# Monopoly Capital and Capitalist Inefficiency

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22 September 2014

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by

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**Abstract**

This paper examines the arguments and assertions of Baran's and Sweezy's *Monopoly Capital: An Essay on the American Economic and Social Order* (1966) by assessing the degree of economic efficiency or inefficiency in how surplus value and economic surplus were created by 16 major capitalist economies during the 2000s using data envelopment analysis (DEA). After assigning a score to the degree of economic efficiency/inefficiency for each country, one can then assess which factors influence the degree of efficiency/inefficiency. This paper finds empirical support for many of the arguments put forth by the authors, Baran and Sweezy, as well as others regarding the inefficiency of the use of some forms of economic activity to help absorb economic surplus and to create surplus value.

January 2015

**Acknowledgements:** The authors would like to thank the reviewers for their helpful and constructive comments. Any errors or omissions are those of the authors.

**Disclosure Statement**: No funds were used in the development of or writing of this paper.

**Keywords**: data envelopment analysis, Marxian economics, neoclassical economics, over production, over investment, stagnation thesis, surplus value, under consumption, x-inefficiency

**JEL Codes**: B24, B51

## Introduction

With the recent global financial crisis and Great Recession, Paul Baran's and Paul Sweezy's analysis of monopoly capital brings to mind old criticisms of capitalism. When their landmark book, *Monopoly Capital: An Essay on the American Economic and Social Order* (1966) was published, orthodox political economists rarely gave them any credit for pointing out the systematic drawbacks of a modern capitalistic economy. However, as the globalization and integration of the world economy has proceeded since their book was written in 1966, the negative byproducts of capitalist economies have caused severe strains to global governance and problems in managing a stable international economy. The United States sub-prime mortgage crisis and a series of bankruptcies of large financial firms provided a picturesque example of how a country's level of monopoly capital could drive an international economy to a perilous situation.

Baran and Sweezy argued that as "profit maximizers and capital accumulators," modern giant corporations concentrate most of a country's economic activity into what they deemed to be monopoly capitalism.[1] They attempted to update traditional Marxist thought by arguing that a mature capitalist economy has a tendency toward stagnation because of under consumption or over production, which prevents absorption of the economic surplus (1966 9-10, 76, and 84). To be more precise, they define economic surplus as "property income" (profits, dividends, rents, interest, and capital gains), or the traditional concept of surplus value, *plus* the value of economic activities considered unproductive or non-productive (advertising, distribution through wholesaling and retailing, government, finance, insurance, etc.). Because of a lack of direct competition among the giant corporations,

[1] The economic surplus is an amount equal to what is produced in an economy minus its "social necessary" costs of production and has a tendency to rise over time according to Baran and Sweezy. See p. 52.

stable pricing, and lower and lower production costs, corporate profits, and thereby surplus value, would tend to increase in an unlimited fashion over time unless new outlets for investment are found. Another problem is that as product markets mature and sales growth stagnates, there is further pressure to absorb part of the surplus value generated from business operations and labor exploitation. Due to the lack of surplus value absorption, this part of the economic surplus is then channeled into "unproductive" economic activities such as advertising, marketing, militarism, finance, and welfare spending. Finally, another reason for the inability of all surplus to be absorbed is because population growth and market development (i.e., more potential sales or sales outlets) are not rapid enough to sell all products produced and to assist absorption. Therefore in the short run there are only so many investment opportunities available for capitalist investors.[2]

The Baran and Sweezy thesis gave rise to a whole new way of thinking about capitalism in the late 20th century and created an "overaccumulation" school of thought within modern Marxism. Much of the Baran and Sweezy tradition is carried on in the publication *Monthly Review: An Independent Socialist Magazine* and its editors and writers, such as John Bellamy Foster and Fred Magdoff. Marxists have always subscribed to the notions of increasing wealth and business concentration, and periodic crises, but the thesis of overaccumulation of surplus and subsequent stagnation due to too much surplus not being absorbed was a new way of thinking about capitalist recessions and crises. Additionally, the notion that capitalists create and expand unproductive economic sectors

[2] For the U.S., Baran and Sweezy point out that up to the time their book was written, surplus value had been going down whereas economic surplus had been going up as a share of GDP. Since the 1980s, however, the rough equivalent of surplus value in the US, net operating surplus, actually has gone back up after declines in the 1950s, 1960s, and 1970s, and this is mostly due to declines in payments to labor (Lambert and Kwon, forthcoming). The analysis for this paper showed US economic surplus also continuing to increase during the last decade.

and use militarism, research and development, and other means in order to absorb surplus was also somewhat of a new way of thinking. The contention that such avenues of surplus absorption were wasteful and inefficient was also a unique contribution.

The purpose of this paper is to reevaluate their work and to assess the degree of economic efficiency or inefficiency of 16 major economies in surplus value and economic surplus production during the last decade empirically. This paper proceeds as follows. The next section summarizes Baran's and Sweezy's main arguments regarding monopoly capital. Next, a discussion of the data, variables, and methods used in this paper including the technique and method of DEA as a tool for assessing efficiency. The subsequent section examines the scale and efficiency of 16 OECD (Organization for Economic Co-operation and Development) countries. Finally, there is an analysis of the degree of capitalist inefficiency and monopoly capital through quantitative research methods. The findings of the DEA, a set of correlation coefficients, and regression analysis are reviewed and evaluated as to their importance and impact especially with regard to 1) macroeconomic economies of scale, 2) degree of macroeconomic concentration, and 3) the degree of unproductive consumption/investment in these 16 economies. Finally, in the concluding section, the justification for validating much of the Baran and Sweezy (and Edward N. Wolff [1987]) concepts of economic concentration and of surplus absorption through unproductive consumption/investment are discussed including implications for further analysis and research.

## The Main Arguments of *Monopoly Capital*

*The Role of the Large Corporation*

According to Bara and Sweezy, there exists a certain amount of excess capacity because of the large size and market power of modern day corporations. In addition, the underutilization of resources is encouraged (Steindl 1956) along with, as mentioned above, the steady prices that are higher than what would be the case under more competitive conditions (Berle and Means 1931; Strachey 1956). Despite partially mitigating over production or under consumption, excess capacity and underemployment also promote a lack of surplus absorption because less is in invested in productive activities than would otherwise be the case. In a mature capitalist economy, most industries are considered monopolistically competitive[3] (e.g., large retail chains) or oligopolistic (e.g., airlines, large manufacturers) and enjoy large economies of scale in production—lower and lower average costs as output is increased or sales become greater (Slavin 2005, 567). Although there are more firms and lower economic profits in a monopolistically competitive industry when compared to an oligopolistic one, there is still less competition in monopolisitic competition than in an ideal, perfectly competitive industry. Instead of competing on price, firms rely heavily upon advertising and brand positioning. However, despite economies of scale in production in monopolistic competition and oligopoly, consumer demand is often not enough to buy all the products made at their normal prices unless techniques other than price competition are employed. Price competition is avoided because of its destructive potential and because it can lead to industry instability. Therefore, if other

[3] See Edward H. Chamberlin, Theory of Monopolistic Competition (Cambridge, MA: Harvard University Press, 1933). The term was originally used by Edward Chamberlin and Joan Robinson (1933) in the 1930s. It is a market structure where firms compete with many other firms, but each firm sells items that are a little different in appearance or packaging, or brand name. For instance, monopolistically competitive industries include those such as retail clothing stores, gas stations, car dealers, financial consulting services, etc.

techniques of surplus absorption besides greater investment in manufacturing or transportation activities are not employed, for example, the economy would be in a perpetual state of under consumption (or overinvestment/overproduction),[4] and there would be less profits and no areas in which to invest or re-invest the economic surplus.

*Surplus Absorption*

The challenge to an advanced capitalist society is that besides using traditional means of investment and consumer expenditures, it must find other ways to absorb the excess surplus (which includes surplus value) by expanding the size of government through military and social welfare spending; spending more money on product research and development; and developing sectors of the economy which can be classified as unproductive (sectors or lines of work such as marketing, advertising, and finance, for example). These efforts provide outlets for the surplus value in terms of investment and more profits and are attempts to boost the capitalist system toward full employment and greater economy wide capacity utilization by making sure that industry produces a certain amount of arms; that the poor have enough income to spend on consumer items; that corporations spend a certain amount of profits on researching potential new products that may open up new avenues for surplus absorption; and that goods that would ordinarily not be sold at their regular prices are sold without price competition or price wars through the extension of credit to consumers who would not otherwise be able to afford them, or through selling their products by employing tools such as product differentiation, branding,

[4] Although there is a debate as to which is more important when it comes to triggering an economic crisis—under consumption, over production, or over investment—this paper treats the concepts as virtually the same. Whether the problem is not enough effective demand for goods or too much produced, the result is still the same—lower profitability and less surplus absorption.

or repeated promotional efforts, even though not much of a difference may exist among the products that are often in the mature stage of the product life cycle (Baran and Sweezy 1966).

*The Dynamics of Capitalism*

In order to analyze the dynamics of capitalism, Sweezy puts forth a relationship between national income and surplus absorption of a capitalist economy in one of his earlier works. Sweezy (1970, 187-189) citing Otto Bauer (1936) notes that the change in national income is the sum of the change in wages, the change in surplus consumed by capitalists, and the change in amount of surplus invested and added to the existing capital stock:

$$\Delta \text{ National Income} = \Delta \text{ Wages} + \Delta \text{ Capitalist Surplus} + \Delta \text{ Surplus Invested} \qquad (1)$$

Since the driving force of capitalism is greater and greater accumulation according to Baran and Sweezy, and since this requires more and more investment, wages and capitalist surplus are functions of the surplus invested, k, yet do not grow as fast as the surplus invested. They grow but at a decreasing rate. If the rate of consumer goods spending, c, is a positive function of wages and capitalist surplus, and if consumption goods produced are proportional to the amount of capital stock in an economy, then the following contradiction eventually occurs over time (t) as national income grows at a constant or a decreasing rate, which is a characteristic of a mature capitalist economy:

$$dc / dt < dk / dt \qquad (2)$$

This in turn means that consumption growth cannot keep up with output growth, which results in a glut of goods produced unless other means are created for absorbing the surplus.[5]

A mature capitalistic system not only suffers from a contradiction of not enough consumption (or over production) to spur greater and greater accumulation through productive activities, but it is also inefficient because the areas used to absorb the excess surplus according to Baran and Sweezy are unproductive—expenditures on the military and warfare, social welfare, advertising, marketing, finance, real estate, etc. These economic sectors are assumed to be unproductive because they add little or no value to the goods produced in an economy that satisfy the consumer needs of food, clothing, shelter, education, etc. That is, they are only ancillary to the productive sectors of the economy - agriculture, construction, certain government functions, manufacturing, mining, transportation and utilities. Baran and Sweezy mention that "surplus can be absorbed in the following ways: (1) it can be consumed, (2) it can be invested, and (3) it can be wasted" (Baran and Sweezy 1966, 87). Much of the rest of the book discusses how the unproductive sectors of the economy help surplus absorption through the waste of investment in unproductive activities.[6]

Similarly, Wolff (1987) develops a model of the US economy which shows that surplus absorption through unproductive consumption and investment is necessary in order to try to prevent stagnation. However, unlike Baran and Sweezy, he does not believe that

[5] This assumption of falling consumption takes into consideration the traditional Marxian notion of the fall being due to rising exploitation through wage cuts or more intensive work or rising unemployment due to layoffs resulting from labor being replaced by machinery. However, these factors are not emphasized by Sweezy in chapter 10 of *The Theory of Capitalist Development* (1942 (1970)), which explains the under consumption theory of stagnation. They are addressed in other parts of the book.

[6] The notion of waste in capitalism is something that has often been cited in many Marxists writings. For example, the wastefulness of capitalism was a key theme in *Beyond the Waste Land* (1983) by Bowles, Gordon, and Weisskopf.

this method of surplus absorption is a rational reaction to combating stagnation. Wolff instead argues that it is irrational in that unproductive consumption and investment will only increase over time, and since such activities are wasteful and do not create surplus value, he argues that labor productivity and capital accumulation must eventually fall as time goes by as unproductive employment and investment become bigger and bigger portions of the economy. In general, and put in terms of neoclassical economics, if the economy can be modeled using a Cobb-Douglas production function,

$$Y = AK^{\alpha}L^{\beta} \qquad (3)$$

where Y is national output, A is the impact or level of technology or total factor productivity, K is total capital, L is total labor, α is the productivity of capital, and β is the productivity of labor, then as increasing portions of K and L become more unproductive, $\alpha + \beta < 1$, which is a manifestation of decreasing or diseconomies of scale. That is, as more and more capital and labor inputs are added, especially in unproductive sectors, there is proportionally less and less output (and hence surplus), which is inefficient since less output could be achieved from fewer resources, especially fewer unproductive resources. Conversely, more output could be achieved if more or all inputs were in more productive sectors or in productive lines of employment, although this would probably result in greater output and over production.

This paper contends that a productivity measurement such as DEA can be used to assess on a relative basis whether a national economy, in its production of surplus, is operating under increasing, constant, or decreasing returns to scale.[7] Briefly, DEA is a

[7] Although typically a technique employed in mainstream analysis, one cannot necessarily classify DEA as part of neoclassical economics since it is a general technique for assessing efficiency in any context by comparing inputs and outputs through linear programming methods.

linear programming technique that allows for the relative rankings and comparison of different entities or decisions making units [e.g., nations, firms, etc.] according to their efficiency in turning inputs into outputs. If an economy is exhibiting decreasing returns to scale (that is, it is producing too little output relative to the inputs being used, which is also inefficient),[8] one can assess how much of this is due to that economy's share of economic activity being classified as unproductive. Because not enough surplus can be absorbed due to under consumption or over production, greater surplus absorption will be attempted through unproductive pursuits. In other words, a greater and greater amount of resources will be used in less productive pursuits. This is a situation that often becomes apparent at the microeconomic level with decreasing returns to scale at the firm level with oligopolistic industries.

Next, one of the tenets of Marxism is that capital tends toward greater concentration and centralization so that most markets are dominated by a few corporations or competitors. Monopoly capital is a concept often used by Marxists or Neo-Marxists to characterize modern day capitalism. Mainstream economics also recognizes that many markets in many advanced industrial countries are characterized by market concentration, and it has developed terms such as oligopoly and monopolistic competition to describe many modern day markets. Pryor (2001) finds that during the 1980s and 1990s many major US markets became more concentrated after deregulation and mergers.

Mainstream economists also argue that monopolies, monopolistic competitors, and oligopolies are characterized by a certain degree of x-inefficiency wherein firms earn economic profits and operate at average total costs (short run and long run) higher than the

[8] With increasing returns to scale, too few inputs are used relative to output, and output could be increased and average costs decreased with more inputs. In the case of constant returns to scale, inputs and outputs are employed in such a way that costs are minimized.

minimum possible average costs. This is often because they operate with a certain amount of planned, excess capacity as Berle and Means (1931), Steindl (1956), and Baran and Sweezy (1966) argue, and these firms engage in activities such as advertising or have high executive salaries (Berle and Means 1931; Steindl 1956; Baran and Sweezy 1966; Colander 1998, 309-311). If many markets within an advanced capitalistic economy are either monopolistically competitive or oligopolistic, then these economies could be operating with a certain degree of x-inefficiency, i.e., the underutilization of plant and equipment (capacity), or the underemployment of resources, such as labor, machinery, or buildings, etc., or the use of too many resources in unproductive activities which add little to output. The last situation would indicate too many resources being used to produce a certain level of surplus.

This paper proposes the use of DEA as a way to assess whether national economies are operating with x-inefficiency (Leibenstein and Maital 1992; Colander 1998, 309-311). If economies are operating with x-inefficiency, or where average total costs > minimum average total costs or where more inputs are being used relative to output, which would indicate diseconomies of scale (that is, as output goes up, so do costs), then perhaps data envelopment analysis offers a way to estimate the inefficiency of monopoly capital within and among different nations. If that can be done, an estimate of how surplus absorption takes place within a national economy is possible, especially since Baran and Sweezy (1966) and Wolff (1987) among others indicate that surplus absorption is geared toward investment in many areas deemed to be unproductive (i.e., military spending, sales effort, etc.). DEA could then offer some empirical support or refutation of the the Baran and Sweezy and Wolff assertions.

The use of a mainstream, efficiency evaluation technique such as DEA would also bolster any findings of capitalist inefficiency since it has some association with neoclassical economics and has not been used in Marxian analysis to date, or at least its use in this way has not been found in the course of research for this paper. And although a neoclassical concept, the production function equation can be used to show decreasing returns to scale in a mature, capitalist economy, and so its use is appropriate in this paper.

## Methods

Data envelopment analysis (DEA) is a nonparametric, linear programming technique that is designed to measure and compare the efficiency of different entities or decision making units (DMUs) with regard to their abilities to minimize input usage in the process of generating outputs, or with respect to their maximizing output in the process of using inputs. From a list of the DMUs' inputs and outputs, DEA creates a composite DMU, or "super" DMU, which matches a production possibility frontier (PPF) that approximates the minimum use of inputs or resources to get a maximum output level. Each DMU is assigned an efficiency score based on how close it is to the composite DMU's PPF, and those DMUs which match the composite DMU or have a combination of inputs and outputs which would place them on the PPF receive a score of 1.0. In input oriented DEA, those DMUs which score below 1.0 fall below the composite DMU's efficiency and are deemed "inefficient." Alternatively, in output oriented DEA, those DMUs which score above 1.0 are deemed inefficient.

Therefore, in an output oriented DEA model,

$$\text{Efficiency score of a DMU} = \frac{\text{Weighted Sum of a DMU's Outputs}}{\text{Weighted Sum of a DMU's Inputs}}$$

which is then compared to and ranked with the scores of other DMUs according to how close each comes to matching the performance of a composite DMU which is constructed to illustrate maximum efficiency.

Since Baran and Sweezy argue that surplus maximization and continuous accumulation of surplus are of paramount importance in a capitalist system, this paper focuses on output oriented DEA where a country's total labor hours and value of fixed assets in US dollars are 1) used as inputs to generate a country's net operating surplus (NOS) or surplus value in dollars; and 2) used as inputs to generate a country's economic surplus, or NOS + the value of unproductive economic activities. NOS is defined as the residual returns to capital, or total business receipts minus wages and salaries, depreciation, interest paid on loans, taxes, etc., and comes close to the Baran and Sweezy meaning of surplus value (US Bureau of Economic Analysis http://www.bea.gov/glossary/glossary.cfm). The assumption is that a capitalist economy attempts to maximize NOS production and ancillary economic activity given its inputs with the goal of maximizing surplus value and economic surplus. The DEA technique used in this paper is a general, linear Charnes, Cooper, and Rhodes (1978), or CCR, output oriented DEA model (Charnes, Cooper, and Rhodes 1978, 23-24). For the purposes of this paper, an efficiency score represents a country's ability to transform a set of inputs (labor and capital) into a set of output(s). The above model also identifies a benchmark group (an efficient DMU which matches the composite DMU) for any inefficient DMUs (Boussofiane, *et. al.* 1991; Anderson, *et. al.*, 1999; Cooper, Seiford, and Tone 2006).

DEA has been used in the past to measure the performance of different countries with regard to efficiency, whether efficiency in macroeconomic labor productivity (Lovell, Pastor, and Turner 1995; Maudos, Pastor and Serrano 2000), in the delivery of social services (Golany

and Thore 1997), or efficiency in GDP production (Lambert 2011). It has been proposed as a useful tool for economists because of its ability to highlight "x-inefficiency" in production or in any economic system (Leibenstein and Maital 1992). DEA can also estimate whether a DMU is experiencing decreasing, constant, or increasing returns to scale with regard to output production in relation to benchmark DMUs.

A DEA efficiency score represents an elasticity which measures "the relative change in output compared to the relative change in input" according to Cooper, Seiford, and Tone (2006, 119-121). A DEA returns to scale score is the sum of the output weights or multipliers which indicate the degree or scale—increasing, constant or decreasing—at which a DMU is producing its output with respect to the composite DMU or a benchmark DMU(s).[9] A returns to scale score can have a score anywhere from zero to no upper limit with a score of 1.0 representing constant returns to scale whereas a score less than 1.0 indicates increasing returns to scale and a score greater than 1.0 indicates decreasing returns to scale.

In the pursuit of surplus value and surplus maximization and absorption, overproduction in the monopoly capital sense of the word is occurring in the countries which exhibit decreasing returns to scale relative to more efficient countries given that the inputs used are yielding output at a less than proportional rate. This is low productivity, which is a symptom of stagnation. In both neoclassical and Marxian schools of thought, low

[9] For the US in 2010 a score of 0.89 was calculated for an input oriented efficiency score and 1.24 for an output oriented efficiency. The sum of the output weights, or the scale score, for the input oriented model for the US was 183.29 whereas for the output oriented model the scale score was 206.07. Output oriented efficiency scores are simply the reciprocals of input oriented score. The score of 183.29 is the sum of the weights (167.33 + 15.96) that would have to be used to make the outputs of Luxembourg and Switzerland, respectively, match the total output of the US. Luxembourg and Switzerland are considered benchmark countries for the US with regard to efficiency, and both have efficiency scores and scale scores of 1.0 for 2010. These scale scores indicate constant returns to scale, which is the measure of maximum efficiency for DEA.

productivity of labor and capital would correspond to stagnating and/or lower returns or payments to these “factors of production,” which in turn lead to difficulties in labor and capitalist consumption, or in general, under consumption of the inefficiently produced output over time, or lead to an increase in consumer debt and the growth of the finance, insurance, and real estate industries (F/I/RE) in order to keep the rate of consumption increasing (Foster and Magdoff 2009; Mosely 2013).

First, to show the concentration of economic activity that is occurring throughout the 16 countries, correlation coefficients will be calculated to show the degree of corporate concentration in each country and throughout the globe. Next, two sets of scale scores, which measure the output-oriented efficiency and the economies of scale each country has in its production of surplus value and economic surplus relative to its benchmark country(ries) are used as dependent variables in regression models (regular least squares, fixed effects regression and random effects regression) and are predicted using the independent variables listed below. These scale scores are based on how each country uses its total fixed assets and total labor hours each year to produce surplus value (NOS) and economic surplus.

The hypotheses are that the greater the value of inefficient ways of absorbing the surplus (military expenditures, nonproductive industries, welfare expenditures, research and development expenditures), the greater the value of the scale scores (the greater the diseconomies of scale) for a country in the production of surplus value or total surplus. Likewise, the greater the shares of worker/consumer expenditures, capitalist consumption, and capitalist investment (NOS shares and additions to total fixed assets), the greater the values of the scale scores since these are proportional to investment and are decreasing

functions of investment. This would mean greater inefficiency and less economies of scale in production. As outlined by Baran and Sweezy, each of the variables listed below represents a way that surplus can be absorbed.

The sources of data for all of these variables are either the Organization for Economic Cooperation and Development (OECD) statistics website (http://stats.oecd.org/Index.aspx?#) or the United Nations (UN) Statistics Division (http://unstats.un.org/unsd/snaama/dnllist.asp). Based on the Baran and Sweezy set of assertions, we can hypothesize relationships between the scale scores of each country and the following variables.

1. *Research and Development (R and D) expenditures of each country as a percent of GDP*. In order to increase investment and future sales opportunities, capitalist economies undertake a lot of research and development in order to come up with new products and potential new markets, although much research and development is wasteful, because a good portion of the money spent is on how to re-design product packaging and styles, etc. Thus, as the value of research and development expenditures of each country as a percent of GDP increases, so do the scale scores for each country on average in *ceteris paribus*.
2. *Military Expenditures as a Percentage of GDP*. Militarism and imperialism are important to surplus absorption since they guarantee a stable, global political environment for capitalist markets. Also, they are usually politically easy to support since military expenditures have a certain amount of public and popular support (Patterson 2012, Ch. 17). Since this is "wasteful" or unproductive form of

surplus absorption, a greater degree of military spending is associated with greater scale scores (greater diseconomies) on average, *ceteris paribus*.

3. *Total Public Social Welfare Expenditure as a Percentage of GDP*. By creating and occasionally expanding the welfare state, a capitalist system guarantees a certain amount of surplus absorption by assuring that those unemployed and/or in poverty have a minimum amount of money to spend through food stamps, housing support, etc. Along the lines of Baran and Sweezy (1966), and Greenberg (1977), among many others, there is the argument that the main purpose of government is actually to serve capitalist interests, although Baran and Sweezy more specifically believe that welfare state spending is generally wasteful and is not the most preferred way to absorb surplus since too much of it can lead to a workforce that cannot be exploited as easily. The hypothesis is that the greater the welfare state spending, the greater are the scale scores on average, all else constant.
4. *Non-productive Sector of the Economy as a Percentage of GDP.* As mentioned earlier, outlets for surplus absorption present themselves through investment in efforts such as sales and marketing, banking, finance, real estate, retailing, etc., even though such enterprises are not considered as productive or as yielding as much surplus as other ventures in agriculture, mining, manufacturing, etc., or those industrial pursuits deemed productive.[10] The classification for industries

[10] Not all Marxist scholars subscribe to the notion that there is a distinction between productive and non-productive labor and output, or that it is important. Houston (1997) and Laibman (1999) argue that such a distinction is unimportant and irrelevant for Marxist analysis. On the other hand, Mohun (1994, 1996, 2002, and 2014) and Dumenil and Levy (2006) argue that such a meaningful distinction is important and that the biggest growth in unproductive labor over the last few decades has been in the area of managerial hours and pay. The fact that managers have become such a big part of unproductive labor and absorb a greater and

considered as productive follows the one outlined by Shaikh and Tonak (1994). Therefore, this paper hypothesizes that the greater that this portion is of a national economy, the higher the scale scores for a country on average.

5. *Consumer Expenditures as a Percentage of GDP*. Labor income as a share of national income is used for Sweezy's wage pool (1970) that keeps consumption at a certain level. Workers' consumption mostly comes from their income and would be considered a traditional form of surplus absorption, although many household expenditures would go into or for areas considered to be non-productive (finance charges, retail markups, etc.). Since consumer expenditures are a function of the surplus generated, this variable should be positively associated with any inefficiency or diseconomies of scale in surplus value and surplus production on average, *ceteris paribus*.
6. *NOS as a Percentage of GDP*. This is used to represent Sweezy's shares of capitalist consumption and investment (1970), and should be proportional to and a function of surplus generation, whether the surplus value or the surplus is generated efficiently or inefficiently, all else held constant. Therefore, this variable is hypothesized to have a positive relationship with the scale scores.
7. *Percentage Change in Total Fixed Assets from the Year before*. This is another traditional method of capitalist absorption of surplus as noted by Baran and Sweezy and expressed as "k" in equation (1) above. Given the discussion by Baran and Sweezy, it is proportional to the surplus value and surplus generated,

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greater share of surplus as time passes reflects some degree of class aspects to unproductive labor according to Mohun (2014).

and so it is hypothesized to be positively associated with the economies of scale scores in surplus value and surplus production, all else held constant.

8. *Net Foreign Direct Investment as a Percentage of GDP.* Baran and Sweezy mention that one outlet source of surplus value and surplus is overseas investment, although they show that more dollars flow back to the U.S. than is channeled out with regard to net investment. Therefore, they do not see much efficacy in net foreign direct investment (Net FDI). Nonetheless, Net FDI is an attempt by a capitalist society to increase investment, and so it is used as an independent variable, and the hypothesis is that greater levels of Net FDI should be associated with more inefficient production of surplus value and economic surplus all else constant.

## Scale and Efficiency of the 16 OECD Countries

For this paper, the returns to scale scores for surplus value and economic surplus for the 16 OECD countries listed in Table 1 were calculated for each year from 2000 to 2010[11] in order to assess whether each country was producing its surplus value (NOS) and economic surplus with increasing, constant or decreasing returns to scale.[12] For 2010 the total GDP

[11] A time period which includes two recessionary periods (2001 and 2008-2009) and two cyclical peaks (2000 and 2007) so as to "smooth out" any cyclical effects of extreme upturns or downturns.

[12] For this time period, there were only 16 countries for which the OECD database (http://stats.oecd.org/Index.aspx?#) gave data for each year for each country on total fixed assets (which includes intangible assets such as copyrights, patents, etc.) and total labor hours. More data for other years existed for years prior to 2000, but some countries considered for the panel for the time period for this paper would have been lost, and so the panel would have been unbalanced. Also, since defining and quantifying a country's level of technology into one factor or index is problematic (Romer 2012), this paper assumes that technology is endogenous to the production of GDP and NOS and is "embodied" in the values of total fixed assets and hours worked. Greater values of assets and fewer work hours per country, all else held constant, imply greater levels of technology and productivity. All countries are OECD members, and hence, should roughly have parity in technology levels and technology dissemination as well, on average, so that the value of total fixed assets and labor hours can be the focus of the production function inputs in this paper.

for the 16 countries was around 61% of global GDP.[13] A country which produces its surplus value or economic surplus with increasing returns to scale (a score less than 1.0) basically has the ability to add more inputs and yet at the same time expand output at a rate greater than its percentage increase in inputs.

In fact, although such a country is operating inefficiently by not using enough inputs or by producing too little, it has room for expansion. Such a country could also still be at the stage of utilizing mostly productive labor, or increasing its amount of productive labor, and not having to worry so much about surplus absorption relative to an advanced capitalist country. The transitional and growing economies of Hungary and Slovenia showed an average score that indicated increasing returns to scale scores for each year from 2000 to 2010 for both types of scale scores, surplus value and economic surplus. Finland, a more developed nation, showed an average score for economic surplus production which indicated increasing returns to scale. Countries showing decreasing returns to scale scores (a score greater than 1.0), on the other hand, would be producing output at a decreasing rate given their inputs, and thus would have to find alternative ways to absorb surplus through unproductive activities, although the unproductive activities do not add as much value to output growth as do productive activities. This type of performance is also rated as inefficient, and decreasing scale scores for both surplus value and economic surplus were typical for the economies of most of the advanced capitalist economies listed in Table 1 with the exceptions of Luxembourg and Switzerland.

(Insert Tables 1 to 5 around here)

[13] United Nations Statistics Division 2010.

Table 2 displays descriptive statistics for the variables used in the DEA, correlation, and regression analyses. Table 3 shows correlation coefficients that show the degree of correlation among a country's economies of scale scores and the share of a country's corporate sales, profits, assets, and market values as a percentage of the top 100 companies of the Forbes Global 2000 total amount of sales, profits, assets and market value from 2006 to 2010 (*Forbes* 2006-2010). All of the correlation coefficients show a moderate to strong positive correlation among the variables. The greater the degree of diseconomies of scale for each nation, whether for surplus value or economic surplus production, the greater the sales, profits, assets, and market values as a percentage of global corporate sales, profits, assets, and market values, all else constant. Despite inefficiencies in production due to too many inputs given outputs, larger corporate size is associated with other measures of capitalist success. In standard microeconomics teaching, although monopoly and pricing power are associated with ATC > minimum total costs, which is inefficient, at the same time economic profits are higher than what they would be in a more competitive situation. The results in Table 3 somewhat support this.

## Capitalist Inefficiency and Monopoly Capital

As shown in Table 4, a regression analysis of 16 OECD countries was conducted where surplus value was the dependent variable in the model. In looking at the different regression results (least squares, fixed effects, and random effects) in Table 4, all three models show pretty much the same results, six of the eight independent variables are statistically significant at the 0.05 level (95% level of confidence), and each of these has its

hypothesized sign with the exception of R & D expenditures as a portion of GDP.[14] Total welfare spending and Net FDI as portions of GDP do not matter, and R & D expenditures are associated with lower scale scores (increasing and constant returns to scale scores), and this fails to support the Baran and Sweezy notion of R & D spending as mostly being associated with waste. Baran and Sweezy predict that R and D and "technological progress" should not have that much of an impact on surplus absorption (1966. 110). However, the results of the models indicate that it is associated with greater efficiency in the production of surplus. Over 80% of the variation in the scale scores/weights can be explained by the six variables that represent methods of surplus absorption - R & D spending, military expenditures, consumer expenditures, capitalist consumption, fixed assets investment, and nonproductive sectors as a share of GDP. Each, except for R & D expenditures, is associated with greater diseconomies of scale. No evidence of multicollinearity or serial correlation is apparent given the VIF (variance inflation factor) scores and Durbin-Watson (D-W) statistic scores shown in the least squares results in Table 4. All VIF scores are below 5.0, and the D-W statistic is either close to, at or above 2.0, which are appropriate cut-off scores to indicate no problems (Studenmund 2005).

Table 5 shows the results of regression analysis in which the dependent variable used is economic surplus. These models show fewer statistically significant variables and lower adjusted r-squared values (around 52-57%). Those variables which are good predictors of the efficiency of economic surplus production are military expenditures, the

[14] A Hausman test indicated the use of the random effects model, which yields essentially the same results as the least squares model. Nevertheless, we present all three models here. The dependent variable was classified several different ways—according to each nation, year, European vs. Non-European nation, and constant returns to scale vs. non-constant returns to scale nation (a scale score of 1.0 versus all other scores below and above 1.0), yet the results were close to all the same with the same six independent variables showing statistical significance and roughly the same coefficient value and sign in either the fixed or random effects models.

nonproductive share of an economy, and capitalist consumption (NOS as a percent of GDP). There are no signs of multicollinearity or serial correlation problems in this model either.

Military expenditures have the biggest impact on both types of scale scores.[15] Using the least squares results, a one percent increase in military spending is associated with around a forty-three point increase in surplus value scale scores on average and around a thirty-three point increase in economic surplus scale scores. This somewhat validates the Baran and Sweezy argument that the greatest amount of excess surplus absorption in a modern day capitalist economy, especially in the US, comes about through military expenditures, although greater military spending is associated with greater diseconomies/inefficiency in an economy (Baran and Sweezy 1966, 204-206). The variable which has the next greatest impact on both scale scores is the non-productive share of economic activity. Again, using the least squares model, a one percent increase in unproductive economic activity is associated with a 1-3 point increase in surplus value and economic surplus scale scores, on average, and holding all else constant.[16]

The results of the models in Tables 4 and 5 support most of the Baran and Sweezy and Wolff assertions that monopoly capital outlets for surplus absorption are basically inefficient, wasteful, or unable to create use value on average. They do not yield better returns than productive means of surplus absorption through lines of industry that create use value. Also, greater levels of consumer expenditures and capitalist consumption and investment are also associated with greater surplus value scale scores (and greater levels of capitalist consumption and investment are associated with greater economic surplus

[15] Step-wise regression also confirms this.
[16] Step-wise regression confirms this.

scale scores), indicating that larger capitalist economies that rely upon large levels of consumer spending—like most of those of the mature capitalist countries—are showing signs of diseconomies of scale, or perhaps showing symptoms of stagnation and slower growth. Again, larger economies of scale scores indicate greater degrees of diseconomies of scale for each country, or that too many inputs are being used to yield too little additional output or surplus value/economic surplus on a relative basis.[17] Higher levels of six of the variables are linked to higher surplus value diseconomies of scale scores, and higher levels of three of the variables are linked to higher economic surplus diseconomies of scale scores.

In terms of surplus value (NOS) and economic surplus production from 2000 to 2010, Luxembourg and Switzerland consistently ranked the most efficient. They had scores of 1.0 for both economies of scale scores for each year. These two countries, whether individually or jointly, were the benchmark countries to which the other countries were compared each year. Most other countries exhibited either increasing returns to scale (Hungary and Slovenia, and sometimes Finland) or decreasing/diseconomies returns to scale (the remaining 11 to 12 countries) where more or less output could have been produced according to the inputs used when compared to Luxembourg or Switzerland. Among the countries on the list, Luxembourg and Switzerland had average unemployment rates during this time period lower than the average for the other 14 countries and were usually in the top 5 of the list each individual year for lowest unemployment rates. From 2000 to 2002, Luxembourg had the lowest unemployment rate and was followed by Switzerland in second place. These numbers would imply high levels of capacity utilization and less slack in their economies when compared to the other countries. Again, slack and excess capacity would

[17] Or, fewer inputs could be used to yield the same level of output.

be indicators of monopoly capital waste and inefficiency according to Baran and Sweezy (1966, 237).

Additionally, Luxembourg had the highest GDP per capita for each year from 2000 to 2010 whereas Switzerland had the third highest level of GDP per capita for the years 2000 to 2007 after the United States and then was in second place from 2008 to 2010. Luxembourg and Switzerland also are the lowest among the 16 when it comes to military expenditures as a percentage of GDP (Luxembourg in last place 2000 to 2007, Switzerland in last place 2008 to 2010) and are somewhere in the bottom third of R and D spending. Luxembourg, along with the United States, had the highest values for portion of the economy in nonproductive activities whereas Switzerland was somewhere in fifth to sixth place. Luxembourg and Switzerland fall somewhere in the middle when it comes to social welfare expenditures, which probably accounts for why this variable is not a good predictor of the economies of scale variable, and the two countries are spread out in the bottom half of the consumer expenditures portion list and finish in second or third place behind the Czech Republic during the decade when it comes to surplus value (NOS) as a percentage of GDP. Although Luxembourg had high rates of investment in fixed assets during the decade (some years were over 10%), Switzerland had low rates of investment—less than 5% on average during the time period.

## Conclusion

Although a relative comparison among these 16 capitalist countries, the analysis presented in this paper supports the notions of capitalist concentration and inefficiency (diseconomies of scale) for most of these countries in their production of surplus value and economic

surplus. Again this is due to the large presence of unproductive activities in their economies such as military spending, nonproductive sectors of the economy, etc. As Wolff notes in the concluding chapter of his book:

> Unproductive activity thus appears as a contradiction of the advanced capitalist system. It threatens the reproduction of the system by reducing the rate of accumulation. Its one apparent virtue is that it absorbs part of the social product and thus alleviates the realization problem. But this product could also be absorbed by increased accumulation (or increased personal consumption). Moreover, unproductive activity is a feature of advanced capitalism that benefits neither workers nor capitalists. (1987, 178)

Although mostly writing about the US economy, Wolff also notes that as long as unproductive labor growth and pursuits continue to grow at faster rates than productive ones, economic growth and productivity growth will continue to slow. This slowdown will make the rate of surplus accumulation slower, which in turn will lead to stagnation. In our analysis, as the years progressed, those nations which showed either surplus value or economic surplus economies of scale scores greater than one usually saw the scores become larger—until the onset of the Great Recession.

An alternative path that could be followed would be one in which unproductive and wasteful economic activity would be minimized or eliminated and where workers would get a just and equitable share of surplus value and the economic surplus through productive activities in which there would be no planned excess capacity or slack in an economy. Less slack and less excess capacity would create greater employment, and more likely than not, a shorter work week. Although capitalistic countries, Luxembourg and Switzerland with their low unemployment rates, low levels of militarism, and high efficiency ratings give some slight indication of what is possible.

Some limitations to this research paper should be mentioned. The production function used in the DEA calculations did not incorporate a value for technology, which was assumed to be endogenous and already "embodied" in the values of total work hours and total fixed assets. Also, DEA is a technique which develops a relative ranking of efficiency based upon DMU inputs and outputs. It does not and cannot be used to develop absolute measures of efficiency. Additionally, if data for more countries had existed, perhaps the economies of scale scores for the countries in our panel would change slightly or dramatically depending upon how the relative rankings would be re-configured.

Nonetheless, many of the hypotheses surrounding monopoly capital examined here are supported. It will be interesting in a post Great Recession economic climate, where the economies of most nations are still growing slowly at best, to see what new ways of surplus absorption will be employed by the advanced capitalist nations. Whether there will be a dramatic burst in the growth of current or new industries or a breakout of a new war(s) remains to be seen.

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**Table 1 Average of Output Oriented Economies of Scale Scores for Surplus Value (NOS) and Economic Surplus, 2000-2010**

| Countries | Economies of Scale Surplus Value | Economies of Scale Economic Surplus |
|---|---|---|
| Australia | 10.332 | 5.909 |
| Austria | 6.850 | 5.151 |
| Belgium | 5.788 | 4.003 |
| Canada | 3.442 | 2.830 |
| Czech Republic | 2.519 | 1.784 |
| Finland | 1.199 | 0.955 |
| France | 34.789 | 23.320 |
| Germany | 48.811 | 32.432 |
| Hungary | 0.992 | 0.810 |
| Korea | 4.315 | 3.572 |
| Luxembourg | 1.000 | 1.000 |
| Netherlands | 13.141 | 10.537 |
| Slovenia | 0.263 | 0.246 |
| Switzerland | 1.000 | 1.000 |
| United Kingdom | 64.657 | 56.944 |
| United States | 205.096 | 123.896 |

## Table 2 Descriptive Statistics

| Variables | Means | St. Deviation |
|---|---|---|
| NOS ($ millions) | 424,240 | 884,241 |
| Economic Surplus ($ millions) | 1,422,291 | 3,016,060 |
| Economies of Scale, Surplus Value | 25.2600 | 50.8400 |
| Economies of Scale, Econ. Surplus | 17.1500 | 42.900 |
| Total Fixed Assets ($ millions) | 4,601,355 | 8,800,016 |
| Total Hours Worked (millions) | 34,547 | 59,725 |
| R & D Pct GDP | 2.1193 | 0.7348 |
| Military Exp Pct GDP | 1.6910 | 0.8254 |
| Nonprod Sector Share Pct GDP | 60.0600 | 9.6320 |
| Tot Public Soc Welfare Pct GDP | 21.3140 | 5.5640 |
| Consumer Exp Pct GDP | 54.7570 | 6.8780 |
| NOS / GDP Pct | 28.2870 | 5.1440 |
| Pct Chg Tot Fixed Assets | 5.1550 | 3.0520 |
| Pct Sales ($billions) of Top 100 | 4.8980 | 8.6400 |
| Pct Profits ($billions) of Top 100 | 4.5800 | 8.9900 |
| Pct Assets ($billions) of Top 100 | 4.8760 | 7.5800 |
| Pct Mkt. Value ($billions) of Top 100 | 4.4200 | 9.3200 |

## Table 3 Correlation Coefficients

| | Econ of Scale Surplus Value | Econ of Scale Econ Surplus | Pct Sales ($bil) | Pct Profits ($bil) | Pct Assets ($bil) | Pct Mkt Value ($bil) |
|---|---|---|---|---|---|---|
| Econ of Scale Surplus Value | 1.000 | | | | | |
| Econ of Scale Econ Surplus | 0.547 | 1.000 | | | | |
| Pct Sales ($bil) | 0.512 | 0.969 | 1.000 | | | |
| Pct Profits ($bil) | 0.551 | 0.978 | 0.984 | 1.000 | | |
| Pct Assets ($bil) | 0.524 | 0.904 | 0.939 | 0.921 | 1.000 | |
| Pct Mkt Value ($bil) | 0.868 | 0.751 | 0.731 | 0.771 | 0.660 | 1.000 |

## Table 4 Regression Analysis of Dependent Variable Surplus Value (NOS) Scale Scores

### 1) Least Squares

| Predictor | b | SE | t-score | p-value | VIF |
|---|---|---|---|---|---|
| Constant | -324.420 | 26.110 | -12.430 | 0.000 | |
| R & D Pct GDP | -8.628 | 2.602 | -3.320 | 0.001 | 1.492 |
| Military Exp Pct GDP | 43.053 | 2.717 | 15.850 | 0.000 | 2.053 |
| Tot Pub Soc Welfare Exp Pct GDP | 0.008 | 0.413 | 0.020 | 0.985 | 2.151 |
| Nonprod Sector Share Pct GDP | 2.780 | 0.216 | 12.900 | 0.000 | 1.758 |
| Consumer Exp Pct GDP | 1.294 | 0.322 | 4.010 | 0.000 | 2.006 |
| Pct Chg Tot Fixed Assets | 1.093 | 0.541 | 2.020 | 0.045 | 1.114 |
| Net FDI Pct GDP | -0.346 | 0.210 | -1.650 | 0.101 | 1.135 |
| NOS Pct GDP | 1.826 | 0.364 | 5.010 | 0.000 | 1.433 |

S = 20.7047, R-Sq = 84.2%, R-Sq(adj) = 83.4%, n = 176
Durbin-Watson statistic = 2.78689

### 2) Linear Regression, Fixed Effects

Fixed-effects (within) regression — Number of obs = 176
Group variable: nation — Number of groups = 16

R-sq: within = 0.8425 — Obs per group: min = 11.0
between = 0.8111 — avg = 11.0
overall = 0.8383 — max = 11.0

F(8,152) = 101.67
corr(u_i, Xb) = 0.0720 — Prob > F = 0.0000

| | b | SE | t-score | p-value |
|---|---|---|---|---|
| Constant | -325.599 | 26.990 | -12.060 | 0.000 |
| R & D Pct GDP | -5.796 | 2.703 | -2.140 | 0.034 |
| Military Exp Pct GDP | 41.712 | 2.791 | 14.950 | 0.000 |
| Tot Pub Soc Welfare Exp Pct GDP | -0.137 | 0.425 | -0.320 | 0.748 |
| Nonprod Sector Share Pct GDP | 2.685 | 0.229 | 11.740 | 0.000 |
| Consumer Exp Pct GDP | 1.358 | 0.327 | 4.150 | 0.000 |
| Pct Chg Tot Fixed Assets | 1.144 | 0.552 | 2.070 | 0.040 |
| Net FDI Pct GDP | -0.008 | 0.082 | -0.100 | 0.922 |
| NOS Pct GDP | 1.910 | 0.382 | 4.990 | 0.000 |

**3) Linear Regression, Random Effects**

Random-effects GLS regression  Number of obs = 176
Group variable: nation  Number of groups = 16

R-sq: within = 0.8420  Obs per group: min = 11.0
between = 0.8230  avg = 11.0
overall = 0.8391  max= 11.0

Wald chi2(8) = 874.70
corr(u_i, X) = 0 (assumed)  Prob > chi2 = 0.0000

| | b | SE | t-score | p-value |
|---|---|---|---|---|
| Constant | -321.314 | 26.135 | -12.290 | 0.000 |
| R & D Pct GDP | -7.348 | 2.566 | -2.860 | 0.004 |
| Military Exp Pct GDP | 43.057 | 2.718 | 15.840 | 0.000 |
| Tot Pub Soc Welfare Exp Pct GDP | -0.039 | 0.415 | -0.090 | 0.924 |
| Nonprod Sector Share Pct GDP | 2.754 | 0.219 | 12.570 | 0.000 |
| Consumer Exp Pct GDP | 1.216 | 0.318 | 3.820 | 0.000 |
| Pct Chg Tot Fixed Assets | 1.104 | 0.542 | 2.040 | 0.042 |
| Net FDI Pct GDP | -0.006 | 0.078 | -0.080 | 0.935 |
| NOS Pct GDP | 1.856 | 0.367 | 5.060 | 0.000 |

sigma_u 3.2342917
sigma_e 20.648635
Rho .02394689 (fraction of variance due to u_i)

## Table 5 Regression of Dependent Variable Economic Surplus Scale Scores

| Predictor | b | SE | t-score | p-value | VIF |
|---|---|---|---|---|---|
| Constant | -208.220 | 36.930 | -5.640 | 0.000 | |
| R & D Pct GDP | -3.496 | 3.680 | -0.950 | 0.343 | 1.492 |
| Military Exp Pct GDP | 33.595 | 3.843 | 8.740 | 0.000 | 2.053 |
| Tot Pub Soc Welfare Exp Pct GDP | 0.563 | 0.584 | 0.970 | 0.336 | 2.151 |
| Nonprod Sector Share Pct GDP | 1.645 | 0.305 | 5.400 | 0.000 | 1.758 |
| Consumer Exp Pct GDP | 0.497 | 0.456 | 1.090 | 0.277 | 2.006 |
| Pct Chg Tot Fixed Assets | 0.205 | 0.766 | 0.270 | 0.789 | 1.114 |
| Net FDI Pct GDP | -0.094 | 0.296 | -0.320 | 0.752 | 1.135 |
| NOS Pct GDP | 1.306 | 0.515 | 2.530 | 0.012 | 1.433 |

S = 29.2860, R-Sq = 55.5%, R-Sq(adj) = 53.4%, n = 176
Durbin-Watson statistic = 1.93286

**2) Linear Regression, Fixed Effects**

Fixed-effects (within) regression Number of obs = 176
Group variable: nation Number of groups = 16

R-sq: within = 0.5500 Obs per group: min = 11.0
between = 0.6095 avg = 11.0
overall = 0.5535 max = 11.0

F(8,152) = 23.22, corr(u_i, Xb) = 0.0435 Prob > F = 0.0000

| | b | SE | t-score | p-value |
|---|---|---|---|---|
| Constant | -207.016 | 38.844 | -5.330 | 0.000 |
| R & D Pct GDP | -1.452 | 3.890 | -0.370 | 0.709 |
| Military Exp Pct GDP | 32.443 | 4.017 | 8.080 | 0.000 |
| Tot Pub Soc Welfare Exp Pct GDP | 0.330 | 0.612 | 0.540 | 0.590 |
| Nonprod Sector Share Pct GDP | 1.588 | 0.329 | 4.820 | 0.000 |
| Consumer Exp Pct GDP | 0.573 | 0.471 | 1.220 | 0.226 |
| Pct Chg Tot Fixed Assets | 0.200 | 0.794 | 0.250 | 0.801 |
| Net FDI Pct GDP | 0.038 | 0.118 | 0.330 | 0.744 |
| NOS Pct GDP | 1.327 | 0.550 | 2.410 | 0.017 |

sigma_u 7.6328034, sigma_e 29.718215
rho .06188412 (fraction of variance due to u_i)
F test that all u_i=0: F(15, 152) = 0.68 Prob > F = 0.7970

**3) Linear Regression, Random Effects**

Random-effects GLS regression  Number of obs = 176
Group variable: nation  Number of groups = 16

R-sq: within = 0.5485  Obs per group: min = 11.0
between = 0.6502  avg = 11.0
overall = 0.5551  max = 11.0

Wald chi2(8) = 208.40
corr(u_i, X) = 0 (assumed)  Prob > chi2 = 0.0000

| | b | SE | t-score | p-value |
|---|---|---|---|---|
| Constant | -206.978 | 36.784 | -5.630 | 0.000 |
| R & D Pct GDP | -3.262 | 3.598 | -0.910 | 0.365 |
| Military Exp Pct GDP | 33.682 | 3.834 | 8.790 | 0.000 |
| Tot Pub Soc Welfare Exp Pct GDP | 0.553 | 0.585 | 0.940 | 0.345 |
| Nonprod Sector Share Pct GDP | 1.645 | 0.308 | 5.350 | 0.000 |
| Consumer Exp Pct GDP | 0.463 | 0.448 | 1.030 | 0.302 |
| Pct Chg Tot Fixed Assets | 0.204 | 0.766 | 0.270 | 0.790 |
| Net FDI Pct GDP | -0.010 | 0.110 | -0.090 | 0.925 |
| NOS Pct GDP | 1.312 | 0.515 | 2.550 | 0.011 |

sigma_u 0
sigma_e 29.718215
rho 0 (fraction of variance due to u_i)