, can only be effective at creating decarbonization and energy-efficiency technologies if it leads to the publication of a quasi-deterministic forecast of how the price will vary over a sufficiently long period¹³.

Local agricultural methods are disrupted and driven to destructive practices.

In agriculture and livestock, in addition to meteorological variations, globalization has added significant randomness to prices [Daviron et al., 2011] which, since the winner takes all, ends up destroying traditional, sustainable practices and encouraging methods that are destructive and short-sighted. These survival techniques may also draw on ancient agricultural and farming customs but these are then carried out using the available mechanized technologies (burning of forests, fishing and hunting endangered species)¹⁴.

The economic valuation of non-marketable common goods will relentlessly erode them.

A major consequence of the random nature of economic prices is that all the theoretical logic of cost-benefit analysis is lost, when applied to the environment.

To preserve the environment, economists usually say we must give a value to its preservation, i.e., put a price on it. This presents various kinds of difficulties, technical, political or legal. On a purely technical level, cost-benefit analysis (CBA) gives a price to non-marketable goods in such a way as to be comparable with marketable goods¹⁵. CBA methods are usually explained in textbooks¹⁶, so we will not go into detail here. However it is done, cost-benefit analysis can only determine a price *based on information from the past and the present*. Yet prices fluctuate. There will necessarily come a time when randomness in the evolution of prices will mean that the service provided by the collective good will be valued lower than the substitute marketable goods that it could be replaced by. Certainly we can see that preserving the environment is of growing importance in public opinion and in this regard, a proper CBA needs to be updated to take this into account. But this concerns non-marketable goods – by definition, there is nothing to sell. The price estimate of the ecological service is inevitably calm and quasi-deterministic. It can only follow a smooth curve (a convolution) and thus a time will come, sooner or later, when the service provided by artificial means will be cheaper.

¹³ The graphs shows that neither the TIPP in France, nor the Italian tax that has significantly increased pump prices, satisfy this criterion.

¹⁴ On the complex interplay of interactions, cf. [Warren 2011]. Furthermore, being unable to occupy space with sustainable activities, poor regions are al

¹⁵ Serious shortcomings in this method, when applied to the environment, have already been identified, cf. [Hanley 1992] and [Ackerman et al. 2002]. But the point made here is, in our opinion, even more serious.

¹⁶ For these methods, without any critical discussion, see [Pearce et al. 2006].

This is particularly serious for biodiversity. A typical approach employed by free-market economists is to divide species into two categories¹⁷. On the one hand there is the *remarkable biodiversity*, comprising those species considered by various *ad hoc* bodies to be *threatened*. For them we calculate the cost of maintaining them as we would for, say, a historic building. On the other hand, for *ordinary biodiversity*, i.e., all other species, we calculate their value by the *ecological service* they provide, from prokaryotes (bacteria) to eukaryotes (higher species) using standard methods of cost-benefit analysis. We can then buy and sell every part of nature or exchange against goods or services already quantified economically.

It is clear that on each specific question, on the way to preserve such and such species in its current condition, the fluctuations in cost legitimize artificial substitutions and the irreversible destruction of habitats. Consider a specific marshy wetland area that is in destructive competition with a deposit of fossil fuels. The two rarities do not evolve in the same way. On the one side there are real and random fluctuations in the price of fossil energy (due to speculation) and on the other there are gradual adjustments in the calculation of "ecological services". The fuel deposit will, someday, end up priced above the carefully calculated estimates for the marsh. *For the environment, this method is the bulldozer of substitutability.*

Taking economic value as a moral compass when faced with uncertainty is to play roulette with the environment, and will lead, sooner or later, to ruin.

Market value is still considered, not only by mainstream economists but also by policy makers, as a reflection of what people are willing to concede for the use of goods, after taking account of personal criteria and the collective game of social exchange. In the background is a picture of a harmonious world, in an equilibrium that slowly evolves with improvements in business performance and changes in consumer tastes. This image is a legacy of the neoclassical thinking of Léon Walras and others of the 19th century, who saw the economy in terms inspired by the minimal action principle in mechanics, and who described equilibrium states by mathematical methods of optimization. It is completely superseded by current practices which, while still relying on that philosophy, have great difficulty in thinking of economics without growth [Jackson, 2009], particularly in the case of the credit and securities market and because of the "debt-based monetary system" [Sorrel, 2010].

But in addition to this, prices fluctuate. In these conditions the competition between a non-marketable good and a commercial commodity is not equal. Under the blows of the waves, even large fragments of a cliff can fall into the sea, but they do not rise again when the sea is calm¹⁸. The key point here is that in the long term the present economic organization, with its financial markets that govern the most important prices, is incapable of setting limits to prices that fluctuate. *In other words, the whole world is finite and bounded, except for prices.*

¹⁷ Cf for example in France "Approche économique de la biodiversité et des services liés aux écosystèmes, Contribution à la décision publique", *Centre d'Analyse Stratégique* April 2009.

¹⁸ Recent examples include the exploitation of oil sands in Canada, coal in Australia, and the Belo Monte dam which has just been signed off by the president of Brazil, and which will flood 400,000 hectares of forest, and displace 40,000 inhabitants.

From quoted prices in financial markets to prices in everyday life.

We first make a remark that complements the arguments above. Stock prices, currency rates and commodity prices fluctuate in financial markets, as we have said. But the way the economy works in society in reality means there are certain “valves” which ensure that certain quantities stay stable or grow randomly, but never go down. This is generally true of real estate prices in city centers in Europe, and of salary levels for certain professions, etc. Without going into the mathematical details, the reader will understand that the existence of steps and rises creates a situation that is random and unpredictable, whose consequences are similar to those of a process which rises and falls, in so far as we never know how much it will increase in a given time period¹⁹.

It thus appears that the primary source of turbulence that spreads through the economy comes from the financial markets²⁰. This leads us to the conclusion that this turbulence, which has such devastating effects where the economy and the environment meet, is there to allow financial markets to exist. Given that, should we conclude that we should get rid of them? Yes, so long as we measure how much this idea necessarily disrupts free trade from top to bottom. Because even if capital markets are the principal source of randomness, they are not the only ones (there is also randomness in business, in transport, in economic policy decisions, etc.). Until we know how to think, globally and in the details, about a sustainable economics that does not unduly restrict our customary freedom, in which the evolution of prices over time is smooth, it is essential to regulate and vigilantly resist the attacks of randomness that come from economic logic.

Conclusion

Randomness hides trends. It is precisely for this reason that there is randomness in financial markets. For if the trends were clear, they would be immediately exploited, and their clarity would disappear. In hiding these trends, randomness weakens the arguments that one can derive from the finiteness of the world and its limits. This is one reason why the warnings given by the Club of Rome were not acted upon: *bell curves – quasi-exponential growth, overshoot, peak, decay and collapse – we do not see these in prices.* We genuinely feel, when watching commodity and share prices that the economy is still broadly in the same situation. So long as agents' behavior is governed by the economic climate rather than by moral considerations, *business as usual* will continue.

For the ancient Greeks, chance was on the side of nature; they feared the wrath of Poseidon so much that they were ready to sacrifice a young girl. Until the 18th century it was the “elements” that were random; humans actually occupied only a tiny part of the planet. Now the situation has changed: a great disaster, such as the Tōhoku tsunami, may kill 20,000, i.e., three millionths of the world population, yet this is far lower than the number who die in car accidents each year. Humans occupy the majority of the planet and it is they, by economic reasoning and free-market logic, that are the main source of randomness. *The economy is now the environment that the environment finds itself in. Neoliberalism has become the storm,*

¹⁹ One way to understand such reasoning, often used by economic correspondents in the media, is to consider the graph of relative changes, where the randomness of the increases is more obvious.

²⁰ Specifically, the turbulence comes from the fact that if a market shows a clear trend that sets it apart from a risk-free investment, then it is unstable, since buying and selling will, respectively, cause the price to increase or decrease.

against which the world needs protection. That clearly means that it is not enough to relay information about the current and future physical states of the world; this will not convince an economic agent who sees prices fluctuate. It is essential to attack the problem at its root, which is the way that the market economy “speaks” by imposing a screen of volatility over the determinism of the collapse.

Appendix

A) On the origin of the volatility of market prices.

Robert J. Schiller begins his 450-page book *Market Volatility* [Schiller, 1989] with the phrase “The origin of price movements are poorly known in all speculative markets for corporate stocks, bonds, homes, land, commercial structures, commodities, collectibles and foreign exchange”.

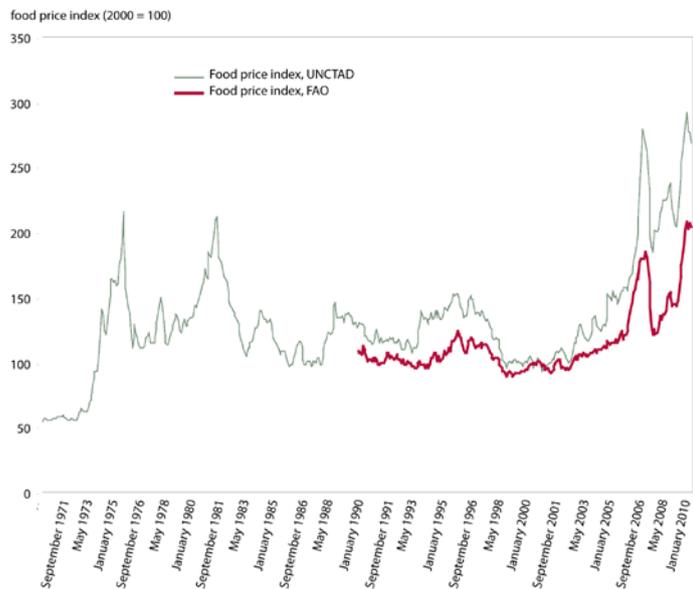
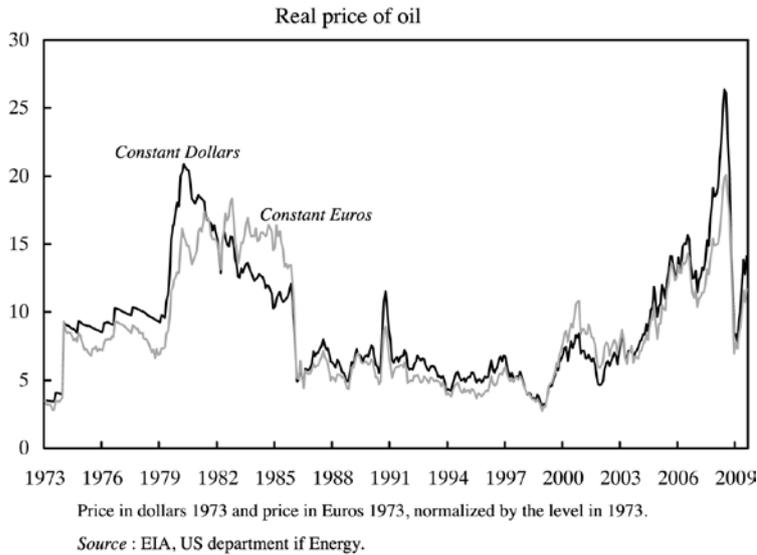
In its simplest version, finance theory says that an asset cannot have a foreseeable evolution unless it is deterministic and varies as the core investment, without any risk: the “bond”. It also says that under certain hypotheses, often framed in terms of perfect information – although the notion of information is simple to express mathematically, but not at all simple in what it represents – the uncertain assets are martingales, i.e., processes which have the “centre of gravity property” [Bouleau, 2004]. We know mathematically that these processes are very irregular. Thus we have a theory that explains the irregularities we see in stock prices. But this is not the real explanation of the behavior, of course, because markets usually function with only incomplete, partial information.

All studies conclude that there are two types of reason. On the one hand, the effect of real shocks that change the landscape of the activity: technological innovation, consumer tastes, social or political change, fundamental changes in currency rates, etc. On the other hand, there are psychological factors arising from differing opinions, changes in confidence, differing levels of risk-aversion, etc.

In this article we have outlined a simplified form of the non-arbitrage principle: the value of an asset cannot be predicted if its evolution is different from a bond, because if not, then it would enable risk-free profits and this would change its value. This argument does not explain the phenomenon beyond saying that the variation in the price of an asset (its volatility) is even larger when the evolution of the asset is more uncertain.

To discuss this latter phenomenon would require a definition of uncertainty different from that given by volatility. This is a genuine research program with a high risk of subjective interpretations. We are therefore reduced to recording that volatility is, often (for instance for currencies), lower in the more highly diversified and highly structured economies of advanced countries, and greater concerning the assets of developing countries where there is more uncertainty about the future.

B) We choose two graphs from among the many possible, to serve as a visual aid to complement this article.



World food prices, UN Conference on Trade and Development (UNCTAD) and Food and Agriculture Organization (FAO), Sources: UNCTAD and FAO.

figure 7

C) If one compares the above reflections on the compulsory agitation of markets to recent events concerning political strategies on the environment such as the strength of the climate-skeptic current, one might legitimately ask whether there would be some structural economic link, by the mere incentives of liberalism, that *push to contradict even the most scientific predictions*, see [Michaels 2008] [Oreskes et al. 2010].

I do not currently have the sociological analyses that would bring out the facts regarding this in Europe or the U.S. That is why I leave this comment out of the main text and state it in the appendix as a hypothesis.

This hypothesis would give a stronger meaning to the term "merchants" in the title of Naomi Oreskes' book since we would then talk about "market doubts."

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Democracy and sustainable development: Implications for science and economics

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Abstract

Sustainable development is a contested concept in that it is interpreted differently by different actors. A distinction has been made between “weak” and “strong” sustainability. Some have referred to three aspects or “pillars” of sustainable development; economic, social and environmental. Others have advocated a further broadening of the kinds of dimensions to be considered. The present author has argued that a distinction between monetary and non-monetary aspects of development is crucial and also that an actor’s relation to ongoing development and the present political-economic system can be categorized in terms of “business-as-usual” (BAU) interpretation and attitude, “social and ecological modernization” or as demanding “radical change” in our present political-economic system.

Mainstream neoclassical economics in its textbook form will be scrutinized with respect to its scientific and ideological features. This will be related to what appears to be needed to meet the challenge of sustainable development. An economics that is more open and compatible with normal ideas about democracy is indicated.

Influential actors in business, government and civil society have their specific – or less precise – ideas of economics for management and governance. Such mental maps of influential and other actors are closely related to mainstream neoclassical economic theory. This assertion has of course to be made credible or proven by special studies. Here, I will scrutinize a consensus report prepared for the Rio+20 Conference (United Nations Secretary-General, 2012) with respect to the ideas of economics to which it refers. My conclusion is that the report’s authors do not know of or consider any alternative to the neoclassical perspective. Pluralism with respect to paradigms in economics is then recommended as an essential first step towards sustainable development.

Key words: neoclassical economics, theory of science, ideology, pluralism, institutional economics, institutional change, democracy, sustainable development, 2012 UN panel on global sustainability

Introduction

In science, the positivist tradition demands that concepts be clearly and, if possible, quantitatively defined. Concepts that are a bit ambiguous should be avoided. This practice of looking for concepts that are clearly defined is also valid for the social sciences. But additionally, we have to live with a number of so called “contested concepts” (Connolly 1993), such as democracy, power, solidarity, institution – even sustainable development – that can be interpreted in more ways than one. Avoiding such terms and concepts would make social science less relevant and useful. In those situations we have to make distinctions between different interpretations and clarify for the reader to which ones we refer. Rather than reductionism, in the sense of simplifying our conceptual framework, we have to live with some complexity.

The distinction between weak and strong sustainability (Neumayer, 2010) relates to the issue whether all kinds of impacts can be traded against each other in one-dimensional, usually monetary, terms. “Weak” sustainability refers to such a trade-off philosophy. It is assumed for example that even negative irreversible environmental impacts can be compensated for by other positive impacts as part of a summation procedure. Neoclassical Cost-Benefit Analysis (CBA) in monetary terms exemplifies such assumptions and beliefs. “Strong” sustainability on

the other hand does not permit this kind of one-dimensional trade-off philosophy. Each impact should be described in its own terms, and one-dimensional calculation is no longer considered meaningful or acceptable.

The distinction between economic, social and environmental impacts (e.g. Zedec, 2001) can be seen as a step towards strong sustainability. Environmental impacts are considered separately in Environmental Management Systems (EMS) for organizations or in Environmental Impact Assessment as part of decision-making, for example investments in infrastructure. This approach is not without problems, however. Environmental impacts also refer to resources and are for some of us (being ecological economists) as “economic” as financial or monetary impacts. Social impacts may similarly include ethical concerns and thereby all kinds of impacts.

To deal with these issues, a distinction must be made between financial or monetary impacts and non-monetary impacts. (Söderbaum, 2000) On the non-monetary side there are many kinds of impacts, such as those related to health, social situation, biological diversity, land-use, etc. Some of these impacts are not easily reversed.

A Nobel Laureate in physics, Murray Gell-Mann, has proposed 7 kinds of interdependent transitions “to a more sustainable world”; the demographic transition, the technological transition, the economic transition, the social transition, the institutional transition, the ideological transition and finally, the information transition (Gell-Mann 1994, pp.345-366). Gell-Mann’s list of transitions opens the door for a discussion of institutions and ideologies so often avoided. We will come back to these issues later on. For the moment we can make the observation that seriously considering sustainable development represents an ideological orientation that differs from the present mainstream.

This in turn brings us to a distinction between three different actor interpretations and attitudes. Some actors believe that we can “continue as before” emphasizing economic growth and profits in business, and believing that markets and technology will solve all possible problems. Others are skeptical of such a business-as-usual attitude and agree that there are serious problems which demand modification and “modernization” (Hajer, 1995) of our present political-economic system. Finally, there are those of us who believe that we should also consider “radical change” in our present political-economic system. Taking sustainability seriously means for example that one realizes that the most powerful organization in our present society, the business corporation, is defined in monetary (financial) terms while sustainable development is mainly a matter of performance in non-monetary terms. How can we deal with this tension or contradiction in the future?

Relationships between science and politics

As a philosophy of science, positivism holds that science must – as much as possible – be kept separate from politics. The scientist or scholar should test a hypothesis objectively, meaning that he or she should be neutral in value terms, even “value-free”. But in social science this idea of separation of science from politics is not very realistic, not even an ideal to aim at. We should rather admit that “values are always with us” in social science research and education as argued repeatedly by Gunnar Myrdal (e.g. 1978). It is here alleged that the neoclassical paradigm in economics is specific not only in scientific but at the same time in

ideological terms. This is also true of any other specific theoretical perspective in economics, such as a version of institutional economics or feminist economics.

If science cannot be separated from politics then scholars, just as other actors in society, have to respect normal ideas of democracy. Values and ideology has to be dealt with openly rather than hidden behind some idea of value-neutrality. It need not be added that our present challenge of moving from an unsustainable to a sustainable development path is not only a matter of explanation and facts but also of values and ideology. On what facts are we focusing, for example?

The values or ideological orientation of actors exemplify the subjective aspects of individuals, scholars included, in dialogue and action for sustainable development. Hermeneutics, i.e. the study of interpretations (Ricoeur, 1981), narrative analysis of the stories told by specific actors (Porter Abbot 2002) and social constructionism – referring to the fact that a person in one form or other is actively engaged in the creation of her own phenomenal world (Burr, 2003, p.19) – are other aspects of a theory of science pointing to the subjective aspects of an actor's thinking, arguments and behavior.

The ideology of neoclassical economics in relation to demands for sustainable development

Neoclassical economic theory in its textbook version starts with assumptions about the meaning of economics, how the economy can be understood, about the actors in the economy (individuals, firms and the state), about markets, about efficiency in decision-making and about instruments for public policy. All theories are based on assumptions and the neoclassical perspective or paradigm can hopefully contribute something also to the handling of sustainability issues. As I have pointed out repeatedly, it is the monopoly position of neoclassical theory in education at university departments of economics globally that is a problem. Economics has become standardized to neoclassical theory with its connected ideology, and today textbooks with essentially the same content are used. Gregory Mankiw's *Principles of Economics* (2008) is an example of this as is Klas Eklund's *Vår ekonomi* (2007) to take an example from Sweden.

Other theoretical perspectives exist and have been developed elsewhere, but university departments of economics continue to protect neoclassical theory. It may be noted that this is the theory that has been dominant during a period when things have gone seriously wrong in relation to demands for a sustainable development.

Idea about Economics

In neoclassical theory, "economics" refers to markets where individuals and firms are the actors and where improved efficiency in "resource allocation" is believed to be automatically achieved or sometimes as a result of state intervention.

From the point of view of sustainable development (in its "modernization" or "radical change" version), the focus on markets is too limited. Non-market relationships are no less important in understanding the functioning of an economy. Expressed in political terms, "democracy" should, according to some of us, be seen as the overriding principle. The title of a book edited by Miroslav Lapka; *Is Globalization Overpowering Democracy? The Challenge for Ecology*,

Economy and Culture (2007) is revealing. Actually, the word “democracy” is missing in the index of most neoclassical textbooks, including the ones by Mankiw and Eklund mentioned above.

View of the Economy

In neoclassical theory the “economy” refers to markets for commodities, labor and financial capital in single nations where individuals (households) and firms relate to each other and where the state is a regulating actor. International economics as a field then refers to exchange or transfer of commodities, financial capital and labor between nations.

From the point of view of sustainable development reference to households and firms as actors is not enough. In addition, individuals and organizations acting as part of civil society are influencing markets and are active in policy-making processes. Media and environmental organizations (Greenpeace, WWF etc.) operating at the local, national or global level are part of this. Also universities, churches, political parties and organizations connected with local and national government as well as regional (European Union) and international organizations (at the UN-level for example) are part of governance and the economy.

As ecological economists we furthermore see markets as embedded in a socio-cultural sphere and also in an ecological sphere. This suggests that indicators focusing on market performance in monetary terms are not enough to measure performance of the economy. A number of non-monetary indicators are needed as well.

View of human beings

In neoclassical theory “individuals” (as actors in the economy) are understood in “Economic Man” terms. They are regarded as consumers maximizing their utility choosing between baskets of commodities, subject to a monetary budget constraint. Individuals also have roles in relation to labor markets and financial capital markets.

From the point of view of sustainable development, individuals can be understood as actors in a socio-psychological context. They also have roles as political actors guided by their ideological orientation. Neoclassical Economic Man assumptions can be replaced by Political Economic Person (PEP) assumptions (Söderbaum, 2008). It need not be said that this role of being active (or not so active) in relation to sustainable development is part of the political-economic system and extremely important in relation to our present discussion.

View of organizations

In neoclassical theory “firms” are the only organizations considered. It is assumed that the firm focuses only on monetary performance and that profits are being maximized.

From the point of view of sustainable development other views or models of organizations also seem warranted. As already mentioned, there are additional organizations which perform as actors in the economy (universities, public interest organizations, political parties, organizations as part of government, etc.) influencing what is achieved in terms of sustainability. It should also be observed that there is no mentioning of kinds of objectives other than monetary profits in the neoclassical theory of the firm. No reference is made to Corporate Social Responsibility (CSR) and similar ethical issues. It can be noted as an

example that CSR is not found in the index of Mankiw's textbook. The neglect of balancing issues in relation to non-monetary dimensions of various kinds is also reflected in the assumption that profits are maximized. No reference is made to acceptable or satisfactory monetary profits.

It cannot be denied that a model of organizations as profit-maximizing firms is of some relevance in present society. The dominance, if not monopoly, of neoclassical theory in university education and the power of those establishment and other actors who believe in profits and limited horizons with respect to motives may explain this. But other models of organizations are becoming increasingly relevant for actors who take sustainability seriously.

Rather than the neoclassical hierarchic model, a first step is to recognize the existence of stakeholders with different interests in relation to an organization. Tensions and conflicts are possible and different actor categories become more visible. In addition to the stakeholder model (Freeman, 1984), network models of organizations emphasizing relationships between individuals and organizations (Ford, 1990) as actors have been proposed. One implication is that the borders between organizations become less clear than what is assumed in neoclassical theory. An individual as actor in organization A may bother about her relationships to actors in organization B. The organization is understood as a collective of actors, and a network of cooperating actors may also be understood as a collective comparable to other networks. Business corporations in the same field may work together for some purposes, municipalities or cities may work together, universities may work together in networks.

As part of Political Economic Organization (PEO) assumptions, ethical/ideological issues related to organizations can also be considered and made visible. The organization is guided by its mission (or ideological orientation) that may be monetary in kind but also multi-dimensional. Actors may exploit their power positions in relation to other actors or emphasize fairness. Responsibility and accountability become issues to be considered.

Our deliberation suggests there is no single "true" model of organizations. In attempting to understand business corporations or other organizations we need to consider different models that may contradict each other or be complementary.

View of markets

In neoclassical theory "markets" are understood in mechanistic terms. Firms "supply" commodities that consumers "demand". Supply and demand are "forces" resulting in market "equilibrium" at specific prices and quantities exchanged for each commodity.

From the point of view of sustainable development it appears constructive to also consider other models of markets. The models proposed for an understanding of organizations are a relevant starting point. The Network model of markets is one example. Markets can also be understood as relationships or exchange between political economic persons and political economic organizations as market actors. Focusing on the power position and ideological orientation of each market actor then becomes an option. Is a relationship characterized by "exploitation" or "fairness" according to a specific ethical viewpoint? "Fair trade" and issues of Corporate Social Responsibility (CSR) can then be considered. And such issues of responsibility can be extended to other organizations such as universities. Do we need reference to University Social Responsibility (USR) in relation to the sustainability issues?

Approach to decision-making

In neoclassical theory decision-making is a matter of monetary optimizing. In the case of the firm, profits are maximized and at the societal level Cost-Benefit Analysis (CBA) is applied as a kind of societal profitability analysis. The focus on the monetary dimension is specific not only in scientific but also in ideological terms. As part of CBA, even “correct” prices for purposes of resource allocation are dictated and connected with actual or hypothetical markets. Why apply this particular market ideology at the expense of all other potential ideological orientations?

From the point of view of sustainable development and considering the fact that our societies claim to be democracies a more open approach to decision-making is called for. Economists as analysts have no right to reduce all kinds of impacts to the monetary dimension and apply the “weak” sustainability criterion mentioned earlier.

Environmental Impact Assessment (EIA) is a step in the right direction – although limited in scope to environmental impacts – and Positional Analysis (PA) is another option of a more holistic kind (Söderbaum, 2008). It is built on distinctions between monetary and non-monetary impacts and between impacts as flows, referring to periods of time, and positions (or stocks) referring to points in time. Decision-making is furthermore regarded as a matching process between an actor’s ideological orientation and expected impacts for the case when specific alternatives are chosen. Conclusions are conditional in relation to each ideological orientation considered.

Policy instruments

In neoclassical theory environmental charges or taxes and command-and-control (prohibitions) instruments are considered as the main public policy instruments. The polluter pays principle should be applied in the sense that external negative impacts on third parties are “internalized” to become part of the market transaction. More recently the creation of new markets for pollution permits has become a popular option among neoclassical economists.

In relation to sustainable development neoclassical policy instruments can certainly be useful. These instruments are logically connected with other aspects of the neoclassical paradigm. The alternative to the neoclassical perspective as described above is less mechanistic and focuses more on the responsibilities of various actors in a democratic society. Policy and politics is certainly an issue for the national government through state intervention but also for all other actors as PEPs and PEOs. The neoclassical idea where consumers and firms react mechanistically to external stimuli is replaced by an idea of governance where actors at all levels from the local to the global can contribute and are considered responsible for what they do.

A more open political economics where democracy matters

Each economic theory tends to focus on some phenomena at the expense of others. Certain things are absent from neoclassical theory or downplayed. At the same time a specific ideology is built into each paradigm or theory at the expense of other possible ideological orientations. In the case of neoclassical theory, free movements of commodities, of labor and financial capital within and across nations is part of the ideal and is expected to contribute to

efficiency in resource allocation. Competition is also celebrated and “perfect competition” an improvement when compared with so called “imperfect competition”. “Monopoly” is bad and believed to reduce efficiency in commodity markets, labor markets and financial markets.

While competition is expected to be good for the functioning of an economy, this ideal is no longer valid for neoclassical economists when it comes to research and education. Monopoly for one theory, the neoclassical one, is then celebrated. According to this view there can be only one true theory at a time. When ideology is brought into the picture this attitude of neoclassical economists becomes dangerous for society. Limiting research and education at university departments of economics to neoclassical theory with connected ideology means that such departments of economics take on a role as political propaganda centers. Competing ideas of economics with connected ideological orientations are excluded. Modernized and radical versions of sustainable development exemplify such ideological orientations that differ a bit from the ideology of neoclassical theory.

Neoclassical theory is very much connected with the present political economic system and is part of the protection of this system. Global trade or the rights of business corporations to penetrate every part of the globe is not questioned but rather encouraged. In this way efficiency is believed to be increased while barriers to trade have the opposite impact of reducing efficiency. The challenge of sustainable development is not seriously discussed and the fact that transnational corporations have become so powerful is regarded as natural or a non-issue.

Neoclassical economic theory has its role among other economic theories. The present monopoly claim which has led to a global standardization of economics textbooks is however a mistake. All kinds of barriers to dialogue and “competition” have to be removed. We need to move from neoclassical monism to pluralism in economics.

At the time of the classical economists, reference was made to “political economics” rather than economics. Considering the ideological content of any kind of economics, it is here argued that our discipline should always be referred to and understood as “political economics”. But there are more kinds of political economics than the neoclassical version.¹

Political economic person and political economic organization assumptions represent a starting point for an economics that is open in ethical and ideological terms. Economists no longer dictate the objectives of individuals and organizations. Instead such objectives are open for study in each case. PEP and PEO assumptions in turn lead to a different (and more open) view of markets, efficiency, decision making and an alternative view of how decisions can be prepared in a democratic society, of policy instruments and institutional change processes. Along these lines a version of institutional economics has been indicated as an alternative to neoclassical theory (Söderbaum, 2007, 2008, Söderbaum and Brown, 2010).

Economics in the context of a 2012 UN document on sustainable development

What is the role of mainstream neoclassical economics and other kinds of economics in relation to the present dialogue about sustainable development? I have chosen to study one single document “the report of the United Nations Secretary-General’s High-level panel on

¹ Marxian economists have attempted to monopolize the term “political economics”. But according to the present argument their economics is just one kind of political economics.

global sustainability". The title of the report is *Resilient People, Resilient Planet. A Future Worth Choosing* (2012). The panel was led by Tarja Halonen, Finland and Jacob Zuma, South Africa as co-chairs. Gro Harlem Brundtland who chaired an earlier UN report entitled *Our Common Future* (World Commission on Environment and Development 1987) was among the 22 members of the panel.

With so many panel members representing different experiences, and additional actors who have assisted, it is not unexpected that the recommendations are not completely integrated. This need not necessarily be a disadvantage. Some diversity of opinions may be a strength rather than weakness from a democracy point of view.

Democracy in the UN report

In the preface to the 2012 UN report by the two co-authors, the seriousness of the problems faced by humankind is stressed. Considering also the complexity of the problems suggests that it is wise to listen to many voices. The consensus report presented may be a good option but it would be of interest for all of us who participate in the sustainability dialogue to also be informed about departing views by single members of the panel. Democracy is not just an attempt to reach a consensus. It is as much a matter of visualizing tensions and antagonism as part of a continued debate (Mouffe, 2005).

While neoclassical theory largely neglects the idea of democracy, I have here argued for the primacy of democracy over market and that economics itself needs to be democratized. The 2012 UN report certainly emphasizes democracy, for example in the discussion of ways of "empowering people to make sustainable choices". To some extent this can be seen as a way of moving responsibility for the future to individuals in their roles as consumers or producers. But the report also refers to lack of political will among actors in leading positions as a reason for limited success with previous attempts to get closer to a sustainable development.

Science in the report

The ideas about science reflected in the argument of the report are largely limited to positivism. Reference is made to a "global track record of sustainable development" based on studies from the Stockholm Environmental Institute and Stockholm Resilience Centre. There have been varying degrees of success in fields such as the ozone layer, poverty eradication, forests, education, health, the oceans, water and sanitation, energy, climate change, biodiversity & ecosystems, etc. Radiation, nuclear power, and storage of radioactive materials are not mentioned although they are big issues today in some parts of the world following the Fukushima catastrophe in Japan.

Science and universities are not much criticized, which may be explained by the emphasis on positivism. Do universities take their responsibilities seriously in relation present challenges? I am not sure. In fact the dominance of positivism may be a problem since it can be regarded as a limited responsibility doctrine for universities and scientists. There are many reasons to study the subjectivity of individuals as actors in different roles in relation to sustainable development. As previously mentioned, we may speak of a University Social Responsibility. Actors in research and education are also part of a political dialogue and should be made responsible for their behavior.

The members of the panel repeatedly (pages 7, 14, 64, 71) warn against institutional fragmentation, what they call “silos”. Single issue organizations, even at the UN-level are criticized for not looking at problems holistically. From this follows proposals for a “global sustainable development council”. Similarly, integrated thinking is recommended rather than the “silo mentality” (p. 14) that is so common.

I agree about the importance of holistic, integrated and multidimensional thinking. But a careful reading of the UN report reveals that the authors have their own “silos”. At places one can find a wish to reduce all sciences into one conceptual framework, more precisely mainstream neoclassical economics:

“For too long economists, social activists and environmental scientists have simply talked past each other – almost speaking different languages, or at least different dialects. The time has come to unify the disciplines, to develop a common language for sustainable development that transcends the warring camps; in other words, to bring the sustainable development paradigm into mainstream economics. That way politicians and policymakers will find it much harder to ignore.” (UN 2012 report, p.12)

Mainstream neoclassical economics with its monetary reductionism is, as I see it, a silo much like other silos criticized in the report. We are all expected to agree about “full cost pricing” or the “polluter-pays-principle” as has been recommended by neoclassical environmental economists for a long time. The report suggests that we should incorporate “social and environmental costs in regulating and pricing of goods and services, as well as addressing market failures” (UN 2012 report p.7).

Taxes and charges in monetary terms to reduce negative environmental impacts is often a good idea, but such policies should be based on fairness and other ethical/ideological considerations rather than the expertness of neoclassical economists. Neoclassical cost-benefit analysis is built on an idea of “weak sustainability” as previously discussed and on an assumption about consensus in society about correct values in monetary terms for all kinds of environmental and other impacts. This assumption reflects an extreme version of technocracy and is not compatible with democracy. Still, the authors of the report welcome accurate monetary valuation of environmental services in the case of ecosystems and biodiversity recommended in an ambitious volume initiated by the United Nations Environment Programme, *The Economics of Ecosystems and Biodiversity* (Kumar, 2010, p. 50). Why stick to this idea of correct monetary valuation in a situation where (almost) all of us agree that irreversible losses in biodiversity cannot be valued meaningfully in monetary finite terms?

This debate of course needs to continue. For the moment we may note that the panel members and their assistants act as if they did not know of any other economics than the mainstream. Ecological economics as an example started as a reaction by influential ecologists against neoclassical attempts to deal with environmental problems. Ecological economics which is often defined as “economics for sustainable development” is strangely enough not part of the mental map of those who wrote the UN report. It can be mentioned that the International Society for Ecological Economics (ISEE) has existed since 1990 together with the journal *Ecological Economics*. Regional societies have later been formed such as a European Society for Ecological Economics (ESEE), a Canadian society (CANSEE), a Russian Society (RSEE) etc.

There are of course many other associations for economists who depart from the mainstream. Today even a World Economic Association (WEA) exists with 10,000 members who are skeptical of the way neoclassical economists have dealt with financial crises as well as other problems. I will end this section with the observation that the UN report in the part of it that deals with economics is based on a theoretical frame of reference which has dominated during a period when success in dealing with sustainability issues has been very limited.

Ideology in the report

The word “ideology” is not part of the index in Gregory Mankiw’s textbook *Principles of Economics* (2008). “Ideology” is similarly absent from the UN report we are discussing. (However, on its page 35 the role of “political perspectives” is mentioned among factors contributing to change.) But if the problems we are facing are about ethics and ideology in a fundamental sense then the attempt to avoid this aspect of a dialogue is a mistake.

Democracy is discussed seriously in the report, but ideological options are not articulated. And still a little reflection will make it clear that the way we interpret sustainable development is ideological. “Weak” sustainability differs from “strong” sustainability in ideological terms, is an example.

I have previously in this paper argued that neoclassical economics is specific in ideological terms and that any idea of value-neutrality is an illusion. I will now contend that neoclassical economics in ideological terms is closer to some political ideologies than others. Neoclassical economics in fact tends to make Neo-liberalism legitimate. In both cases we have to do with a kind of market fundamentalism. Self-interest is made legitimate, economic growth is seen as a natural objective for the economy and free movements of commodities, financial capital and labor within countries and across national borders is thought of as a way of improving welfare in all parts of the world.

I have discussed this similarity between neoclassical economics and Neo-liberalism at many places (e.g. 2008). Here, I just want to formulate two questions to the authors of the report; if ideological options are part of the problems faced – why do you avoid analysis of such options? Do you agree that the dominance of Neo-liberalism is a problem in relation to sustainable development?

Institutional change in the report

The authors of the report cannot be criticized for avoiding the issue of institutional change altogether. A UN Council for Sustainable Development to overcome some “silo” tendencies has already been mentioned. I want also to point to what I see as a promising experiment in Norway. In a Box on page 65 of the report reference is made to “Governance for sustainable development in Norway”:

“The Ministry of Finance of Norway is responsible for coordinating the Government’s work on sustainable development, including the National strategy for Sustainable Development, which covers the economic, environmental and social dimensions of sustainable development.

To implement this strategy, Norway has integrated sustainable development into the Government’s most important policy document, the annual national budget. In each yearly budget follow-up is reported in a separate chapter, with contribute

This attempt to move some steps away from an annual national budget exclusively in financial terms could be a beginning of a new institutional framework for economic analysis and public policy. But then it is necessary to keep mainstream neoclassical economists at a distance until they have proven a capability to think in interdisciplinary, ideologically open terms.

A serious failure in the UN report is the unwillingness to discuss the role of business, transnational corporations in particular, in relation to sustainable development. The panel members seem to believe that Global Compact and other lists of ethical imperatives together with a dialogue about Corporate Social Responsibility will be enough when supported by the World Business Council for Sustainable Development (WBCSD) and other similar institutions. I do not agree. Joint stock companies are defined in financial profitability terms. Something is of course also achieved in non-monetary terms, but the idea is still one of maximizing profits. We all (or almost all) are shareholders in some companies but this should not be a hindrance for intellectually understanding that there is a need for major institutional change.

Concluding comments

The sustainability problems faced are complex and multi-faceted. They represent a challenge for all actors in society. I have here focused on the role of science, and economics in particular. Among theories of science, positivism has a role but ideas about value-neutrality have to be reconsidered especially for the social sciences. Each conceptual framework in economics is specific not only in theoretical but also in value and ideological terms. For this reason the present monopoly position of neoclassical theory cannot continue. Only pluralism is compatible with a democratic society.

Cooperation at the UN level will hopefully continue in many fields. But politicians and those who assist them in writing reports have to broaden their capabilities to include alternatives to neoclassical economic theory. If the mental maps of leading actors in governance are limited to neoclassical theory, then we are in trouble. In the present situation some diversity of conceptual frameworks and opinions should be encouraged.

Many kinds of policy instruments are needed and they should probably focus on the behavior of many actors categories. How can politicians help us move from a monopolistic situation to pluralism at university departments of economics for example? Are we ready to seriously consider alternative institutional arrangements to the current political-economic system? How can the present dominance of transnational corporations be tackled?

The UN report discussed in this paper is a cooperative effort between countries at the national level. International cooperation at the sub-national level between regions and cities/municipalities should be further encouraged. Perhaps more radical proposals and activities will emanate from such sources.

Many are those who can contribute to a sustainable development. Eva Kras in her writings (Kras 2007) has pointed to the potential role of "visionaries". In the present report we are reminded about some words of Mahatma Gandhi "Earth provides enough to satisfy every man's need, but not every man's greed." (UN 2012, p. 3) But there are many other visionaries who deserve our attention. I am thinking of David Korten (2001), Vandana Shiva (2005) and Naomi Klein (2007). Attempts have been made also to bring together a number of them in a consensus book (Cavanagh co-chair 2002).

While realizing that you cannot expect everything from a UN report of the kind discussed in this paper, it is a thought-provoking exercise to identify issues that essentially have been avoided. I am thinking of a criticism of the present political-economic system and a discussion of its alternatives. Also the connected issues of options with respect to ideological orientations and paradigms in economics need to be part of the dialogue. Finally, why all this reverence in relation to transnational corporations? Actors within these organizations who take Corporate Social Responsibility seriously may need some support from outside.

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Rethinking macroeconomics in light of the U.S. financial crisis

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1. Introduction

The recent U.S. financial crisis showed that mainstream economics was unprepared to deal with it. There was a widespread belief in the self-correcting power of markets; in Alan Greenspan's words, "those of us who have looked to the self-interest of lending institutions to protect shareholders' equity, myself included, are in a state of shocked disbelief."¹

For Colander et al. (2009, p. 2), the majority of economists "failed to warn policy makers about the threatening system crisis and ignored the work of those who did."

Most economists not only did not foresee the depth of the current crisis, they did not even consider it possible. I agree with Caballero (2010, p. 85) that "it is almost tautological that severe crises are essentially unpredictable, for otherwise they would not cause such a high degree of distress." But it is one thing not being able to predict the timing of a crisis, and another one not even considering the possibility of the kind of collapse that the subprime mortgage meltdown unleashed. Mainstream macroeconomics failed to envisage even the possibility of a financial crisis like the one that took place in 2008. Even after the crisis started in the early summer of 2007, it took a long time for orthodox economists to admit that what was going on was a serious matter. Even worse, the institutional changes that made the crisis possible were inspired by the neoclassical thought based on the holy trinity of competition, rationality and efficiency. These were the same constituents that the analytical models had used to build the subprime mortgage securitisation pyramid that nearly blew up the financial system in the US.

Undoubtedly, the recent financial crisis has damaged the reputation of macroeconomics. So, it is time to question what has gone wrong with it and try to put it right.

I start this paper in Section 2 by reminding readers of the origin of macroeconomics as a branch of economics; then, I recall the major turn that it experienced under the influence of the "Lucas critique." Section 3 is devoted to the origin and widespread use of real business cycle (RBC) models. In Section 4, I present how the crisis is analysed from the RBC perspective. The conclusion is that the neoclassical business cycle model contributes too little to the understanding of the recent economic crisis. So, it seems necessary to look for an alternative perspective. In Section 5, a claim is made to re-evaluate Keynes' original contribution to economic analysis and return to Keynes' thoughts, which have been ignored or misstated during the past 40 years. The main contributions made by Keynes are also highlighted. Section 6 reconsiders Minsky's long ignored contributions to financial theory. Section 7 contains the main conclusions, which point out the need to rebuild macroeconomics

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This paper has greatly benefited from many helpful comments made by Guillermo Escudé on a previous version. The usual caveats apply.

¹ *New York Times*, 10/23/2008.

as a discipline in which aggregate quantities play an essential role, while prices have only second-order effects.

2. From Keynes to Lucas

Macroeconomics, as it is now understood, namely the systematic study of business fluctuations and stabilisation policy, was founded by John Maynard Keynes as a distinct field of study within economics.

The central contribution of Keynes was to focus attention on the economic aggregates (income, consumption, investment, savings, etc.). In Keynesian macroeconomics, quantities are related to other quantities, while the role of prices is de-emphasised. This was the quintessence of macroeconomics until Phelps (1970) criticised this approach by arguing that it lacked proper microfoundations. Lucas (1976) argued in the same direction, and this “Lucas critique” had devastating effects on the then dominant approach in macroeconomics. Macroeconomic theory took a major turn at that point: rational expectations representative agent models became the only allowable modelling method. The necessity of microfoundations has been taken as a dogma that rejects as non-scientific whichever contribution had a different approach regarding this basic principle.

However, it is natural to ask how a model that assumes away any agent coordination problems can shed light on macroeconomic phenomena that are intrinsically involved with causing such problems. Since in a complex system aggregate behaviour cannot be deduced from an analysis of individuals alone, representative agent models fail to address the most basic questions of macroeconomics.² In Harcourt’s (2004, p. 1) words, “Modelling the economy as a representative agent rules out by assumption one of the fundamental insights of Keynes (and Marx), to wit, the fallacy of composition, that what may be true of the individual taken in isolation is not necessarily true of all individuals taken together.”

Other disciplines such as thermodynamics and chemistry do not claim the need for a micro theory. All biological creatures are made up of particles. This does not mean that the natural place to start in building biology is to start with particle physics. Botanists study certain characteristics of the behaviour of plants without knowing the exact biochemical mechanisms behind them. Zoologists study anthills without having to resort to the individual behaviour of ants. It is well known that relativity theory (macrophysics) and quantum mechanics (microphysics) are mutually inconsistent. They both recognise that the aggregate behaviour of the systems of particles, molecules, cells and social insects cannot be deduced from the characteristics of a “representative” of the population.

In general, microeconomic models usually ignore non-price interactions and consider individuals as isolated entities who take decisions independently of each other. A basic assumption of general equilibrium theory is that the only interactions among economic agents are through the price system. All adjustments are carried out via fully flexible prices, and agents never experience quantity constraints. Assuming that the preferences and thereby the choices of one individual are influenced by others introduces an important element of uncertainty, which conspires against the possibility of arriving at a stable price equilibrium. So, agents’ interactions are discarded at the micro level and, at the same time, to be acceptable, macro models are supposed to be derived from these sorts of micro models. Not surprisingly,

² Colander et al. (2008, p. 2).

the result is that the most important real economic problems are excluded from economic analysis.

3. RBC Theory

Lucas' work started new classical macroeconomics, which was later recast as RBC theory by Kydland and Prescott. It also goes under the names of neoclassical growth theory and dynamic stochastic general equilibrium models.

The RBC research programme stems from the assumption that business cycles can be studied in a framework postulating market clearing and agents' optimising behaviour (Lucas, 1977). The origins of economic cycles lie in exogenous shocks to the fundamentals, rather than being somewhat intrinsic to the economic system. So, there is nothing inherently bad in business cycles: they are the optimal response of rational economic agents to unexpected changes in the economic environment. Consequently, there is no room – nor need – for stabilisation policies implemented by the government.³

Following these ideas, Kydland and Prescott (1980, 1982) developed a framework to analyse business fluctuations based on a representative agent who solves optimisation problems to arrive at competitive equilibria that are always Pareto optimal.

This framework was used by Prescott (1986) to study the business cycles in the US during the post-World War II period. His conclusion was that fluctuations mostly resulted from random changes in the growth rate of business sector productivity. So, he challenged the dominant view that business cycles are caused by monetary and financial disturbances.

The general equilibrium growth model became the workhorse of neoclassical economics. It is the accepted orthodox paradigm for studying most macroeconomic phenomena, including business cycles, tax policy, monetary policy and growth.

As stated above, the original RBC model was calibrated for the post-World War II period. In the 1970s and 1980s, Lucas and Prescott maintained that, because of its exceptional character, an explanation of the Great Depression was beyond the grasp of the equilibrium approach to the business cycle. However, while Lucas stuck to this view, Prescott changed his mind at the end of the 1990s. RBC theory, he argued, has succeeded in its endeavour to elucidate the Great Depression. The authors credited with this breakthrough were Cole and Ohanian (1999). After that, a volume studying 12 great depressions in different countries by employing simple applied dynamic general equilibrium models was published in 2007.⁴ Finally, Ohanian published an analysis of the recent economic crisis.

4. The Economic Crisis from a Neoclassical Perspective

Ohanian (2010) used a general equilibrium business cycle model to analyse the 2007–2009 recession. So, a model that started out being applied to a relatively stable period in the US

³ Pensieroso (2009).

⁴ Kehoe and Prescott (2007).

economy such as 1954–1982 – and for that reason was long considered inapplicable to explain the Great Depression – is now being employed to explain the Great Recession.

What are the conclusions Ohanian arrives at? His main conclusion is that “lower output and income is exclusively due to a large decline in labour input” (Ohanian, 2010, p. 45). According to Ohanian (*ibid.*), “labour input during the 2007–2009 recession in the United States was far below the level consistent with the marginal product of labour.” Given the huge level of unemployment the crisis generated, it is not big news to know that the labour input sharply declined during that period. More surprising is the reason for that decline, according to Ohanian: the marginal rate of substitution between consumption and leisure was very low relative to the marginal product of labour. So, it seems that the crisis was caused by a sudden and mysterious increase in the preference for leisure. American workers suddenly decided to stay at home and watch TV instead of going to work. Of course, you are forced to reach that conclusion if you start assuming that the recession is an equilibrium outcome for agents who maximise their utilities. We are now again in the pre-Keynesian world where unemployment is always a voluntary decision by workers who have an increased preference for leisure compared with work. Worst of all, this does not contribute at all either to our knowledge of the causes, mechanisms and consequences of the Great Recession or to the knowledge of the policies to prevent a phenomenon like this happening again. In fact, as Ohanian himself recognised, neoclassical economists know little about the specific sources and nature of the shocks, why labour market deviations were so large, why productivity deviations seem to play such a small role in the United States in this period, on how to model real-world financial and policy events in order to determine their impact on the economy, and why macroeconomic weakness continued for so long after the worst of the crisis passed (*ibid.*, p. 63). In summary, the neoclassical business cycle model does not contribute to the understanding of the recent economic crisis.

Its main contribution, if any, is the conclusion that you cannot analyse crises as an equilibrium phenomenon. Of course, this may sound rather obvious for the naïve observer; however, for mainstream economists, this statement has been considered almost taboo for more than 30 years.

This seems to justify Colander's assertion that “the dynamic ‘truth’ force pushing for the best idea and method to win out is relatively weak in comparison to other specific institutional forces that have little to do with the truth of the idea or the usefulness of a method in arriving at the truth” (Colander, 2009, p. 6).

In the same direction, physicist Martin Bojowald (2010) stated that if a certain line of research reaches an influential position, either by chance or because of fashion, that position will soon become stronger thanks to money raising and the influence on new contracts to fill vacant positions. So, it generates a cumulative process that sometimes has nothing to do with truth or usefulness.

5. Back to Keynes

I have argued elsewhere (Beker, 2010, p. 19) that “it should be economic illness rather than economic health that is the main object of economists’ efforts.” So, for example, it is of little help to know that Kydland and Prescott's RBC model gives a good approximation of the

events in a stable period of the American economy such as the post-World War II period. What we need first of all are instruments to deal with unstable, turbulent, chaotic times.

As stated above, Keynes founded macroeconomics. It was a reflection of the Great Depression on economic thought. Keynes offered a theory of depression economics that asserted that the market mechanism could not be relied upon to spontaneously recover from a slump. The labour market may fail to clear; so, government intervention might be necessary to reach full employment. A central tenet in Keynes' thought was his stress not only on the possibility of market failure, but also on the idea that unemployed resources could exist as an "equilibrium" state not spontaneously eliminated by the market mechanism.

The anti-Keynesian counter-revolution was triggered in the 1970s by the appearance of chronic inflation as an economic problem. Neoclassical economics was considered to be mainstream economics for a long while; however, its failure now opens the way to rethinking macroeconomics, recovering its original aims and methodology. So, it seems reasonable to go back to the *General Theory* itself as a starting point and recover Keynes' real ideas.

Keynesian analysis was a policy-oriented one. Keynes was writing in the middle of the Great Depression and he was mainly interested in advising decision makers on how to get out of it. His approach was a short run one, which is relevant for policy decisions: in the long run, we are all dead, he remarked in his *Tract on Monetary Reform* (1923, p. 65), where he added that "economists set themselves too easy, too useless a task if in tempestuous seasons they can only tell us that when the storm is long past the ocean is flat again." For example, it is of little use and comfort to know that after 10 years of deflation, full employment would be restored.

The main contribution by Keynes was his concept of *involuntary* unemployment. Voluntary (classical) unemployment is caused because real wages are above the marginal productivity of labour. The solution lies in reducing wages. On the contrary, Keynes defines involuntary unemployment in the following way:

Men are involuntarily unemployed if, in the event of a small rise in the price of wage-goods relatively to the money-wage, both the aggregate supply of labour willing to work for the current money-wage and the aggregate demand for it at that wage would be greater than the existing volume of employment. Keynes (2006, p. 14)

So, involuntary unemployment persists even if real wages are reduced. The level of employment is not defined in the labour market but in the goods market. For Keynes, given the equipment, organisation and technique of an economy, there is a one-to-one relationship between output and employment.

In fact, in the Keynesian model, the aggregate demand function is given by:

$$D(N) = C(N) + I \quad (1)$$

where **N** is the level of employment, **C(N)** is consumption and **I** investment. The equilibrium in the goods market requires excess aggregate demand to be zero at some level of employment:

$$D(N) - S(N, K_0) = 0 \quad (2)$$

where $\mathbf{S}(\mathbf{N}, \mathbf{K}_o)$ is the aggregate supply function. So, employment is determined as the inverse of the excess demand function for given values of investment, namely the exogenous variable:

$$\mathbf{N} = g(\mathbf{I}, \mathbf{K}_o) \quad (3)$$

Given the organisation, equipment and technique of production, the labour demand is a function of the level of investment. In the Keynesian model, the volume of employment is defined in the goods market. In Keynes' words:⁵

The propensity to consume and the rate of new investment determine between them the volume of employment, and the volume of employment is uniquely related to a given level of real wages – not the other way around. (ibid., p. 27, emphasis mine)

Given the level of employment, "the wage is equal to the marginal product of labour" (Keynes (2006, p. 5)). If:

$$\mathbf{Q} = h(\mathbf{N}, \mathbf{K}_o)$$

is the aggregate production function, being:

$$\mathbf{S} = \mathbf{Q} \times \mathbf{p}$$

Then:

$$\mathbf{w}/\mathbf{p} = \mathbf{Q}_N(\mathbf{N}, \mathbf{K}_o) = h_N(\mathbf{I}, \mathbf{K}_o) \quad (4)$$

where \mathbf{w} is the nominal wage and \mathbf{p} the general level of prices; $\mathbf{Q}_N(\mathbf{N}, \mathbf{K}_o)$ is the marginal productivity of labour for a given level of capital \mathbf{K}_o .

In short, the amount of labour employed depends on the amount of output being produced, which depends on the level of investment. The level of employment is not a function of the real wage rate as in the classical model. Rather, the real wage rate is a function of the level of employment or, ultimately, of the level of investment.

For Keynes, it was self-evident that fluctuations in the level of employment were mainly correlated with fluctuations in the level of output. He did not even think he should give an explanation on this.

There are at least two arguments that justify Keynes' approach. Small changes in the real wage rate usually have a second-order effect on firms' profits and they are often offset by the transaction costs of firing or hiring personnel. That is why if there is a small decrease in real wages, the aggregate demand for labour will not change. Only changes in the output can cause first-order changes in employment. So, it makes sense to assume labour demand as solely a function of output. In the real world, a huge decrease in the real wage rate is needed in order to offset the effect on employment of a relatively small decline in output. Such a decrease in wages is usually socially non-feasible and, by contrast, as Keynes himself noted, may have a contractionary effect on output demand and, consequently, on the level of employment.

A second argument is the one developed in Yellen's (1984) efficiency wage theory. If wage cuts harm productivity, then cutting wages may end up raising labour costs. Workers may

⁵ By the way, the following quotation shows how wrong is Colander's (1991, p. 7) interpretation of Keynes, according to which "there is not a one-to-one relationship between the number of workers used in the production process and the output of those workers."

accept a reduction in real wages but this does not warrant a higher level of employment. Firms will not hire them even at a lower wage because any reduction in the wage paid would lower the productivity of all employees already on the job.

Thus, no self-adjusting mechanism in the labour market ensures full employment. In the Keynesian model, it is not true that real wages and the level of employment are determined by the intersection of the labour demand function with the labour supply function. The level of employment and the real wage rate define an equilibrium point on the labour demand schedule. Workers earn a real wage, which equals the marginal productivity of labour,⁶ but it does not necessarily equal the marginal disutility of labour.

The second important contribution by Keynes was to point out that only by chance can the market attain full employment equilibrium. The most likely situation is one of involuntary unemployment, where labour supply exceeds labour demand.

This is the key difference between Keynes and the different versions of the classics (be it classics themselves, neo-classics or new classics): in the Keynesian model, the labour market does not necessarily clear. If excess labour supply reduces real wages, the volume of employment does not increase; in such a case, the volume of employment will be given by a point to the left of the labour demand curve at the new reduced real wage rate.⁷

That is why, for Keynes, it makes sense for workers to resist any wage reduction.

In Keynes' *General Theory*, there is no reference to real wage rigidity. On the contrary, Keynes argues that workers will usually resist a nominal wage reduction but, instead, they will not resist moderate reductions in real wages because of an increase in prices (Keynes, 2006, p. 13). Wage rigidity was introduced by those – like many New Keynesians – who claim that otherwise the labour market would clear and no unemployment could exist at all. But, strictly speaking, unemployment because of rigid wages is the (classical) voluntary kind of unemployment. It has nothing to do with Keynes' definition of involuntary unemployment. A reduction in real wages will reduce/eliminate the kind of unemployment in New Keynesian models. This contradicts Keynes' definition of involuntary unemployment as quoted above. Unemployment in New Keynesian models is not very Keynesian.

For Keynes, the huge fluctuations in employment studied by macroeconomics have to do with fluctuations in the level of output, not with the level of real wages.

Keynes also disregarded the role of prices in eliminating any discrepancy between aggregate demand and supply. Orthodox economists *after* Keynes assumed that prices play the key role in reaching equilibrium in the goods market. Keynes did not. And not because he assumed rigid prices as the New Keynesians interpret. For Keynes, the equilibrium in the goods market is attained when demand (consumption plus investment) equals aggregate supply. If there is a general glut, firms would reduce their supply until the equilibrium is attained.

⁶ This is the main difference between Keynes and Patinkin's definitions of involuntary unemployment. According to the latter, involuntary unemployment appears when producers are forced by insufficient demand to operate in a region in which the marginal product of labour exceeds the real wage rate (Grossman, 1972, pp. 28–9). But Patinkin (1989, p. 323) admitted he could not find a convincing explanation why then firms did not demand more labour.

⁷ In the efficiency wage case, the demand curve for labour would move to the left, reflecting the fall in productivity caused by the decline in real wages.

The argument that a supply glut would press prices down until aggregate demand equals aggregate supply was developed after Keynes by the so-called neoclassical synthesis as a way out of his dismal conclusions. As a matter of fact, neither Keynes nor the classics thought there was a close connection between Say's Law and price flexibility as the modern parlance imagine.⁸ What the classics emphasised was that every act of production is an act of potential demand creation. And this was the argument Keynes refuted. Only after Keynes did the neoclassical synthesis introduce the role of prices through the wealth effect as a way to guarantee the attainment of the full employment equilibrium.

So, it is not surprising that Keynes – interested in rebutting classical theory and particularly Say's Law – did not mention anything on this argument. In fact, it was only in 1943 that Pigou wrote his seminal article on the wealth effect.⁹ Let us have a look at this effect and its assumptions.

The wealth effect and price asymmetry

Keynes never thought that the decline in prices could be a way out of involuntary unemployment. For him, the real balance effect was limited to the money market, the so-called Keynes effect. He admitted that those who believe in a self-adjusting economic system could argue that declining prices and wages would reduce the nominal demand for money and the nominal interest rate, thereby restoring a market economy to full employment. He rejected this argument by pointing out that a decline in prices and wages is analytically equivalent to an increase in money supply and thus subject to the same limitations he pointed out in connection with increasing the money supply as a way to reach full employment.¹⁰ Keynes did not consider the possibility of a real balance effect on the goods market; nobody did before Pigou (1943).

Keynes was a practical-minded economist. In this respect, although he admits wage and price flexibility, he is very sceptical about downwards flexibility. That is why he insists that real wages, in practice, can be lowered only by the increase in wage/good prices, not by the contraction of nominal wages. If so, it is clear why he did not even consider that there could be a significant real balance effect on the goods market capable of leading automatically in a market economy to full employment by a reduction in nominal prices.

Moreover, with reference to the recent economic crisis, Krugman (2008) illustrates how small the real balance effect could be in practice. Before the crisis, the US monetary base was about \$800 billion. Supposing a 20 percent fall in price levels, this would raise the real value of that base by \$160 billion. But the housing bust wiped out something like \$6 trillion of wealth; there is no comparison with the effects of a drastic fall in the aggregate price level, even if it were feasible.

⁸ See Montgomery (2006, p. 128) for a well-developed argument on the classics, Say's Law and price/wage flexibility.

⁹ Pigou (1943).

¹⁰ Mainly, the limitations that the liquidity trap imposes on the reduction in the interest rate and, consequently, on an increase in investment. "If a tolerable level of employment requires a rate of interest much below the average rates which ruled in the nineteenth century, it is most doubtful whether it can be achieved merely by manipulating the quantity of money" (Keynes, 2006, p. 282).

So, although the wealth effect may be of some use in analysing inflationary processes, it is of no practical relevance when dealing with recession and unemployment. This highlights the need for different approaches when analysing an increase in aggregate demand and when analysing a fall in it.

In fact, as pointed out by Dobrynskaya (2008), “the Phillips curve is empirically found to be convex (Alvares Lois, 2000; Latxon, Rose, & Tambakis, 1999, for the USA; Dolado, Maria-Dolores, & Naveira, 2005, for several European countries) implying asymmetric price rigidity, which means that prices are more sticky downwards than upwards. This results in the Phillips curve being steeper for positive changes in inflation than for negative ones. Therefore, as documented by many authors for many countries (e.g. Cover, 1992), positive demand shocks give rise to inflation without affecting output significantly, while negative ones reduce output without affecting inflation.” She continues: “Peltzman (2000) studies over 240 markets for consumer as well as producer goods and finds that asymmetries are pervasive, substantial and durable, and exist in periods of low inflation as well as in periods of high inflation. These asymmetries also apply to price indices (Verbrugge, 1998).”

For the sake of elegance, economics usually assumes symmetric behaviour. But reality is seldom symmetric. In particular, price behaviour is not symmetric. Usually, wages and prices are downwards inflexible and a lot more flexible upwards as illustrated by inflationary and hyperinflationary processes. A variety of evidence suggests that price/wage asymmetries in fact hold in actual economies.¹¹ Empirical research on wage dynamics has highlighted the presence of downward wage rigidities in a large number of countries.¹²

In his 1972 Presidential Address to the American Economic Association (AEA), Tobin argued that nominal prices can rise more easily than they can fall. Ball and Mankiw (1994) use a menu cost model to explore a possible explanation for such asymmetry, while other authors simply assume its existence in their models. In this respect, it may be worthwhile recalling Solow's AEA presidential address reflection: “I remember reading once that it is still not understood how the giraffe manages to pump an adequate blood supply all the way up to its head; but it is hard to imagine that anyone would therefore conclude that giraffes do not have long necks. At least not anyone who had ever been to a zoo.” (Solow, 1980, p. 7). Although it is, of course, desirable to have an acceptable theory to explain price asymmetry, it seems anyway much more reasonable to assume asymmetric rather than symmetric price behaviour, at least for anyone who studies the real-world economy.

The role of investment

The third main contribution by Keynes was to identify the key role that investment plays in determining the level of employment. The level of employment is determined in the goods market at the point of equilibrium between the aggregate supply and demand for goods. Given the consumption function – which is increasing in the level of income – it is the volume of investment that defines the equilibrium.

Keynes identifies investment as the volatile component of aggregate demand. Investment depends on expectations: the marginal efficiency of capital is, for Keynes, the expected rate of profit. These expectations are subject to a high degree of uncertainty. Economic

¹¹ See, for instance, Ball and Mankiw (1994, p. 14) for additional references to the mentioned by Dobrynskaya (2008).

¹² See Dickens et al. (2007) and Babecký et al. (2010).

fluctuations are exaggerated to a degree because decisions are highly dependent on the political and social atmosphere that gives way to waves of optimism or pessimism – the ups and downs of “animal spirits.”

As Skidelsky (2011, p. 2) points out, “Keynes' picture of the economy differs from the classical -as well as the new classical- picture in its stress on the volatility of investment and the weakness of the rate of interest as an equilibrating mechanism.” Thus, fluctuations in investment are responsible for fluctuations in aggregate output and thereby in employment. No mechanism guarantees that the level of investment will be the one that leads to full employment. On the contrary, only by chance it will be that particular one.

The neo-classics' and new classics' stories are that market clearing ensures that supply and demand in both the labour and goods markets reach equilibria, which correspond to full employment.

So, we come to the fourth main contribution of Keynes: markets do not necessarily clear. For Keynes, equilibrium does not necessarily mean market clearing. If we accept the definition of equilibrium as a state of the world where economic forces are balanced in such a way that in the absence of external influences the (equilibrium) values of economic variables will not change, Keynesian involuntary unemployment is an equilibrium state. Of course, this concept differs from the received view that identifies the equilibrium with the concept of market-clearing solutions. Precisely, Keynes' point of view is that there are no forces in the labour market capable of leading it to a clearing solution.

That is why Barro's (1979, p. 54) critique of Keynesian involuntary unemployment as implying a failure of agents to realise perceived gains from trade misunderstands the Keynesian concept. Barro argues that “it would be mutually advantageous for workers and firms to determine levels of employment in an efficient manner.” But Keynesian unemployment is *involuntary* precisely because it is out of the reach of firms and workers to reduce it. Explicitly, Keynes defines it as a situation where a decline in real wages does not alter the level of employment. So, the simple conclusion is that Barro was not discussing Keynes's position but his own personal interpretation of the *General Theory*.

Keynes on savings

One of the more shocking aspects of Keynesian doctrine is Keynes' approach to personal thrift, as a drag on the economy because of the reduction in aggregate demand for produced goods and services.

This has to do with the active role that Keynes ascribes to investment, while savings adjust passively to the volume of the former. So, for Keynes, investment leads the way and determines the volume of output and employment. Keynes makes clear his thoughts on the subject when, criticising under-consumption theories, he points out that “a relatively weak propensity to consume helps to cause unemployment by requiring and *not* receiving the accompaniment of a compensating volume of new investment” (Keynes, 2006, p. 339). A “weak propensity to consume” means a high propensity to save. A higher propensity to save demands a higher volume of investment to reach full employment.

It is true that in the long run output depends upon productive capacity and productive capacity depends upon capital formation, but capital formation does not depend on savings but upon

investment. Only at full employment can the volume of savings be a restriction for the volume of investment. Of course, this is the only case that orthodox economics considers.

Keynes on inflation

The *General Theory's* main concern was unemployment. Its aim was to show why an economy can be stuck in unemployment and how to get out of it. The appearance of chronic inflation as an economic problem in the 1970s triggered the anti-Keynesian revolution. It was argued that demand stimulus to raise employment would always be associated with higher inflation. Keynesian models – it was said – assumed away the problem of inflation as a possible consequence of excessive aggregate demand stimulus.

“Popular folklore has it that he was largely unconcerned with inflation from the start, that his subsequent preoccupation with unemployment led him to ignore it altogether, and that, as a result, he favoured expansionary measures to eliminate unemployment regardless of their inflationary consequences.” (Humphrey, 1981, p. 1)

As a matter of fact, Keynes (2006, p. 271) admitted that wages and prices would rise gradually as employment increases: “(...) we have in fact a condition of prices rising gradually as employment increases” and “an increasing effective demand tends to raise money-wages though not fully in proportion to the rise in the price of wage-goods” (ibid., p. 275).

This was the origin of the idea behind the Phillips curve: there is always a trade-off between alternative levels of unemployment and inflation: the lower the level of unemployment, the higher the level of inflation is. It is up to society to choose the preferred combination of both.

Finally, “when a further increase in the quantity of effective demand produces no further increase in output and entirely spends itself on an increase in the cost-unit fully proportionate to the increase in effective demand, we have reached a condition which might be appropriately designated as one of true inflation” (ibid., p. 276). So, for Keynes, true inflation sets in after full employment has been reached.

The new classical literature objected that the short-run Phillips curve trade-off could not be exploited because a reputation for doing so would soon lead the public's inflation expectations to change, in a way that would eliminate the apparent gains achieved by the policy. The argument was that the private sector, endowed with rational expectations, would expect the central bank to act in the way that it does, and the expectation of inflationary behaviour would shift the short-run trade-off in an adverse direction. This adverse shift in the employment–inflation trade-off would mean higher levels of inflation for each level of unemployment. So, the long-run Phillips curve would be vertical, which means that there would be no trade-off between inflation and unemployment.

However, the argument is valid only if the central bank follows a naïve policy of inflating at any cost without making any commitment on inflation goals. If it does and the commitment is credible to the private sector, there is no reason for a shift in the Phillips curve.

By contrast, the good empirical fit of traditional Phillips curve equations is an important argument against new classical objections. The fit would not be as good as it is if the Phillips curve were continuously shifting as actual inflation changes.

Anyway, as stated at the beginning of this subsection, the *General Theory* was mainly devoted to the analysis of unemployment. Anyone interested in knowing Keynes' opinion on inflation and the ways to fight it should refer to his writings between 1913 and 1930 when inflation was a major economic problem in Europe.

6. Hyman Minsky's contribution to financial theory

The currently observed turmoil in financial markets has recently brought to prominence the ideas of Hyman Minsky, after a long period of unjust oblivion.

Minsky called himself a "financial Keynesian." His financial theory is a distinguished contribution to the analysis of economic instability. While Keynes identified as a fundamental flaw of the capitalist system the possibility of stable unemployment, Minsky added instability as a normal result of modern financial capitalism. He was convinced that leverage is the Achilles' heel of capitalism. His 1987 analysis of securitisation was a prescient study of its nature and perils: "Securitization lowers the weight of that part of the financing structure that the central bank (Federal Reserve in the United States) is committed to protect. A need by holders of securities ...may mean that a rise in interest rates will lead to a need by holders to make position by selling position, which can lead to a drastic fall in the price of the securities" (Minsky, 2008, p. 3).

He strongly criticised the neoclassical approach: "The neoclassical way of doing economics, which rests upon splitting the financial system off from what is called the real economy, throws no appreciable light on the effect that a financial system has upon the functioning of the economy" (Minsky, 1992b, p. 15).

On the contrary, he thought that the financial system plays a critical role in modern capitalist economies. "Liability structures, which link yesterdays and tomorrows to today, introduce a degree of intertemporal complexity into the economic process beyond that due to the different expected lives of capital assets, the gestation period for investment output and the time it takes to transform a labor force" (ibid., p. 3). Such complexity may generate time series that can be characterised as incoherent, chaotic or ones that exhibit hysteresis (ibid.).

He characterised modern capitalism, especially in the United States, as "money manager capitalism." "The evolution has been from a financial structure where external finance was mainly used for trade to an even greater use of market or institution based external funds to finance the long term capital development of the economy" (Minsky, 1996, p. 11).

He maintained that "the financial panic is made possible by the changes in the financial structure that takes place during the long-swing expansion. As a result, the triggering event for a deep depression need not be specially severe..." (Minsky, 1964, p. 325). Financial instability is fostered by three factors: 1) the rise of debts relative to income; 2) the rise in the price of stock market and real estate assets and 3) the decrease in the relative size of ultimate liquidity (ibid., pp. 325–6).

Minsky held that during expansions, profits accrue disproportionately to firms with the most aggressive financial practices, resulting in an erosion of safety margins. So, over a prolonged period of prosperity, investors take on more and more risk, until lending exceeds what borrowers can pay off from their incoming revenues. When over-indebted investors are forced

to sell even their less-speculative positions to make good on their loans, markets spiral lower and create a severe demand for cash – an event that has come to be known as a “Minsky moment.”

As pointed out by Randall Wray (2011, p. 62) “Minsky’s view is that the transformation of the economy and its financial structure from robust to fragile is due, not to external market factors like government intervention and regulation, but to the ‘normal’ operations and incentives of financial capitalism.”

Minsky’s financial fragility theory classifies the financing of the purchase of large real illiquid investment projects into three categories: hedge finance, speculative finance and Ponzi finance. Ponzi financing is the most fragile financial system and it is the one most likely to lead to a “Minsky moment.”

“The first theorem of the financial instability hypothesis is that the economy has financing regimes under which it is stable, and financing regimes in which it is unstable. The second theorem of the financial instability hypothesis is that over periods of prolonged prosperity, the economy transits from financial relations that make for a stable system to financial relations that make for an unstable system” (Minsky, 1992, pp. 7–8).

“Over a protracted period of good times, capitalist economies tend to move from a financial structure dominated by hedge finance units to a structure in which there is large weight to units engaged in speculative and Ponzi finance” (ibid., p. 8).

He also formulated what he termed his *anti-laissez faire* theorem: “In a world where the internal dynamics imply instability, a semblance of stability can be achieved or sustained by introducing conventions, constraints and interventions into the environment” (Ferri and Minsky, 1991, p. 20). Apt intervention and institutional structures are necessary for market economies to be successful.

The financial instability hypothesis “holds that business cycles of history are compounded out of (i) the internal dynamics of capitalist economies, and (ii) the system of interventions and regulations that are designed to keep the economy operating within reasonable bounds” (Minsky, 1992, p. 8). “To contain the evils that market systems can inflict, capitalist economies developed sets of institutions and authorities, which can be characterized as the equivalent of circuit breakers. These institutions in effect stop the economic processes that breed the incoherence and restart the economy with new initial conditions” (Minsky et al., 1994, p. 6).

Although recognising that Minsky always professed to draw his inspiration from Keynes, Leijonhufvud (2009, p. 742) argues that Minsky’s “upward instability hypothesis stands in stark contrast to the economy’s tendency, in Keynes’ theory, to gravitate to a state of unemployment equilibrium.”

However, de Antoni’s (2008, p. 4) interpretation seems more accurate in that “the two authors might be considered as faces of the same coin looking in opposite directions.” For this author, while Keynes looked at a depressed economy, Minsky looked at a booming economy. Both share a common approach to economics. “A careful reading of their writing suggests that, whilst both of them are at the mercy of waves of optimism and pessimism, Minsky ‘fights’ against the upswing while Keynes ‘fights’ against the downswing” (ibid., p. 25).

As Minsky did not provide a rigorous formal model, his contributions did not reach the pages of leading mainstream journals, although his analyses were far more illuminating than were many of the elegantly mathematical but often useless models that plagued them. Only after the recent crisis has his name been rescued from oblivion.

7. Summary and conclusions

The failure of neoclassical economics opens the way to rethinking macroeconomics. Since its foundation in the 1930s, macroeconomics has developed as a separate branch of economic theory with little connection to microeconomics. Macroeconomics was the realm of aggregate quantities, while prices played a limited or null role in it. Lucas' (1987) programme aimed at bridging that gap. For him, macroeconomics should be embedded in microeconomic theory. "The most interesting recent developments in macroeconomic theory seem to me describable as the reincorporation of aggregative problems such as inflation and the business cycle within the general framework of "microeconomic" theory. If these developments succeed, the term 'macroeconomic' will simply disappear from use and the modifier 'micro' will become superfluous. We will simply speak, as did Smith, Ricardo, Marshall and Walras, of *economic theory*" (pp .107–8). He succeeded but at the cost of making macroeconomics a discipline nearer to science fiction than to a subject that analyses the issues of interest for policymaking.

So, the first conclusion is that macroeconomics has to go back to its roots and recover its original aims and methodology. Of course, for mainstream economists, a denial that prices always clear markets is felt as tantamount to the abandonment of the explanatory paradigm, so that economic analysis is left with little to say. This is the type of economist that 150 years ago Carlyle caricatured as parrots that only knew the words demand and supply.

By contrast, one should bear in mind that up to now there has been no unified theory in physics. Why should there be in economics? Moreover, general relativity theory and quantum mechanics are mutually incompatible. Why should we demand that the Keynesian theory of unemployment be compatible with Walrasian general equilibrium theory? Perhaps, one should be less ambitious with economic theory.

This is especially so if one takes into account that today there are outstanding physicists such as Stephen Hawking who think that it may not be possible to construct a unified theory and that to describe the various aspects of the universe you have to use different theories for different situations. This "is acceptable so long as the theories agree in their predictions whenever they overlap, that is, whenever they can both be applied" (Hawking and Mlodinow, 2010, p. 117). So, perhaps we should not search for a single theory but for a network of theories in economics, too. However, demanding microfoundations for macroeconomic analysis has not proven to be a good idea up to now. If anything, it has led macroeconomics astray.¹³

The first step in rethinking macroeconomics would be to rescue Keynes' original ideas. One of the main Keynesian contributions is the concept of involuntary unemployment as an equilibrium state. The other key contribution of Keynes has been to identify the crucial role of investment in determining the level of output.

¹³ I have also extensively argued this in Beker (2010).

Owing to the asymmetric behaviour of prices and wages, an increase and a fall in aggregate demand require different approaches in macroeconomic theory. While prices adjust rapidly to excess demand, they do not react at all or are much slower to respond in the presence of excess supply. While in the first case price adjustments play a key role, in the other one quantity adjustments prevail. The search for a unified treatment is the reason for the failure of models that have assumed the symmetric behaviour of prices and wages for that purpose. On the contrary, it seems much more reasonable to consider separately, on one hand, the macroeconomics of inflation and, on the other, the macroeconomics of recession and depression.

This would not be a different situation to the one we have today in physics. According to today's prevalent point of view, "it might be that to describe the universe we have to employ different theories in different situations" (Hawking and Mlodinow, 2010, p. 117).

One example of this is physicists' approaches to the Big Bang. General relativity theory predicts its existence. But Einstein's theory breaks down at that point: it cannot be used to predict how the universe began, only how it evolved afterwards. To describe the origin of the universe physicists resort to another theory – quantum theory – because it was a very small-scale phenomenon, the kind of phenomenon governed by quantum theory.

So, the forces at work were different at and after the Big Bang. The same happens when aggregate demand moves up or down: the forces at work are different; thus, we need different models for their treatment.

If so, policies to guide the economy to full employment in one case and to stabilise prices in the other should be different chapters of the research agenda. In this respect, let us recall, for instance, the assertion by Blanchard et al. (2010, p. 9) that "there is a lot we do not know about the effects of fiscal policy, about the optimal composition of fiscal packages, about the use of spending increases versus tax decreases, and the factors that underlie the sustainability of public debts." Broadly speaking, we still know very little regarding how to help the economy recover from a recession. This is not strange if the underlying assumptions in traditional economic theory have been that recessions are highly improbable and that in any case markets can fix them.

While Keynes identified as a fundamental flaw of the capitalist system the possibility of stable unemployment, Minsky added instability as a normal result of modern financial capitalism. Minsky held that during expansions, profits accrue disproportionately to firms with the most aggressive financial practices, resulting in an erosion of safety margins. When overindebted investors are forced to sell even their less-speculative positions, markets spiral lower and create a severe demand for cash – an event that has come to be known as a "Minsky moment."

The currently observed turmoil in financial markets makes it advisable to rescue from unjust oblivion Minsky's illuminating ideas. His contributions together with Keynes' should be a starting point to rebuild macroeconomics on a solid basis.

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The marginal productivity theory of the price of capital: An historical perspective on the origins of the codswallop

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Abstract

Although it might have been expected that, by this point in time, the unacceptability of the marginal productivity theory of the return on capital would be universally agreed, that is evidently not the case. Popular textbooks still propound the dogma to the innocent. This note is presented in the hope that a succinct indication of the origins of the theory will contribute to a more general appreciation of the unrealistic and illogical nature of this doctrine.

Key words: marginal revolution; marginal productivity theory of distribution; reswitching.
JEL Classification: B13, B51, D33.

Introduction

In a recent paper (2012) in this journal Fred Moseley, drawing attention to some of the confused and confusing ideas encountered in the neoclassical treatment of “capital” and the return thereon, emphatically makes the point that the mainstream marginalist theory is unable to offer any coherent explanation of the rate or nature of profit as the return on capital. Moseley’s damning verdict² prompts the question – how did mainstream theory get into such a mess? In this note we propose a very simple (hardly original) answer to that question: our answer is that the mess has come about through the over-extended application of the marginalist analytical method - the method introduced by, and characteristic of, the neoclassical school of thought.

Marginalism

We mean by the “marginalist method” the analytical procedure of framing issues as problems of choice, problems to which rational agents find the solution by a procedure of substitution at the margin, exchanging incremental units of “y” (representing a marginal cost) for incremental units of “x” (representing a marginal benefit). The neoclassical pioneers³ introduced the concept of constrained optimisation via marginal substitution into economic analysis in the context of utility maximization by the consumer. While, in its original context, the marginal analysis did contribute to new understanding, the neoclassics failed to recognize limits to the appropriate application of their exciting new methodology. What happened was that these

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² Moseley’s verdict accords of course with understanding which is now widespread – though unfortunately not widespread enough – understanding which results from the original contributions of, in particular, Piero Sraffa and Joan Robinson.

³ We are thinking here of the scholars who were influential in pioneering the new approach – i.e. W S Jevons (England, 1835-1882), Leon Walras (France and Switzerland, 1834-1910), Carl Menger (Austria, 1840-1921), Alfred Marshall (England, 1842-1924), E von Böhm-Bawerk (Austria, 1851-1914) and J B Clark (USA, 1847-1938). (Although earlier writers such as Gossen, Cournot and Dupuit had grasped the key marginalist concept of optimization via marginal substitution, their ideas were not generally taken up by their contemporaries.)

unperceived limits were by-passed. This was done in order to facilitate the widespread application of the method. The subject matter of the analysis came to be shaped (distorted) into amenable form such as to allow issues to be represented as problems of choice resolvable by marginal adjustments. In other words, *the* besetting sin of neoclassical economics has been to prioritise the method over the material: to adapt the subject matter of the inquiry to the analytical technique being employed, rather than the other way round.

Why did the methodology play so dominant a role in the neoclassical school's treatment of economic issues? To understand where the neoclassical theorists were coming from, we need to take a step back into the intellectual history of our discipline.

In the latter part of the nineteenth century the subject we now call "economics" was transformed in respect both of its concerns and its methodology: the "classical" *political economy* of Smith and Ricardo (of Marx also) was pushed into the background by the emergence, via the "marginal revolution" of "neoclassical" *economics*. As we have already suggested, the defining characteristic of neoclassical or marginalist theory is to pose issues in terms of constrained optimization. The introduction into economic analysis of this element of mathematical reasoning resulted from the deliberate intention of the neoclassical pioneers to replace the relatively informal and discursive *modus operandi* of the classics with procedures of a more rigorous and "scientific" character.

It is clear that this mathematisation⁴ of economic analysis was consciously carried through as a means of enhancing the scientific character and status of the subject. Keynes (1921/1973, p.349) described the prevailing climate of intellectual opinion: he referred to "the hope, which sustained many investigators in the course of the nineteenth century, of gradually bringing the moral sciences under the sway of mathematical reasoning". There existed at the time a lively expectation that, in the social sciences, understanding would be more effectively advanced by adopting the methods of the evidently progressing "hard sciences" – through, that is to say, the introduction of "precise numerical methods".

Keynes's observation is confirmed by both Jevons's and Walras's accounts of their objectives. In introducing his *Principles*, Jevons (1871/1970, Preface, p.3) was quite explicit as to the line along which he believed economics ought to develop:

In this work I have attempted to treat economy as a calculus of pleasure and pain, and have sketched out, almost irrespective of previous opinions, the form which the science, as it seems to me, must ultimately take. I have long thought that as it deals throughout with quantities, it must be a mathematical science in matter if not in language. . . . The nature of wealth and value is explained by the consideration of indefinitely small amounts of pleasure and pain, just as the theory of statics is made to rest upon the equality of indefinitely small amounts of energy.

Walras (1874/1977, pp.47-48), very much in tune with Jevons, and reflecting the revolutionary character of the marginalist project, looked forward to the recognition, on the basis of a more formal methodology, of economics as a "proper" science – to the day when, as he put it:

. . . the establishment of economics as an exact science . . . need no longer concern us. It is already perfectly clear that economics, like astronomy and mechanics, is both an empirical science and rational science. . . . [In time] mathematical economics will

⁴ Involving no more (at least initially) than simple calculus and algebra.

rank with the mathematical sciences of astronomy and mechanics; and on that day justice will be done to our work.

There is no doubt that the marginalist pioneers of the late nineteenth century had a very particular agenda, different from that of economists of earlier times. Their predecessors, in the earliest days and in the classical era, had a straightforward objective – of understanding how the world in which they lived functioned. The clerical intellectuals of the middle ages and the Reformation wanted to know the circumstances under which commercial decisions were made in the market place, in order to pass informed judgement on the ethical rightness or otherwise of the ways in which people behaved. The classics sought to understand the phenomenon of economic growth, what made for enhanced productivity and allowed a country's escape from poverty, how the fruits of development were distributed and what role the government should, in the national interest, play. By contrast, the marginalist pioneers, it is evident, had another sort of objective in mind: they were setting out to replace the old "political economy" with a new science of "economics" – a discipline which would employ rigorous methods akin to those of the physical sciences and which would, for the world of economic affairs, play an explanatory role and enjoy a status matching that of physics or mechanics with respect to the natural world. Thus the motivation of the marginalist pioneers was a methodological challenge – the challenge to build up a comprehensive model of the economic system on the foundation of the chosen analytical apparatus. In other words, the agenda of the founding fathers of the neoclassical school was not simply, in a completely open-minded way, to understand the economic phenomena of the world about them, but rather to frame explanations which would fit within a pre-conceived general idea of how economics ought to be "done" and how economic activity should be modeled. In these circumstances, it is not a matter of great surprise that concepts were formed and theories adopted according to their compatibility with the favoured theoretical framework rather than their consistency with conditions in the real world.

While the desire to formalize and mathematicise the subject was certainly the key factor, considerations of an ideological nature probably also played a part in bringing about the changes which took place in the character of the discipline in the later nineteenth century. The neoclassical pioneers – middle-class professionals as they were – on realizing that the new approach was generating a vision of the economy as a sphere of harmonious cooperation between the several factors of production, with the respective parties (partners) being rewarded according to the values of their (marginal) contributions, were evidently not unhappy to lay aside the old Ricardian conception with its embarrassing recognition of an inherent conflict of interest between labour and capital: the alternative interpretation in terms of social harmony and fair rewards must have appeared much more congenial. In other words, not only did the new marginalist *methodology* promise an appealing prospect of enhanced scientific respectability for the discipline of "economics", the *substance* of the new discipline as it emerged brought a further attractive bonus – it was comfortably conservative, bourgeois: it no longer carried the awkward implications of a radical or revolutionary character as attached to the old classical political economy.

The marginalist analysis of value and distribution

As mentioned, the characteristic neoclassical vision of constrained optimization through marginal adjustment was first demonstrated with reference to consumer behaviour. A simple consumption/exchange (no production) model economy was constructed; commodity demand

functions derived on the basis of diminishing marginal utility were postulated and a random collection of consumption goods was supposed to be available to the community. (Walras told a story of people shipwrecked on a desert island setting up markets on the beach for the exchange of goods washed ashore.) The analysis demonstrated that market forces would establish an equilibrium set of relative values of the several commodities, these values being of the nature of “indices of scarcity” reflecting the given conditions of demand and supply.

Neoclassical theorists, given their encouraging initial achievement, were of course not content to limit their analysis to the desert island scenario, and accordingly constructed progressively more elaborate models, into which production was introduced⁵ – the production of industrial inputs being brought into the picture as well as that of final consumption goods, thus permitting the possibility of investment and the accumulation of a growing stock of capital goods. What these theorists set out to show was that, even in the case of the most complex and realistic model, the lessons drawn from the desert island case still applied – that, given demand and supply functions derived from the optimizing behaviour of individual agents, market forces would establish a set of equilibrium relative values – of *all* goods and services, including the services of “factors of production” – relative values which could still be interpreted as “indices of scarcity”. These values were understood to reflect the objective conditions of demand and supply as they currently existed. In other words, all relative prices, including the prices paid for the services of labour and of capital, were said to be determined in exactly the same way by the impersonal forces of the market: suppliers of productive services should therefore accept that they are rewarded according to the (marginal) contribution they have made.

Accordingly, as regards capital theory and the return on capital – which are the matters at issue here – the neoclassical story is that the return to the owners of capital (the price paid for the services of capital) corresponds to the marginal productivity of capital, depending on the quantity of capital in use. The background understanding is that the capital stock is built up over time as, period by period, investors employ the capital⁶ provided by savers, the amount of new investment each period being such as to equalize the return offered by investors with the reward sought by savers. As the quantity of capital installed increases over time, then (*ceteris paribus*) diminishing returns are expected to cause the yield on investment to fall. In other words, just as would be the case in the consumption/exchange model should a cargo of apples be washed ashore on the desert island, increasing supply relative to demand and causing the price of apples to fall, so in the more realistic model, according to the neoclassical theory, as investment adds to the stock of capital employed in production, the price falls (that is, the price the investor is prepared to pay for the services of the capital supplied by the saver) falls. With more capital in use, the return to capital diminishes. It is again all a matter of scarcity – of quantities demanded against quantities supplied.

Before we go any further we should clarify the terminology. In neoclassical economics the “return to capital” (or the “price of capital”) is typically identified with the rate of interest, which in ordinary terms is the price of loanable funds, paid by the borrower and received by the lender or *rentier*.⁷ The rate of profit, in other words the return over costs accruing to the actual

⁵ For instance, see specifically Walras’s sequence of increasingly complex general equilibrium models.

⁶ There is some ambiguity here: “capital” might sometimes denote real producers’ goods, at other times, a quantity of loanable funds.

⁷ The “price of capital” in this sense must be distinguished from the prices of individual capital goods as determined by conditions of demand and supply in their particular markets.

industrialist, disappears completely from much of the neoclassical analysis.⁸ It is not always clear what the entrepreneur/industrialist who runs a business is supposed to get out of it: in fact in some models, apparently nothing. The substitution of “interest” for “profit” matches the neoclassical tendency to confuse “capital”, meaning a collection of real producers’ goods with “capital”, meaning a sum of finance. This is indicative of a mistaken presumption that a “quantity of capital” can unproblematically be conceived of or measured in real or monetary terms as may be preferred.

Although the new approach proved advantageous in yielding a gain in understanding in the context in which it was first applied, when extended beyond that very limited area of applicability it brought misrepresentation and confusion. As we have already suggested, the trouble stemmed essentially from an unfortunate propensity of the marginalist theorists to adapt the *subject matter* of their analyses to the *method of analysis* they were employing.

The evidence is there for all to see. Consider, for instance, how the familiar analysis of consumer demand – commonly demonstrated using a utility function in a two commodity model – was extended to the context of production, with a production function replacing the utility function and factor inputs instead of consumption goods. It may appear elegant that an equivalent analytical apparatus is utilized both in the theory of consumption and in the theory of production. But how appropriate actually is the model for the analysis of production?

On inspection, rather than a realistic model of production conditions, this model comes to look more and more like a device introduced to allow the application of the marginalist theory of rational choice. In the context of consumption, the concept of “marginal utility” is easy enough to grasp. But what, referring to the neoclassical analysis of production, is the real world meaning of the “marginal product of the variable factor” (all other inputs being held constant)? Recall D H Robertson (1931) asking what might be the marginal product of labour if a tenth man comes along to join nine men, each with a spade, who are digging a trench? Can collective contributions to output always be “unscrambled” to identify individual marginal products?⁹ Again, the isoquants of the textbook production function are usually drawn – analogous to the indifference curves of the utility function – in such a way as to imply that the appropriate production technique has to be chosen from a whole range of alternative techniques available for producing each possible level of output; surely – as revealed by modern work on choice of technology – this is nothing more than an entirely unrealistic translation of the notion of multiple alternative opportunities from the context of consumption to that of production. We may query also the validity of assumptions commonly made regarding the form of the production function. For instance, neoclassical theorists demonstrate conditions of constant, increasing or decreasing returns to scale using the standard model: but if we try to translate these scenarios into real industrial conditions, we are

⁸ Marshall does in a rather loose way allow for the industrialist receiving an element of “normal profit” over the interest which he pays for loanable funds, but this is essentially treated as a sort of risk premium added to the pure interest rate; its inclusion doesn’t imply any doubt on Marshall’s part as to the validity of the standard “productivity and thrift” theory of interest.

⁹ It was Joan Robinson who pointed out that Marshall, in expounding his theory that the worth of a marginal worker to his employer was equal to the value of the marginal increment of output for which he was responsible, dodged the problem of “unscrambling” and identifying specific factor contributions by utilising the ingenious examples of the marginal shepherd (and the extra railway guard), who can be employed without (significant) complementary resources being required. See A Marshall (1920/1956), VI, I, 7.

likely to conclude they are nothing but “empty economic boxes” (Sir John Clapham, 1922). Again, linear homogeneity is often supposed: not so much, one suspects, because that assumption corresponds to technological reality, rather to avoid a difficulty (the “adding-up problem”) in the neoclassical theory of the determination of factor incomes.

As regards the conventional analysis of production, what is probably the most important fudge or distortion concerns the treatment of “capital”. Suppose we have (as typically) in the production function diagram, quantities of “capital” on one axis and quantities of labour on the other, together with isoquants of the usual shape: what do we understand “capital” to mean? The model presumes that, if we hold the labour input fixed, and vary the quantity of “capital” employed, we should expect to get progressively diminishing quantities of output for each additional increment of “capital” applied in production. Remember (the story is supposed to be about technological possibilities) that the inputs of labour and capital are meant to represent real (not financial) quantities – hours of labour or capital measured in appropriate real units (supposing, of course, such units can be found).¹⁰ Note further: the model implies that we can conceive of production being carried on with different quantities of the same homogeneous “stuff” (“capital”) per unit of labour. So what *is* the nature of this “stuff” we are calling “capital”?

While the measurement of different quantities of a specific consumer good along an axis of the *utility* function diagram makes perfectly good sense, the representation of different quantities of “capital” in the *production* function diagram is problematical. Although neoclassical authors usually ignore the difficulty, some have introduced the terms “putty”, “jelly” or “butter” to denote a homogeneous physical “stuff” which can play the role of “capital” in this model. But where does that get us? In reality, while we can of course point to techniques of production which involve differing degrees of what we may call “capital intensity” (involving different capital/labour ratios) the items of capital equipment associated with these different techniques are qualitatively different things, with quite different technological characteristics – they are not simply different quantities of the same physical “stuff”. It must be accepted that the standard model of the neoclassical textbooks makes no sense whatever – it has no recognizable real-world equivalent. But what it did do – apparently to the satisfaction of its neoclassical authors – was provide a parade ground upon which the favoured marginal analysis of rational choice could be exercised, in this instance with regard to the determination of input prices rather than the determination of the prices of final consumption goods. Phenomena relating to production are represented – or rather misrepresented – as corresponding to phenomena relating to consumption, thus (apparently) making possible the direct transfer of the utility maximisation analysis to the context of production.

Even if we cannot meaningfully quantify the existing stock of heterogeneous real capital goods in terms of any real measure (such as tons or horse-power), and we cannot sensibly dodge the issue by supposing that the capital stock consists simply of homogeneous “stuff”, can we get over the difficulty by measuring the capital stock in terms of *value*? This is the alternative commonly favoured in the neoclassical literature. Consider the long-established

¹⁰ “. . . the production function has been a powerful instrument of miseducation. The student of economic theory is taught to write $O = f(L, C)$ where L is a quantity of labour, C a quantity of capital and O a rate of output of commodities. He is instructed to assume all workers alike, and to measure L in man-hours of labour: he is told something about the index-number problem involved in choosing a unit of output; and then he is hurried on to the next question, in the hope that he will forget to ask in what units C is measured. Before he ever does ask, he has become a professor, and so sloppy habits of thought are handed on from one generation to the next.” (Joan Robinson (1953-54, pp.81-106).

“productivity and thrift” theory of interest, or, in other (neoclassical) words, theory of the return on capital. As mentioned above, the picture is that loanable funds (capital in liquid form) are offered on the market in the form of savings, and demanded from the market by industrialists to finance investment. Both quantities of supply and of demand for loanable funds are represented as functions of the rate of interest: the supply curve is upward-sloping¹¹ on the basis of utility-maximising behaviour respecting the time-pattern of consumption; the demand schedule is downward-sloping reflecting the assumption that the more new capital is added to the existing stock, the lower will be the return at the margin. It is evident that, when it is established, the market-clearing price – the equilibrium rate of interest – in equating the quantity demanded and the quantity supplied of capital (capital quantified in terms of value), constitutes, in standard neoclassical fashion, an ‘index of scarcity’.

Thus, the neoclassical theory interprets the price of capital as exactly equivalent to the price of, say, shoes, which happen to have been picked up on the shore of the Walrasian desert island – with both prices reflecting the existing conditions of demand and supply and both prices adjusting to a value which equates quantity demanded and quantity supplied. But while the story makes sense with regard to the price of shoes, it is unacceptable as an explanation of the price of capital. Why so? The point is that the neoclassical theory is fundamentally mistaken in presuming that, in the case of the economy in question, quantities demanded and supplied of capital can be specified in value terms, *independently of the rate of interest*, and that the equilibrium rate of interest can then be interpreted as the price equating these two quantities. The neoclassical theory of value makes logical sense with reference to the economy of the desert island but is not capable of direct extension to a world in which inputs such as capital goods are produced and in which saving and investment are possible.

The problem for the neoclassical theory arises from the fact that as saving and investment can take place only in a surplus-producing economy – an economy capable of producing more output than is required to replace all inputs (this is, inputs excluding the support of the working population) used up in the current process of production, leaving a “surplus” of output available for distribution as incomes, and thus usable for consumption, investment or other purposes. This “surplus” corresponds to net national income and may be divided in different proportions between competing claimants: the more that goes to profits, the less is left for wages. The implication of this for the theory of capital is that the equilibrium prices of goods produced in such a system, with prices necessarily covering production costs including payments to labour and capital at the going rates, depend on how net output is divided between labour and capital. Different divisions of the surplus, *ceteris paribus*, would imply different costs of production and differing relative prices. *In other words, the structure of relative values is not independent of the distribution of the surplus.*¹²

As all the real capital goods which constitute the economy's stock of capital are in fact products of the system (and certainly not, as one well-regarded neoclassical textbook¹³ described them, “mannas” from heaven), the prices of these goods, relative to each other and to all other goods and services, depend upon how net income is distributed. Different distributions associated with different rates of return on capital (different rates of profit) imply different equilibrium values of each good and consequently different total values for any

¹¹ That is, the supply of “capital” is represented as a positive function of the “return to capital”.

¹² The classic demonstration of the dependence of equilibrium relative values on the division of the surplus is to be found in P Sraffa (1960), Chapter VI.

¹³ C E Ferguson (1969).

particular collection or set of produced commodities. The point is that it is not possible to specify the value of the set of produced commodities which comprises the economy's stock of capital, before knowing what the rate of return on capital is, according to how the surplus is divided between wages and profits. The neoclassical explanation of the return on capital as corresponding to the rate of interest which equates the quantity of capital demanded (measured in terms of value) with the quantity of capital (as value) supplied fails on account of its circularity: to determine quantities of capital in value terms we need to specify first the rate of return on capital. We need to know the answer to the question before we can apply the neoclassical method of finding that answer.¹⁴

It must be evident by now that the neoclassical interpretation of the return on capital as the price which equates the quantity demanded with the quantity supplied is untenable – indeed *doubly* so. It is *logically* impossible to explain the rate of interest by reference to the quantity of capital measured as a sum of values (e.g. as the marginal product of that amount of capital). It is *empirically* meaningless to explain the return on capital by reference to capital measured in real units as such measurement could be possible only if capital goods are all composed of the same homogeneous “stuff” (porridge anyone?). There is no way out of the marginalist impasse – the return on capital must be explained in other than neoclassical terms.

What this situation implies is that, for neoclassical theory to provide an explanation in marginalist terms, the real world *must be misrepresented* to meet the requirement of the theory. To explain the price of *anything* neoclassical theory requires that total quantities and marginal amounts of whatever “thing” is the focus of attention must first be identifiable. Therefore, as a matter of theoretical necessity, in attempting to apply the marginalist approach to explain the return on capital, neoclassical analysis (mis)represents any given set of real producers' goods (machines, buildings, etc) as being what it is not – as constituting a specific quantity of something called “capital”, which under all conditions can be measured unambiguously as the same amount of “capital”.¹⁵

To summarise briefly. The marginalist theory of value and distribution can be applied satisfactorily only to the fairy-tale desert island consumption/exchange system. When an economy capable of production, especially surplus production, is considered, comprehensive application of the marginalist theory of value becomes suspect, but it was no doubt tempting for the neoclassical theorists to push on regardless with their programme of transforming the subject. Their analysis of production moves away from reality in presenting decision makers with opportunities of choice of technique more akin to the choices to be made by the consumer than representative of actual industrial conditions. The misrepresentation of capital

¹⁴ Given the fundamental logical deficiency of the concept of the neoclassical production function, the characteristically rigorous analyses of the properties of different forms of production function to be found in the neoclassical literature put one in mind of the words “deck chairs” and “*Titanic*”.

¹⁵ It is sometimes suggested that, because in the Walrasian model the existence of heterogeneous capital goods is recognized, Walras's analysis must be free of the error of employing the concept of quantities of “capital in general”; but that is not so. In Walras's theory, the rate of interest is determined as the price which equates the quantity demanded and the quantity supplied of “commodity E”. Commodity E represents the value of a certain set of producers' goods; ownership of commodity E is a title to the return on these items. Saving (demand for E), a function of the rate of interest, is represented as the *purchase by rentiers* of a quantity of commodity E (entitlement to the return on real assets of corresponding value); commodity E is *issued by firms* (supply of E) wishing to raise funds for the purchase of capital goods to the value of E issued; the quantity of E issued is also a function of the rate of interest. This is merely a version of the neoclassical productivity and thrift theory of interest.

(real producers' goods) as homogeneous "stuff" looks like a rather desperate attempt to pretend that heterogeneous goods can be lumped together as one commodity with respect to which marginal increments can be identified. When saving and investment come into the picture the problem with "capital" becomes acute: if the rate of interest is to be explained as corresponding to the marginal product of a certain quantity of capital, then, even if that quantity is measured in value terms, it has no meaning independent of the rate of return; the argument is circular. It would be possible to place a unique value, independent of the distribution of output and the rate of interest, on a collection of commodities only when no surplus output is produced and incomes received by members of the community are uniquely determined as rentals on given endowments. There is no possibility of meaningfully envisaging "capital" (meaning a set of manufactured producers' goods as may exist in the real world) and the return (profit) to those who employ these goods in production in the terms proposed by the neoclassical theory.

The neoclassical theorists, having approached the analysis of economic phenomena by way of utility maximization in consumption, actually ended up with a supposedly general conception incapable of adequate comprehension of the realities of production with a surplus: in effect, the marginalists remained stranded on Walras's desert island.

The puzzle of the neoclassical theory's continuing appeal

It is understandable that the neoclassical pioneers, in their enthusiasm to advance their new and apparently promising approach to economic analysis, might initially have overestimated its potential and left some muddles and confusion for their successors to sort out. But why have subsequent neoclassical theorists been so keen to stick with this highly unsatisfactory treatment of capital and interest? At one time they argued (though ineffectively) about the issues (the great "Two Cambridges" debate of forty years ago); at other times - and this would seem to be the situation in recent years - they have apparently decided to turn a blind eye to the increasing volume of criticism coming from various quarters, and keep right on along the orthodox lines. Given that it is impossible to mount a coherent and logically sound defence of the theory, its longevity cannot be put down to any positive case advanced by its adherents. There must be some other factors at work.

Moseley (2012, p.136) stresses the factor (alluded to above) that *ideological considerations* very probably tended to make theorists of a right-wing outlook sympathetic to the neoclassical treatment of socio-political matters. If one likes the implications of a theory, one may feel hostility to the arguments of its critics, while, on the other hand, if the implications are uncongenial, an alternative theory may be favoured and its weakness too readily overlooked. The new marginalist doctrines proved seductive. The neoclassical theoretical contention that all members of the community are rewarded in proportion to their (marginal) contributions, together with the thesis that the market economy constitutes a system of harmonious cooperation, rather than one of fundamental conflict over shares of the cake, must have had widespread appeal as a comfortable justification of the socio-economic status quo. Even if the marginalists did not set out with the deliberate intention of subverting the whole classical concept (à la Smith, Ricardo and Marx) of the nature of the economic system, the freedom of the new doctrines from the politically awkward implications of the old classical theory may very well have played an important part in diverting the profession on to - and keeping it on - a new path along which social harmony and justice were viewed as the natural products of the market system. Ideological comfort was bought at the price of intellectual integrity.

Misunderstanding may produce a false sense of *complacency*. An attempted defence of the neoclassical treatment of capital, which seems to have gained some currency, is that the case against the orthodox dogma is nothing more than esoteric nonsense – on the ground that the notion of “reswitching”¹⁶ is unsupported by empirical evidence. But that is to misunderstand what is at issue: given that in any economy the question of distribution has been answered according to whatever fundamental circumstances prevail, relative values will correspond to that distribution, and changes in relative values on account of changes in distribution are not to be expected. It is therefore nonsense to think of “reswitching” as an empirical issue – the issue is one of *logic*: while, with a given set of relative prices, the total value of any specified collection of producers’ goods can be calculated, such a calculation can be done only when a rate of return is already determined, and a rate of return cannot be determined by presupposing that such a collection of producers’ goods constitutes a certain “quantity of capital” measured in terms of value.

Another factor may be that *an element of arrogance, leading to ignorance*, exists in mainstream neoclassical thinking. If it is supposed that respectable and scientific economic analysis dates from no earlier than the marginal revolution of the late nineteenth century, people are unlikely to devote much effort to understanding the contributions of earlier writers – such as Smith, or Ricardo, or Marx.¹⁷ They are not then likely to be aware of just how limited in scope and method the standard body of neoclassical doctrine actually is; nor are they going to appreciate the intensity of the struggles of earlier theorists with issues of capital theory and how naïve by comparison the marginalist analysis may be reckoned. In short, they do not have in mind an alternative conceptual and theoretical framework against which marginalist models and theories could be compared and judged.

Conclusion

What is the alternative? There is no alternative but to return to the approach associated with the older classical tradition¹⁸ which, referring to a recognizable real-world surplus-producing economic system, with capitalist institutions, explains income shares in terms of the economic power of the competing parties concerned. The income shares received by competing claimants depend not on unidentifiable marginal contributions, but upon the relative abilities of

¹⁶ “Reswitching”: the term refers to peculiar implications, *incompatible with the neoclassical analysis of technology choice*, which emerge from “thought experiments” as to possible effects on relative values of the (notional) existence of different distributions of the surplus. We emphasise that the reference is to “thought experiments”, *not* empirical studies.

¹⁷ J R Hicks once (in 1937) admitted to Keynes that “I don’t pretend to know anything about the interpretation of the Ricardians, having made a practice of restraining my interest in the history of theory at 1870.” (Quoted in J M Keynes (1973) p.81.) While Hicks undoubtedly came to widen his horizons, one would not be surprised to find the outlook of many modern mainstream theorists to be comparably blinkered.

¹⁸ Moseley (2012, pp.136-137) identifies Marx’s theory as the main alternative theory of profit. We prefer to speak of the *classical* theory as offering the appropriate alternative, intending the adjective “classical” to comprehend in a general way the contributions of Marx as well as those of Smith, Ricardo and others. What is important here are not differences that may exist between the Smithian and Marxian approaches (primarily with respect to the labour theory of value), but what is common to both: a commitment to objective analysis of the working of a surplus-producing, capitalist industrial economy. That is what distinguishes classical political economy (in the sense in which we define it) from the fundamentally flawed apologetics of the neoclassical school.

rival parties, in the circumstances in which they find themselves, to command a portion of the available output. We need to look to the realities of economic power.

Adam Smith (1776/1976, Book I, Chapter VIII) put it thus:

What are the common wages of labour, depends everywhere upon the contract usually made between these two parties, whose interests are by no means the same. The workmen desire to get as much, the masters to give as little, as possible. The former are disposed to combine in order to raise, the latter in order to lower, the wages of labour.

It is not, however, difficult to foresee which of the two parties must, upon all ordinary occasions, have the advantage in the dispute, and force the other into a compliance with their terms. The masters, being fewer in number, can combine much more easily . . . In all such disputes the masters can hold out much longer. A landlord, a farmer, a master manufacturer, or merchant, though they did not employ a single workman, could generally live a year or two upon the stocks which they have already acquired. Many workmen could not subsist a week, few could subsist a month, and scarce any a year without employment. In the long run the workman may be as necessary to his master as his master is to him; but the necessity is not so immediate.

That looks to be a more promising way of tackling the question.

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