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## INEQUALITY AND WEALTH CREATION IN ANCIENT HISTORY: MALTHUS' THEORY RECONSIDERED

**ABSTRACT.** The main purpose of this paper is to propose the hypothesis that inequality was essential for the sustainability and 'development' of early agriculturally based societies that developed in Prehistory and Ancient History. This was so for varied reasons: there was a need for some members of societies – the dominant class also called the elite – to escape from the Malthusian trap. In most cases, agriculture produced a bigger economic surplus eventually. Managerial problems – such as the ones associated with storage, the division of labor, irrigation, trade – being part of the consequences of the Neolithic revolution, created pressures to develop more centralized political organizations, a process which led later to the formation of the early states. This process allowed the appearance of powerful local chiefs who changed the nature of their original communities with new forms of social organization, in which one individual and his enlarged family – transformed into a ruling elite – received the benefits of the labor of a large number of serfs belonging to less-favored communities in neighboring areas. Although the surplus appropriated by the elite was used in specific ways – consumption, investments and expenditures on armed forces – it increased the power and wealth of these societies, albeit a solution involving unequally distributed wealth. While this is not the only factor in the growing dominance of agriculturally based societies, it is one of main ones as is evidenced by considering six early civilizations resulting from the Neolithic revolution. This result involves an important modification of Malthus' theory. However, inequality – though necessary – was not a sufficient condition for the sustainability and economic development of these early societies.

**Keywords:** economic surplus, elite dominance, early civilizations, inequality, Malthus, property rights, wealth.

## Introduction

One of the most controversial issues in economic history is about the population theory of Thomas Robert Malthus who in 1798 wrote *An Essay on the Principle of Population*. Implicitly or not, all economic studies on long-term economic development refer to Malthus' theory. For instance in his recent book, G. Clark stated that (2007, p. 1): "*Before 1800 income per person – the food, clothing, heat, light, and housing available per head – varied across societies and epochs. But there was no upward trend. A simple but powerful mechanism explained in this book, the Malthusian Trap, ensured that short-term gains in income through technological advances were inevitably lost through population growth*". According to this view, the crucial factor was the rate of technological advance. As long as technology improved slowly, material conditions could not permanently improve, even while there was cumulatively significant gain in the technologies. Thus, the average person in the world of 1800 was poorer than many of their remote ancestors and the quality of life also failed to improve on any other observable dimension.

Various criticisms (both on theoretical and/or empirical grounds) have been made, directly and indirectly, of Malthus' theory. One of our main criticisms of the Malthusian model is that it is inconsistent with the empirical evidence for the preindustrial world. Some authors<sup>1</sup> believe that G. Clark's view about the applicability of Malthusian hypothesis of population growth holds for all human history, except for the last 200 years. Clark dismisses many empirical studies such as that of Angus Maddison (e.g. 2007) which provided an empirical basis for long-run income estimates as inconsistent with the logic of the Malthusian economy. Angus Maddison used information on real wages to infer changes in GDP per capita growth. As pointed out by Bolt, J. and J. L. van Zanden (2013, p. 12) who followed up A. Maddison's project: "*The overall conclusion is however that those pre-industrial societies were able to achieve income levels that were much higher than subsistence*", a conclusion that directly contradicts Malthus' theory.

Another criticism of Malthus' theory is about the role of inequality – mainly income inequality – because it was pervasive in the agrarian economies that dominated the world until 1800. Thus, a central concern is about the consistency of Malthus theory with the existence of inequality based on social classes. It is clear that the Malthusian trap belongs to social evolutionary theory. In Malthus' model, the economy of humans in the years before 1800 turns out to be just the natural economy of all animal species, with the same kinds of factors determining the living conditions of animals and humans. Therefore, it is assumed that mankind was subject to natural selection throughout the Malthusian era, even after the arrival of settled agrarian societies with the Neolithic Revolution. Since the struggle that shaped human nature did not end with the Neolithic Revolution but continued right up until the Industrial Revolution, one cannot avoid taking into account one of the results of this struggle, namely the existence of inequality. Milanovic, B., P. H. Lindert and J. G. Williamson (2007) have extensively studied inequality in 14 ancient pre-industrial societies. These societies range from early first-century Rome to India just prior to its independence from Britain. They demonstrated that while inequality in historical pre-industrial societies is equivalent to that of today's pre-industrial societies, ancient inequality was *much* greater when expressed in terms of maximum feasible inequality. More precisely, they emphasized the role of the elite in creating inequality. Indeed, they stated that (2007, pp. 28-29): "*the extraction ratio – how much of potential inequality was converted into actual inequality – was significantly bigger than [it is] now. (...) The ratio shows how powerful and extortionary are the elite, its institutions, and its policies*". However, given the lack of data, they do not assess societies

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<sup>1</sup>E.g. Persson, K. G. (2008).

and civilizations which existed before the Roman Empire. They however offered a conjecture about what has happened in these early times (2007, p. 5): “*Income inequality must have risen as hunter-gatherers slowly evolved into ancient agricultural settlements with surpluses above subsistence. Inequality rose further as economic development in these early agricultural settlements gave the elite the opportunity to harvest those rising surpluses*”. It is therefore the purpose of the present paper to study the relevance of Malthus’ theory for Neolithic societies and for the early civilizations that emerged from the Neolithic revolution taking account of such inequality.

The paper is organized as follows. Section 2 considers some of the main changes introduced by the Neolithic revolution in relation to population and production. A critical assessment of Malthusian stagnation is presented in Section 3. The central role of property rights in Malthus’ model is detailed in Section 4. Section 5 is devoted to the links, in the economic literature, between inequality and economic growth. These links, and the emergence of a dominant class from the Neolithic period, are studied in Section 6. Evidence of inequalities in early civilizations, as well as evidence of the uses of the economic surplus is presented in Section 7. Section 8 is about the sustainability of inequality and its implications for economic growth. Section 9 concludes.

This article mainly presents empirical evidence that several early agrarian societies were able to achieve economic growth (and avoid the Malthusian trap) because a dominant class appropriated the economic surplus and in particular cases, used it for capital accumulation and to promote technical progress. However, the underlying theoretical reasons for this deviation from the Malthusian trap are also suggested.

## **1. Food Production and Population Size during the Neolithic Revolution**

The Neolithic revolution led to major changes in human life. Two of these are the following: On the one hand, the amount of food available due to the development of agriculture and animal husbandry increased, compared to the available food which could be obtained by hunting and gathering. In other words, the Neolithic period is characterized by the emergence of an economic surplus provided by agriculture. However, this did not happen suddenly. The Neolithic process spanned from 10,000 BP to 3500 BP. Therefore, the potential economic surplus from agriculture did not occur instantly but took some time to become available because new techniques<sup>2</sup> had to be developed and proven.

On the other hand, the population level increased sharply. Until the beginning of the Neolithic period, estimates of world population vary from 5 million to over 20 million. But after the farming revolution, the rate of growth increased considerably, from 0.0015 percent per annum to 0.1 percent per annum<sup>3</sup>. There were several reasons. By shifting to the agriculture, people became settled and therefore were able to have more children. The Palaeolithic hunter-gathering (denoted by HG in the sequel) groups virtually existed in an equilibrium eco-social system; and they were able to control their population in response to variations in food supply. Thus, births were normally spaced at 3–5 year intervals among nomadic hunter-gatherers and the maximum potential fertility per woman was reduced to 3–5 children and often further diminished by infanticide and high mortality. During the Mesolithic period and judging from the number of sites, the population in the Near East started increasing from 15,000 B.P. with the appearance of Natufian sites. This was marked by an increase in sedentariness and a broadened range of subsistence strategies. Later, the birth rate dramatically increased with the emergence of agricultural sedentary settlements. This is

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<sup>2</sup>Such as, for examples, irrigation systems for cultivation, genetic management of plants and animals, the development of ploughing techniques.

<sup>3</sup>See Renfrew, C. and P. Bahn (2012, p. 456).

believed to be due to the changed social status of women and to better childcare, combined with the larger and more regular availability of a more nutritious food supply. Indeed, because labor productivity was higher in farming than in foraging activities, people were better nourished. As has been emphasized by Childe (1936, pp. 14, 143), these two consequences of the Neolithic revolution supported a substantial increase in human population. Both changes induced by the Neolithic revolution, i.e. the largest amount of food resulting from agriculture and the increase of the population level, do not occur separately but were connected. Such connections could be explained as stated by J. Diamond (1997, p. 111): “*In all parts of the world where adequate evidence is available, archaeologists find evidence of rising densities associated with the appearance of food production. Which was the cause and which the result? (...) In principle, one expects the chain of causation to operate in both directions (...) That is, the adoption of food production exemplifies what is termed an autocatalytic process—one that catalyzes itself in a positive feedback cycle, going faster and faster once it has started*”.

## 2. Malthusian Stagnation: Theory and Evidence

Although agricultural food production was during the Neolithic epoch, much larger than could be obtained by foraging, many authors<sup>4</sup> consider that the Neolithic period cannot be seen as a period of economic growth by modern standards. In their views, the evolution of economies over the major portion of human history (i.e. until the 18<sup>th</sup> century Industrial Revolution) was actually marked by Malthusian Stagnation. Technological progress and population growth were miniscule by modern standards and the average growth rate of income per capita in various regions of the world was even slower due to the offsetting effect of population growth on the expansion of resources per capita. In other words, as pointed out by T. Malthus (1798), for thousands of years, humans were subjected to persistent struggle for existence and therefore survival necessitated a “*perpetual struggle for room and food*”. Resources generated by technological progress and land expansion were channeled primarily towards an increase in the size of the population, with a minor long-run effect on income per capita. According to this literature<sup>5</sup>, the evolution of population and output per capita across most of human history was consistent with the Malthusian paradigm. The positive effect of the standard of living on population growth along with diminishing labor productivity kept income per capita in the proximity of a subsistence level.

However, the above stated vision associated with Malthusian stagnation is subject to some weaknesses or shortcomings.

First, and as we will see in more details in the sequel of this paper, a problem with the recent literature on Malthusian Stagnation is its failure to take account of class inequality in some societies during the Neolithic period and thereafter. In prehistory and early history, the common people were subject to Malthus’ theory but not the elite. Life was not short and dismal for all. While an increase in per capita food availability was eventually made possible by agriculture, there is no evidence that this increase was on such a large scale and combined with other social changes to trigger a demographic transition, that is to place a brake on population growth. That being so, one is left with the query of why was the growing potential economic surplus not frittered completely away by the increased population levels as predicted by the Malthusian theory? We claim that this was because in some societies, significant class inequality emerged. These societies were characterized by a dual class structure consisting of a relatively small dominant class and a large dominated class. The former appropriated a proportion of the output produced by the dominated class. Depending

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<sup>4</sup>See e.g. Galor, O. (2005) or Ashraf, Q. and O. Galor (2011).

<sup>5</sup>Galor, O. (2005), G. Clark (2007), Ashraf, Q. and O. Galor (2011).

on the amount of output appropriated from the dominated class, this restricted their rate of population growth given that they tended to reproduce in accordance with the Malthusian theory.

Secondly, and even though it is difficult to know how to measure technological progress adequately, considerable progress was made in the Neolithic period, related to genetic selection of cultivars, agricultural management techniques, to the taming of animals for draft work (...) and, later, the working of metals. Therefore, and has demonstrated by E. Boserup (1965) for more recent agrarian economies, food supply increased to accommodate population growth. Indeed, as a population found that it was approaching food shortages, it would identify ways of increasing supply by means of new technology, better seeds, new farming methods and so on. In other words, in the long run, the growth of the population is not restricted by the amount of food produced by agriculture.

Thirdly, possibly human development in early history should not be judged by increases in average income per head. An alternative might be to consider advances in knowledge, in communications and transport as signs of development. For example, the development of writing was a very important innovation as were developments in numbering systems. There were many other innovations in early history such as in metal working and significant engineering feats<sup>6</sup>. Social innovations also occurred. The accretion of knowledge tends to be cumulative, and is greatly assisted by systems which enable it to be recorded and disseminated. This is a vast improvement on oral transmission of knowledge, as far as prospects for economic and cultural development are concerned. We know that many early societies supported a priestly or intellectual class associated with their dominant persons, and that they were responsible for considerable advances in knowledge. They provided the original basis for many of today's knowledge-based economies. In many cases, even knowledge that did not add much to productivity may have eventually been useful. Therefore, the origin of knowledge in early history shows that it was the appropriation of the economic surplus (i.e. the existence of income inequalities) that enabled scribes, priests and other people belonging to the elite to add to knowledge. This would not have been possible if Malthus' theory had applied to all.

The above critique is similar to R. Brenner's (1976) interpretation of the processes of long-term economic change in late medieval and early modern Europe. He rejects the rigid Malthusian theory based solely on the laws of supply and demand and introduces class struggle as the key element in European pre-industrial economic history. In doing so Brenner rejects the views of Malthusian historians<sup>7</sup> for whom long-term movements in prices, in income distribution, in investment, in real wages, and in migration are dominated by changes in the growth of population. R. Brenner defines the "*class struggle as the conflictive class relations over property, i.e. the appropriation of the production surplus*" (1976, p. 32). Possible outcomes of such conflict could include the creation of new "property relations" or the reaffirmation of the old institutions.

### 3. Malthus' Model and Property Rights

It appears that Malthus' conclusions about economic stagnation are very dependent on the implicit assumption made about the existence of property rights, and therefore about the existence of inequalities among individuals.

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<sup>6</sup> However, advances in knowledge did not always result in immediate applications. For instance, Early Greeks used steam power to create motion in toys but did not put steam into practical use.

<sup>7</sup> E.g. M. M. Postan (1973, p. 32), "*Behind most economic trends in the middle ages, above all behind the advancing and retreating land settlement, it is possible to discern the inexorable effects of rising and declining population*".

### ***3.1. Malthus' Model as an Open-Access Model – Scramble Competition***

The Malthusian stagnation can in fact be represented as a special case where there are no property rights. In other words, it is associated with open-access to resources, especially land available for agriculture, and leads to scramble competition<sup>8</sup>. With a resource available in fixed quantities – i.e. land and therefore the global amount of food resources – the population increases until it reaches an equilibrium where the per capita availability of the resource equals the subsistence level – the latter being defined by the quantity of food resource required by each individual in the population to survive. However this equilibrium is unstable and any shock (e.g. on the total of food resources) can lead to extinction of the population. The previous result (i.e. food resource or income per head above the subsistence level being not sustainable in the long run) explains why Malthus has suggested diverse policies in order to control the growth of population.

### ***3.2. Contest Competition and Implications for Wealth Creation***

With the development of agriculture – and the emergence of an elite – property rights were implemented, especially with respect to land ownership. It seems likely that significant changes in social organization occurred in many societies following their transition from H-G mode of earning a living to agriculture. This probably was not immediate but gained momentum as the potential economic surplus made possible by agricultural production increased. The main social change was the emergence of greater social inequality and the emergence of a dominant class. This class extracted a surplus from those dominated and its position was maintained by force. It used its power to enforce property rights and acquire these. The rule of law – as we know it today – hardly existed (Tisdell, 2013).

Therefore, competition during this epoch is better described by contest competition rather than by scramble competition. Under contest competition, individuals stake out rights to the limited available resources, i.e. land and the food resources it provides. Contrary to the scramble competition case, if the initial population exceeds the carrying capacity, the whole population will not perish; the equilibrium associated with an income per capita equal to the subsistence level is stable under contest competition. If some inequalities exist among individuals, e.g. if some individual (e.g. the elite) have territories (or land ownership) providing food resources in excess of their subsistence level, then it adds to the sustainability because it acts as a buffer against external (negative) shocks such as environmental changes.

North, D.C. and R.P. Thomas (1977) offer a theory of modern economic development that falls within the category of "social institutional theory" rather than demographic theory. But whereas R. Brenner (1976) finds primary causal importance in the institutions that define local class relations (a Marxian idea), North and Thomas argue that property relations that create the right kinds of incentives will stimulate rapid economic growth (a Smithian idea). They find that this is the innovation that took place in England in the early modern period; for them, it was the creation of capitalist property relations that stimulated economic growth.

## **4. Inequalities and Growth in the Economic Literature**

The links between inequality and economic growth have been extensively studied in the economic literature. Three main approaches exist: the traditional, the recent and the Classical ones.

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<sup>8</sup>C. A. Tisdell (2013, pp. 143-49). See also C. A. Tisdell (2005, Ch. 1).

The traditional – or neoclassical – viewpoint dominated the field of macroeconomics and economic growth until late 1980s. It suggests that income distribution has no significant effect on macroeconomic activities and economic growth. As pointed out by G. Bertola *et al.* (2006, p. x), “*In contrast to its paramount importance in nineteenth-century classical economics, however, income distribution became a topic of minor interest in recent decades. (...) While early growth models in the post-Keynesian tradition were still strongly concerned with distributional issues, subsequent “new classical” theoretical developments removed distribution from the set of macroeconomic issues of interest*”. The observed relationship between inequality and economic growth was interpreted as capturing the effect of the growth process on the distribution of income, rather than the effect of the distribution of income on the growth process. This viewpoint is exemplified by the representative agent approach to macroeconomics.

A more recent view of development<sup>9</sup> (from the 1990s onwards) considers that equality in sufficiently wealthy economies stimulates investment in human capital and in individual specific projects, and enhances economic growth. In other words, the replacement in modern economies of physical capital accumulation by human capital accumulation as the prime engine of economic growth has changed the perceived qualitative impact of inequality on the process of development.

The classical viewpoint considers that inequalities have a positive impact on economic growth. This seems to be especially true in early stages of development – as during the Neolithic revolution and for early civilizations – as physical capital accumulation is a prime source of economic growth, inequality enhances the process of development by channeling resources towards individuals whose marginal propensity to save is higher, i.e. to the elite. However, whether economic growth eventuates at all depends on what the elite do with their appropriation. Particularly in the early Neolithic period, the sustainability of the dominant class could depend on how they balanced their appropriation between consumption, investment and expenditure on armed forces.

The previous three approaches demonstrate the changing attitudes of economists to the role of inequality in fostering economic growth. In fact, the perceived role of inequality in fostering economic development has altered with the stage of economic development and social change. The classical position was probably appropriate in early times. It is less relevant now. For modern economies, like the US economy from the beginning of the 20th century, inequality in the distribution of land ownership adversely affected the emergence of human capital promoting institutions (e.g., public schooling) and thus the pace and the nature of the transition from an agricultural to an industrial economy, contributing to the emergence of the great divergence in income per capita across countries<sup>10</sup>. New institutions such as limited liability companies have also made a difference. For one thing, inequality now is to a greater extent based on ‘merit’ rather than on force and inheritance as it was in the past. Furthermore, in higher income countries, Malthus’ theory no longer applies and factors like human capital and equality of opportunity have become more important.

However, this conclusion is challenged for economies in early stages of development, like during the Neolithic revolution and for early civilizations. Indeed, in the earliest context in which agriculturally-based societies had to struggle for their existence, inequality based on the power of the dominant class was vital for their survival and for the nature of their economic development. Societies<sup>11</sup> where this pattern did not prevail were easily crushed by others or failed to show any significant material development.

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<sup>9</sup> O. Galor (2005).

<sup>10</sup> O. Galor, O. Moav and D. Vollrath (2009).

<sup>11</sup> E.g. the Melanesian society.



## 5. Economic Surplus and Inequalities from the Neolithic Period

From the previous sections of this paper, we have seen that two schools of thought attempt to explain major economic transformations. One describes these in terms of facts about population, while the other argues that the central causal factors have to do with social institutions (social-property relations and institutions of political power). The demographic theory focuses its attention on the factors that influenced population growth, including disease; the social institutions theory focuses attention on the institutional framework within which the economic actors (elite, farmers and craftsman or the dominated class) pursue their goals. The first one involves an application of a biological or ecological theory, emphasizing common and universal demographic forces; the other is based on a social theory emphasizing contingency and variation across social space.

The links between inequality and economic growth assumed by the classical economists can be applied to the Neolithic period. In particular, the role of the elite and of land ownerships seems to be in perfect accordance with the classical point of view. It was not until after the Industrial Revolution and demographic transition that inequality became less important (or even an impediment to) economic growth<sup>12</sup>. Prior to this, inequality prevented at least some in society not sinking in abject poverty and it was a force for social advancement.

The Malthusian theory seems therefore not well suited to describe the early stages of economic development following the Neolithic revolution. Indeed, another major consequence of the Neolithic revolution, associated with the existence of an economic surplus, is the increasing social and economic inequalities. Although such inequality existed in some HG societies (especially in complex<sup>13</sup> HG societies where an economic surplus was provided by food procurement) it was magnified in most Neolithic societies. Therefore, an elite or an upper class, was able to accumulate very large surpluses for discretionary expenditure following the agricultural revolution and later development.

### 5.1. Agriculture and the Emergence of a Dominant Class

The available archaeological and anthropological evidence strongly suggests that when we talk about the Neolithic revolution, the rise of agriculture is associated with the effects of political complexity, such as the existence of social classes. Agriculture provides a number of preconditions<sup>14</sup> for the emergence of states<sup>15</sup> as centralized political organizations governing over territory. First, HG groups are mostly nomadic whereas, in contrast, agriculture allows groups to settle and, hence, to take control over a territory. Second, compared to hunting and gathering, agriculture is an extremely efficient mode of calorie production. Hence, agriculture allows populations to grow to a size when it becomes meaningful and even necessary to rely on more formalized forms of social organization. Third, agriculture and fixed settlements enable food storage. Storage of food is linked to important features of the state as it allows taxation and subsequently the emergence of division of labor. In HG societies, all members are involved in the subsistence economy whereas storage of taxed food allows a part of the population to devote their full time to non-subsistence related activities. Thus, storage provides the precondition for social classes not directly involved in production such as public servants and professional soldiers.

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<sup>12</sup> However, inequality probably still plays an important role today in economic growth, but this is not the purpose of the present paper.

<sup>13</sup> For a presentation of complex HG societies, see Price, T. D. and J. Brown (1985).

<sup>14</sup> J. Diamond (1997).

<sup>15</sup> Bockstette, V., Chanda, A. and L. Putterman (2002).

These arguments imply that agriculture provides the preconditions for the state formation. However, the links between the two phenomena run deeper. Often, the Neolithic revolution necessitates the emergence of specialized agencies of coercion, i.e. the formation of elite and states. Indeed, the population growth following agricultural transition ignites an autocatalytic process when population growth creates a pressure for the intensification of the subsistence economy which, subsequently, causes further population increase and further production intensification. These accelerating pressures for production intensifications have a number of important consequences. First, they leave fewer buffers against starvation in bad years making collective systems of risk management more attractive. Second, they facilitate resource competition – and ultimately, warfare – which fuels group-wide integration and allow efficient leaders to emerge. Third, they put premium on more sophisticated production technology, a development that requires community-wide collaboration. Fourth, they increase the benefits of trading and thereby also the transfer of decision-making power to single individuals such as the head trader. In sum, managerial problems associated with the consequences of the Neolithic revolution create pressures to develop more centralized political organizations, a process which leads ultimately to the formation of the early states.

### ***5.2. Inclusive versus Extractive Institutions***

Neolithic societies and societies of early civilizations therefore have features characterised by exclusive (extractive) institutions. These contrast with their opposite inclusive institutions<sup>16</sup>. Inclusive economic institutions are those that allow and encourage participation by the great mass of people in economic activities that make best use of their talents and skills and that enable individuals to make the choices they wish. To be inclusive, economic institutions must feature secure private property, an unbiased system of law, and a provision of public services that provides a level playing field in which people can exchange and contract; it also must permit the entry of some new businesses and allow people to choose their careers. Extractive economic institutions are those which have opposite properties to inclusive ones. They are called “extractive” because such institutions are designed to extract incomes and wealth from one subset of society to benefit a different subset.

Although many public services (roads construction, fortifications, irrigation systems...) can be provided by markets and private citizens, the degree of coordination necessary to do so on a large scale often eludes all but a central authority. The state is thus inexorably intertwined with economic institutions, as the enforcer of law and order, private property, and contracts, and often as a key provider of public services. Political and economic institutions are therefore closely related, and especially so when one considers early civilization.

Once agriculture developed sufficiently to yield a substantial economic surplus in the Neolithic period, most power – public, economic and religious – was concentrated in the hands of a few people. This class division appears to have arisen once agriculture developed to the stage where economic surplus generated by it was large enough (and storable enough) to support towns. V.G. Childe (1936) describes this as the Second Neolithic Revolution, the first being the commencement of primitive agriculture (or gardening) not yet yielding a significant economic surplus.

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<sup>16</sup> See Acemoglu, D. and J. Robinson (2012) for a complete treatment of (political and economic) extractive and inclusive institutions.

## 6. Inequalities and the Uses of the Appropriated Surplus in Early Civilizations

Many economists have studied and are still studying the causes of economic development, in relation with past and recent history. Among the various causes considered, the role of institutions became central for the last two decades. For instance D. Acemoglu and J. Robinson (2012, p. 97), state that: *“Political and economic institutions, which are ultimately the choice of society, can be inclusive and encourage economic growth. Or they can be extractive and become impediments to economic growth. Nations fail when they have extractive economic institutions, supported by extractive political institutions that impede and even block economic growth”*.

However, early civilizations<sup>17</sup> are good examples of successful societies with extractive institutions. Early civilizations were all laid out on agriculture. The word *civilization* itself comes from the Latin term for *city*, and in truth most civilizations do depend on the existence of significant cities. In agricultural civilizations, most people do not live in cities. But cities are crucial because they amass wealth and power, and they allow the rapid exchange of ideas among relatively large numbers of people, thereby encouraging intellectual thought and artistic expression. Cities also promote specialization in manufacturing and trade and encourage the emergence of centers of political power.

The early civilizations – resulting from the Neolithic revolution – arose in six different sites, four of them along the fertile shores of great rivers. At least three and possibly all six of these early civilizations arose entirely independently of each other. Having started in 3500 B.P., civilization developed in its six initial centers – the Middle East<sup>18</sup>, Egypt<sup>19</sup>, northwestern India<sup>20</sup>, northern China<sup>21</sup> and two in America<sup>22</sup> (Central and South; although slightly later in time). These areas covered only a tiny portion of the inhabited parts of the world, although they were the most densely populated. Such early civilizations, all clustered in key river valleys, were in a way pilot tests of the new form of social organization. Only after about 1000 B.P. did a more consistent process of development and spread of civilization begin – and with it came the main threads of world history. However, the great civilizations unquestionably built on the achievements of the river valley pioneers, and so some understanding of this contribution to the list of early human accomplishments is essential. In these societies of all these early civilizations, the elite appropriated part of the economic surplus and used it for three main purposes.

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<sup>17</sup> Unlike an agricultural society, which can be rather precisely defined, civilization is a more subjective construct. One can define civilizations only as societies with enough economic surpluses to form divisions of labor and a social hierarchy involving significant inequalities. Other, however, press the concepts of civilization further, arguing, for example, that a chief difference between civilizations and other societies involves the emergence of formal political organizations, or states, as opposed to dependence on family or tribal ties. One widely agreed definition is based on the fact that most civilizations developed writing.

<sup>18</sup> In Mesopotamia, Sumerians created the first civilization. The Sumerians themselves fell to a people called the Akkadians, who continued much of Sumerian culture. Another period of decline was followed by conquest by the Babylonians, who extended their own empire and thus helped bring civilization to other parts of the Middle East. Thereafter, new invaders, first the Assyrians and then the Persians, created large new empires in the Middle East.

<sup>19</sup> Egypt was a second center of civilization in northern Africa, along the Nile River. Egyptian civilization, formed by 3000 B.P., benefited from the trade and technological influence of Mesopotamia, but it produced a quite different society and culture.

<sup>20</sup> A prosperous urban civilization emerged along the Indus River by 2500 B.P., supporting several large cities, including Harappa and Mohenjo Daro.

<sup>21</sup> Civilization along the Yellow River (also known as the Huanghe site) in China developed in considerable isolation, although some overland trading contact with India and the Middle East did develop.

<sup>22</sup> Two of the south hemisphere's most impressive cultural traditions developed in Mesoamerica (Mexico and northern Central America) and in the mountainous Andean region of South America. They are respectively the Olmec (1200 to 400 B.P.) and the Chavin (900 to 250 B.P.)

### **6.1. Consumption and Feasting**

Part of the appropriated could be used for unproductive expenditures, such as feasting and the consumption of resources, motivated by social competition between local groups who tried to achieve dominance over their neighbours. Such expenditures were already existing among HG societies – in the form of *Kula* or *Potlatch* – and are considered by some authors as one of the reasons explaining the Neolithic transition<sup>23</sup>.

In the Levant, Sumerian art developed steadily, as statues and painted frescoes were used to adorn the temples of the gods. Statues of the gods also decorated individual homes. Sumerians developed complex religious rituals and erected impressive shrines and massive towers, called ziggurats, that formed the first monumental architecture in this civilization. This is the most visible feature that this dead society left behind. The ziggurats demonstrate the existence of a highly evolved society existing thousands of years ago in this area, these structures indicate that there was social inequality. High class people demanded that they have a place to conduct ceremonies and to live well. They wanted to build a great structure so that foreigners would be impressed by what they had built. The construction of ziggurats demonstrated that there was one person in charge who had great power over the people.

In the Egyptian civilization, the king, or pharaoh, possessed immense power. Pharaohs had a godlike status and built splendid tombs for themselves (the pyramids) from 2700 B.P. onward. Egyptian art was exceptionally lively; cheerful and colorful pictures decorated not only the tombs but also palaces and furnishings. Most ancient Egyptians were on the poverty line while a handful of priest-kings held fabulous wealth. The fortunate members of Egyptian society were Pharaoh and his court, his literate administrators and priests and those subordinate to them (doorkeepers, soldiers, quarrymen, artists and craftsmen etc). In the elite group, we find the use of perfumes, cosmetics, a sit-down toilet, scrolls, oil-burning lamps, footwear, gloves, salt and pepper, honey, wines, a chariot, board games, tweezers, spoons, animals, wigs, musical instruments, meat, fine clothes, time measurement, servants, slaves, etc.

Harappan society appears to have been dominated by a powerful priestly class, which ruled from the citadel of each capital. The priests derived this control from their role as intermediaries between the Harappan populace and a number of gods and goddesses, who controlled fertility.

In northern China, like the elites of many early civilizations, the Shang rulers and nobility were preoccupied with rituals, oracles, and sacrifices. In addition to the fertility functions of the ruler, the entire elite was involved in persuading spirits to provide good crops and large families. Shang artistic expression reached its peak in the ornately carved and expertly cast bronze vessels that were used to make these offerings. Offerings included fine grain, incense, wine, and animals.

Little is known about Olmec political structure, but it seems likely that the rise of major urban centers coincided with the appearance of a form of kingship that combined religious and secular roles. Finely crafted objects decorated the households of the elite and distinguished their dress from that of the commoners who lived in dispersed small structures constructed of sticks and mud. The authority of the rulers and their kin groups is suggested by a series of colossal carved stone heads, some as large as 3.4 meters high.

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<sup>23</sup> See Bender, B. (1978), or Hayden, B. (1990).

## ***6.2. Investments, Productive Expenditures and Produced Public Goods***

The elite also financed some productive expenditures, especially the production of some public goods: the irrigation system, the transportation network, the education system (even if it was restricted to the elite), science, writing, (...).

Farming in Mesopotamia, because of the need for irrigation, required considerable coordination among communities, and this in turn served as the basis for complex political structures. By about 3500 B.P., a people who had recently invaded this region, the Sumerians, developed a cuneiform alphabet, the first known case of human writing. Sumerian science aided a complex agricultural society, as people sought to learn more about the movement of the sun and stars (thus founding the science of astronomy) and improved their mathematical knowledge. In other words, Sumerians and their successors in Mesopotamia created patterns of observation and abstract thought about nature that a number of civilizations, including our own, still rely on.

The Egyptian economy was more fully government-directed than its Mesopotamian counterpart, which had a more independent business class. Government control may have been necessary because of the complexity of coordinating irrigation along the Nile. The pharaoh initiated gigantic construction projects, was officially the high priest of all of Egypt's numerous temples, and maintained a closed government redistributive system based on a well organized administration.

Though hundreds of miles apart, Harappa, Mohenjo Daro, and other urban centers of the northern Indian civilization were remarkably similar in layout and construction. Each city was surrounded by walls, which extended a mile from east to west and one-half mile from north to south. Coordinated construction on such massive scale might have meant an effective central government that could organize and supervise the daily tasks of large numbers of laborers. The existence of a strong ruling class is also indicated by the presence of large, well fortified citadels in each city. These citadels may have served as sanctuaries for the cities' populations in times of attack and as community centers in times of peace.

In Northern China, an organized state existed that carefully regulated irrigation in the fertile but flood-prone river valley. By about 2000 B.P. the Chinese had produced an advanced technology and developed an elaborate intellectual life. They had learned how to ride horses and were skilled in pottery; they used bronze well and by 1000 B.P. had introduced iron, which they soon learned to work with coal. Their writing progressed from scratches of lines on bone to the invention of ideographic symbols. Science, particularly astronomy, arose early.

In Mesoamerica, as religious and political elites emerged, they used their prestige and authority to organize the population to dig irrigation and drainage canals, develop raised fields in wetlands that could be farmed more intensively, and construct the large-scale religious and civic buildings that became the cultural signature of Olmec civilization. An important class of shamans and healers attached to the elite organized religious life and provided practical advice about the periodic rains essential to agricultural life. They directed the planning of urban centers to reflect astronomical observations and were responsible for developing a form of writing that may have influenced later innovations among the Maya. From their close observation of the stars, they produced a calendar that was used to organize ritual life and agriculture.

Recent discoveries about Chavin civilization demonstrate that the vast site called Caral in the Supe Valley had developed many of the characteristics now viewed as the hallmarks of later Andean civilization, including ceremonial plazas, pyramids, elevated platforms and mounds, and extensive irrigation works. The scale of the public works in Caral suggests a

population of thousands and a political structure capable of organizing the production and distribution of maritime and agricultural products over a broad area.

### **6.3. Expenditures on Armed Forces**

What role did violence and warfare play in the development process of early civilizations? Warfare has been defined as an opportunistic or situational phenomenon. This contention appears supported by the some communities exhibited persistently high levels of warfare while other were remarkably non-violent. However, after contact, the violent communities quickly abandoned warfare and became essentially peaceful in approximately a decade. This shows that violent behavior among communities is often the result of people striving to achieve certain objectives within the realities they themselves are constructing and reconstructing.

Inequality was vital to the survival of societies which became increasingly dependent on agriculture and other industries requiring investments. The dominant class wished to keep its power. Furthermore, inequality played an important role in protecting property rights. The privileged landholders (with larger than normal estates) kept military forces of their own (and collectively dominated government) which, in many cases, also added to the military forces. Defence from external forces (as well as internal ones) absorbed varying amounts of the surplus available to the privileged class. Some of the military force was used for territorial expansion and the seizure of other resources. Therefore, a part of the elite's power was used to protect its society from invaders. So indirectly, this class 'protected' all members of its society. Without this system, it seems likely that agricultural societies may have perished as a result of invasions.

For the early Neolithic period, part of the appropriated surplus was already used for expenditures devoted to warfare purposes<sup>24</sup>. Investments in defensive technology would have included the time spent in guarding herds and patrolling lands and settlements, an investment that leaves few archaeological traces. But the most lasting traces are those left by weaponry and fortifications. But the evidence from fortifications is harder to argue away. In the Levant, the first village settlement at Jericho, for instance, has been dated to before 9000 B.P., and within a thousand years it had grown to a substantial settlement of several hectares of mud-brick houses with thick walls. The first evidence of the famous city walls comes from the early eighth century B.P., and the presence of great water tanks, probably for irrigation, is attested from the seventh century. And a massive ditch, thirty feet deep and ten feet wide, was dug into the rock without metal tools.

Later, Sumerian political structures stressed tightly organized city-states, ruled by a king who claimed divine authority. The Sumerian state had carefully defined boundaries, unlike the less formal territories of pre-civilized villages in this region. The government helped regulate religion and enforced its duties; it also provided a court system in the interests of justice. Kings were originally military leaders during times of war, and the function of defense and war, including leadership of a trained army, remained vital in Sumerian politics. Kings and the noble class, along with the priesthood, controlled a considerable amount of land, which was worked by slaves. Warfare remained vital to ensure supplies of slaves taken as prisoners during combat.

During periods of weak rule and occasional invasions, Egyptian society suffered a decline, but revivals kept the framework of Egyptian civilization intact until after 1000 B.P. At key points, Egyptian influence spread up the Nile to the area now known the Sudan, with an impact on the later development of African culture.

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<sup>24</sup> Rowthorn, R. and P. Seabright (2010).

By 1500 B.P., one of the tribes in the north China, the Shang, conquered most of the other tribes and established a kingdom that would lay out the foundations of Chinese civilization. Shang monarchs were served by a sizeable bureaucracy. Most of the peasant and artisan populations of the kingdom were governed by vassals. The later depended on the produce and labor of the commoners in these areas to support their families and military forces. In return for grants of control over varying numbers of peasants, warrior aristocrats collected tribute which went to support the monarch and his court. They supplied soldiers for the king's armies in times of war, and they kept the peace and administered justice among the peasants and townspeople.

#### ***6.4. Surplus and Economic Growth***

Once agriculture developed to the stage where it could support towns, the economic surplus generated by it was appropriated by a dominant class in pre-industrial societies. This appropriation reduced the income (and possibilities for consumption) of the dominated class thereby limiting the increase in their population. In other words, the ruling class extracted rent from those whom it dominated. In the absence of this extraction, the rent would have been frittered away by an increase in the population of the dominated class. For early agrarian societies, this provided a mechanism for avoiding the Malthusian trap because the surplus could be used potentially by the ruling class to undertake capital accumulation and stimulate economic growth. Such concentration of power accelerated capital accumulation in many early agrarian societies, as has been observed by Childe (1936, see especially Ch. 9). However, as was observed above, the economic surplus appropriated by the ruling class could also be used for ostentatious consumption and for provisioning of armed forces, thereby limiting the amount available for capital accumulation and economic growth. The ruling class was subject to opportunity costs in their allocation of the economic surplus to competing uses. Economic growth was weakened if large allocations occurred of the surplus to support ostentatious consumption by the ruling class and to provision the army. In the long-term, low economic growth would most likely have weakened the power of the dominant class. Some early societies or communities clearly faced some very difficult choices. For example, their survival in some cases required considerable expenditure on the army to avoid invasion but this restricted their economic growth in such cases, and could weaken these societies in the long run. The operation of this model also depended on mechanisms to restrict the population size of the dominant class or the elite, as is explained below.

### **7. Inequalities and Sustainability**

As seen previously, the sustainability of the dominant class depended on how the surplus was used by them. That is, the balance of their expenditure on their own consumption, on investment and on armed forces. But the sustainability of the dominant class depended also on others factors such as the size of the available surplus which could be appropriated, the ease of appropriating it, the size of the dominant class, its attitude to technological change.

#### ***7.1. Appropriation of the Economic Surplus***

The fact that cereals (grain) were the early basis of agriculture in Eurasia was advantageous for the development of societies basing their economies on grain production. This is because cereals are stored relatively easily and transport easily compared to fruit and vegetables. They are, therefore, tradeable over long distances and so on. They can be collected as 'taxes' and so on. They can support urbanization. One remaining question is

about the way the elite proceeded to capture the economic surplus? In the Neolithic economy, where agriculture was the main productive sector, it is likely that land ownership was the main mean used by the elite. In others words, the elite has implemented property rights on the land in order to capture the economic surplus provided by the agriculture sector. Although North, D. C. and R. P. Thomas (1977), point out that property rights were essential for the success of agriculture in many societies in early times, these were not governed by the law. Both the acquisition of property (primarily land), and its retention, relied on the use of force or threatened use of force by those laying claim to it. This was, of course, a major economic burden on the dominant class and early agriculturally based economies. Later these property rights were extended by the dominant class to include most natural resources, particularly minerals. Furthermore, 'royalty and nobles' established monopolies, e.g. the salt monopoly in China. They had many ways to extract income from others. Some commodities were especially useful for appropriation, e.g. grains, metals. Inequality extended beyond merely the 'ownership' of land. In many cases, slaves and serfs were 'owned' by the privileged class, as well as significant buildings and other items, such as trading vessels.

### ***7.2. The Size of the Elite***

In addition, the grip of the dominant class on power not only depended upon the size of the surplus and the balance of their expenditure on various purposes, but on them restricting their own numbers. If this did not occur, they became vulnerable to being overthrown for they would have had little of their appropriated surplus left for investment and to support armed forces. In such cases, it is likely that they would have been replaced by a smaller dominant class of invaders or usurpers. They could not let their numbers increase in a Malthusian fashion. Hence, strict rules governing inheritance of property and power were applied. Therefore, the dominant class limited its growth in numbers in several ways. For example, in many cases, inheritance only passed to the eldest son. Also the dominant class could change, for example, as a result of foreign invasion or by external conflict. In any case, it is clear that without restraining the numbers in the dominant class, the members of it would in all probability lose their power. Their power depended on them keeping a surplus available for provisioning forces to retain their power and/or to invest.

### ***7.3. The Lack of Innovations and Political Instability***

For Acemoglu, D. and J. Robinson (2012) societies featured by strong inequalities or extractive institutions cannot lead to sustainable economic growth. Both authors consider that (2012, p. 165), "*Lack of creative destruction and innovation is not the only reason why there are severe limits to growth under extractive institutions. (...) the internal logic of extractive institutions plays also a role. As these institutions create significant gains for the elite, there will be strong incentives for others to fight to replace the current elite. Infighting and instability are thus inherent features of extractive institutions*". In fact these authors are considering two separate problems that might explain the lack of sustainability of societies featured by extractive institutions.

On the one hand, economic growth and technological change are accompanied by a process of creative destruction. They replace the old with the new. New sectors attract resources away from old ones. New firms take business away from established ones. New technologies make existing skills and machines obsolete. The process of economic growth and the inclusive institutions upon which it is based create losers as well as winners in the political arena and in the economic marketplace. Acemoglu, D. and J. Robinson (2012) consider that fear of creative destruction is often at the root of the opposition to inclusive



economic and political institutions. However, this point of view can be challenged. It is the members of privileged class who are responsible for many of our impressive examples of built environments (e.g. pyramids, irrigation work) and of many produced and very useful public goods<sup>25</sup>. Furthermore, in war, it was increasingly the case that new technologies, not numbers became decisive. In Eurasia, new defence and attack technologies developed fairly rapidly after the agrarian revolution. Therefore, historical evidence demonstrates that the elite was not against technological change. On the contrary, the elite was encouraging technological change, especially in weaponry and other activities in which technological change would provided them more efficient means to reinforce their dominance.

On the other hand, even though extractive institutions can generate some growth, they will usually not generate sustained economic growth, and certainly not the type of growth that is accompanied by creative destruction. When both political and economic institutions are extractive, the problem does not come from the fact that incentives will not be there for creative destruction and technological change. The real problem results from the arrangements that support economic growth under extractive political institutions because they are, by their nature, fragile: they can collapse or can be easily destroyed by the infighting that the extractive institutions themselves generate. In fact, extractive political and economic institutions create a general tendency for infighting, because they lead to the concentration of wealth and power in the hands of a narrow elite.

Beyond the two problems mentioned previously, the presumed one – fear of technological change – and the real one – political instability – there are two distinct but complementary ways in which growth under extractive political institutions can emerge<sup>26</sup>. First, even if economic institutions are extractive, growth is possible when elites can directly allocate resources to high productivity activities that they themselves control. The second type of growth under extractive political institutions arises when the institutions permit the development of somewhat, even if not completely, inclusive economic institutions. Even if, as explained previously, many societies with extractive political institutions will shy away from inclusive economic institutions because of fear of creative destruction, the degree to which the elite manage to monopolize power varies across societies. In some, the position of the elite could be sufficiently secure that they may permit some moves toward inclusive economic institutions when they are fairly certain that this will not threaten their political power. It is worth noting that political centralization is the key to both ways in which growth under extractive political institutions can occur; a situation completely consistent with evidence about early civilizations.

### **Concluding Comments**

Two main consequences of the Neolithic revolution were, on the one hand an increase in the size of human population and, on the other, an increased economic surplus produced by agriculture. Although both factors had mutual influences, this did not lead to the Malthusian trap as it is often believed in the economic literature. Indeed, the Neolithic revolution involved managerial challenges – such as the ones associated with storage of food, the division of labor, irrigation, trade. Given these problems, powerful local chiefs emerged that changed the nature of their original communities and developed new forms of social organization, in which one individual and his enlarged family – transformed into a ruling elite – received the benefits of the labor of a large dominated class. Although the surplus was appropriated by the elite and used in specific ways – consumption, investments and

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<sup>25</sup> See the previous section for various examples of technological changes implemented by the elite in early civilizations.

<sup>26</sup> Acemoglu, D. and J. Robinson (2012, pp. 105-106).

expenditures on armed forces – it increased the power and wealth of these societies, albeit a solution involving unequally distributed wealth. While this is not the only factor in the growing dominance of agriculturally based societies, it is one of the main ones and is supported by the evidence from the six early civilizations which evolved from the Neolithic revolution. This evidence reveals that an important modification of Malthus' theory is required. The nature of the basic socio-economic theory underlying these results has been indicated in this paper and it is intended to formally model this theory in a later paper. However, inequality – though necessary – was not a sufficient condition for the sustainability and economic development of these early societies in which political instability was the rule rather than the exception.

## References

- Acemoglu, D. and Robinson, J. (2012), *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*, Crown Publishers, New York.
- Ashraf, Q. and Galor, O. (2011), Dynamics and stagnation in the Malthusian epoch, *American Economic Review*, 101(5), pp. 2003-41.
- Bender, B. (1978), Gatherer hunter to farmer: a social perspective, *World Archaeology* 10, pp. 204-22.
- Bertola, G., R. Foellmi and Zweimuller, J. (2006), *Income Distribution in Macroeconomic Models*, Princeton University Press, Princeton and Oxford.
- Bockstette, V., Chanda, A. and Putterman, L. (2002), States and markets: the advantage of an early start, *Journal of Economic Growth*, 7(4), pp. 347-69.
- Bolt, J. and van Zanden, J. L. (2013), The First Update of the Maddison Project; Re-estimating Growth Before 1820, *Maddison-Project Working Paper*, Nr. 4. Available at <http://www.ggdc.net/maddison/maddison-project/abstract.htm?id=4> (Accessed May 2014).
- Boserup, E. (1965), *The Conditions for Agricultural Growth: The Economics of Agrarian Change Under Population Pressure*, Aldine, Chicago.
- Brenner, R. (1976), Agrarian class structure and economic development in pre-industrial Europe, *Past and Present*, 70(1), pp. 30-75.
- Childe, G. (1936), *Man Makes Himself*, Watts & Co., London. Reprint (4<sup>th</sup> edn.) Collins, London, 1965.
- Clark, G. (2007), *Farewell to Alms. A Brief Economic History of the World*, Princeton University Press, Princeton, NJ.
- Diamond, J. (1997), *Guns, Germs and Steel: The Fates of Human Societies*, W. W. Norton, New York.
- Galor, O. (2005), From stagnation to growth: unified growth theory, In P. Aghion and S. N. Durlauf (eds.) *Handbook of Economic Growth*, Vol. 1A, Amsterdam: North-Holland, pp. 171-193.
- Galor, O., Moav, O. and Vollrath, D. (2009), Inequality in land ownership, the emergence of human capital promoting institutions and the great divergence, *Review of Economic Studies*, 76, pp. 143-179.
- Hayden, B. (1990), Nimrods, piscators, pluckers, and planters: the emergence of food production, *Journal of Anthropological Archaeology*, 9, pp. 31-69.
- Maddison, A. (2007), *Contours of the World Economy 1-2030 AD*, Oxford U.P., Oxford.
- Milanovic, B., Lindert, P. H. and Williamson, J. G. (2007), Measuring Ancient Inequality, *NBER Working Paper Series*, Working Paper 13550. Available at <http://www.nber.org/papers/w13550>

- North, D. C. and Thomas, R. P. (1977), The first economic revolution, *The Economic History Review*, Second Series, 30, pp. 229-41.
- Persson, K. G. (2008), The Malthus Delusion, *European Review of Economic History*, 12(2), pp. 165-173.
- Postan, M. M. (1973), *The Medieval Economy and Society: An Economic History of Britain in the Middle Ages, 1100-1500*, University of California Press, Berkeley and Los Angeles.
- Price, T. D., and Brown, J. (1985), *Prehistoric Hunter-gatherers: The Emergence of Cultural Complexity*, Academic Press, San Diego, Calif.
- Renfrew, C. and Bahn, P. (2012), *Archaeology Theories, Methods and Practice*, Thames and Hudson, 6<sup>th</sup> edition, London.
- Rowthorn, R. and Seabright, P. (2010), Property Rights, Warfare and the Neolithic Transition, *IDEI Working Paper*, No. 654, November, Available at <http://idei.fr/display.php?a=23850>
- Tisdell, C.A. (2005), *Economics of Environmental Conservation* (2<sup>nd</sup> edn), Edward Elgar, Northampton, USA.
- Tisdell, C.A. (2013), *Competition, Diversity and Economic Performance*, Edward Elgar, Cheltenham, UK.

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