'Core' and 'Periphery' in the World Economy: An Empirical
Assessment of the Dependence of Third World Growth
on the Developed Countries

Július Horváth and Richard Grabowski
Department of Economics
Southern Illinois University
Carbondale, IL 62901-4515
E-mail: gr9279@siucvmb.siu.edu, ga1571@siucvmb.siu.edu
Ph: 618-453-5070, 618-453-5067
Fax: 618-453-2717

'Core' and 'Periphery' in the World Economy: An Empirical
Assessment of the Dependence of Third World Growth
on the Developed Countries

1. Introduction

There are several approaches to understanding the character of the global relationship

between the developed and the developing world and these can broadly be classified into

classical, structural and dependency views.[1] Under the classical view are included different

versions of the mainstream economic theory, including the neoclassical development economics

and the theories of stages of economic growth. The classical approach shares the basic optimism

that the world economic system with free trade relations[2] does not represent a restraint on the

possible growth of the developing world. Neoclassical theorists[3] would argue that it is the

internal conditions (i.e., the culture)[4] which represents the main constraint on the development.

Structuralist[5] will stress the problems stemming from the structural organization of the world

economy as well as structural barriers to development in the domestic economy. The

dependency[6] views originate in political economy, their approach is historical, and it is

pessimistic in assessing the possibilities of development of the Third World,[7] at least when

developing countries take part in the world economic system.[8]

Dependency and world system theories[9] divide the world into the center and periphery. In

the center, economies are dynamic and growth in them is stimulated by factors internal to their

economies. In the periphery, growth may occur, but the sources of this growth are external in

nature and, in fact, located in the center. Moreover, this growth is often of a stop and go variety

and tends to be very slow over the long-term. Some theorists of this school argue that underdevelopment of the periphery is a direct result of the development of the center. Developing nations can only free themselves from this dependency relationship by disengaging in free trade and rigidly controlling if not eliminating foreign investment.

The optimism of the 'classic' views and the 'pessimism' of the dependency views are quite contradictory. There have been a number of attempts to empirically test the implications of the dependency school of thought. These attempts have generally utilized regression analysis or related techniques to analyze the relationship between development (often measured by G.D.P. per capita) and various measures of dependency. The results have been mixed. In this paper, a different approach is taken, we introduce a dynamic structural vector-autoregressive model with long-run restrictions which enables us to identify the effect of shocks originating in the center (developed countries) on the peripheral developing countries. This measure is then proposed as an indirect empirical test of dependency theory.

The second section of this paper will briefly review the literature on dependency theory. The third section will introduce the model and the empirical methodology. Section four will discuss the data and its sources and then present the empirical results, while section five will summarize the paper and its major conclusions.

2.

Dependency theorists argue that the economies of Third World countries have been shaped in response to conditions established by developed countries and thus their growth and development has been retarded and dependent. Theotonio Dos Santos (1993, p. 194) defines dependency in the following way:

> By dependence we mean a situation in which the economy of certain countries is conditioned by the development and expansion of another economy to which the former is subjected. The relation of interdependence between two or more economies, and between these and world trade, assumes the form of dependence when some countries (the dominant ones) can expand and can be self-sustaining, while other countries (the dependent ones) can do this only as a reflection of that expansion, which can have either a positive or a negative effect on their immediate development.

Thus the emphasis here is on the notion that independent growth and development are impossible for truly dependent economies. The implication is that this situation is harmful to the long-term development prospects of dependent countries, while the short-run effect can be positive.

The above idea characterizes the work of Andre Gunder Frank.[10] He argues that one can divide the world into countries of the center and countries of the periphery. The underdevelopment of the latter is the direct result of the development of the former. Most development economists have thought of underdevelopment as sort of the original state of nature for most societies and that development involves movement away from this original state. However, Frank believes that the state of underdevelopment is created in the periphery through the growth and expansion of the center.

The relationship of dependency between the center and the periphery is recreated within the periphery itself in terms of the relationship between metropolis areas and satellite areas. Rural satellite areas serve as sources of surplus which is then transferred to the city or metropolis which is in turn partly transferred out of the country to the center. Thus the relationship between center and periphery and metropolis and satellite is one in which exploitation occurs and provides a structure by which surplus is transferred from one geographical region to another. This siphoning of surplus away from satellite areas and peripheries is what makes long-term development in these areas unlikely.

The actual mechanics for exploitation comes in several different forms. The monopolistic powers of the center countries allow them to raise the prices of their exports relative to the prices of periphery exports. In addition, the center also possesses monopsony power with respect to purchases of export products from the periphery which allows them to push down these prices. The net result is that the terms of trade are turned against the periphery and this in effect causes a transfer of surplus. In addition, the activities of multinational corporations also provide a mechanism for surplus extraction. This may occur through the repatriation of profits which represents a transfer of potential surplus value out of the periphery. Finally, multinational corporations which draw out large quantities of capital from national capital markets are in fact crowding out domestic investors. Since the domestic investor would most likely have invested in projects within the country, this also proves to serve as an obstacle to overall development.

The work of Samir Amin[11] provides another view of dependency theory. He views the world as being organized into a world wide capitalist system. This system came about as the result of the expansion of the capitalist mode of production which began in the sixteenth century. All societies are part of this world system, but not equal parts. Specifically, the center and the periphery play unequal roles in the system through a process of unequal exchange.

In the periphery there is an abundance of labor which is in itself partly the result of policy. The ruling groups in the periphery in alliance with those of the center create environments in the former in which few employment opportunities are available to workers and yet peasant farmers lack access to the quantity and quality of land needed to maintain their family's livelihood. As a result, the pool of labor available is large. The reduction in wages which follows causes the prices of commodities produced by the periphery to be reduced. Thus the terms of trade turn in

favor of the center and against the periphery. The transfer of surplus which follows poses a significant barrier to overall development.

As a result of the above process, underdevelopment in the periphery has a number of characteristics. First, production activities are unevenly distributed across sectors in the periphery. There is a modern sector producing products for a small minority of wealthy individuals, but much of the rest of the periphery is starved of capital. Second, the production processes in the center are articulated in nature whereas those in the periphery are disarticulated. In the center demand and supply linkages connect the production process throughout the economy. Thus expansion of sector A has positive impacts on other sectors via these linkages. Alternatively, in the periphery there are few links between various sectors. The result then is that expansion of one sector has little impact via demand or supply linkages to the rest of the economy. This in effect rules out autocentric development in the periphery. The final characteristic is that the relationship between center and periphery is one of dominance of the latter by the former and this dominance is reinforced via financial dependence.

The above discussion, limited as it is, gives the reader some feel for the main ideas proposed by the dependency theory school of thought. Some theorists of the school eschew empirical testing of the theory altogether. They argue that the relationships are qualitative rather than quantitative and thus impossible to measure quantitatively.

A number of scholars have sought to empirically test the propositions and implications of dependency theory. Many of these attempts have involved using regression analysis, usually using as the independent variable dependence (on trade, capital, foreign aid) and as the dependent variable the development or the inequality in the society.[12] Hirsch (1986) stresses that most of

the studies could not incorporate the effect of the developed country on the developing country since allowance for time lags is problematic. Our study will try to remedy this.

The main intention of this paper is not to describe the transmission channels through which developed countries affect the Third World, but rather to evaluate empirically the effect of core countries on the growth rates of the periphery countries. In other words, the object is to identify the negative or positive effects of disturbances originating from the core countries on the periphery countries.

3. Model

In a textbook approach, a typical open economy is subject to demand and supply shocks. Demand shocks reflect changes in taxes, monetary expansion or contraction, or changes in tastes of consumption. It is usually assumed that demand shocks have short-run and medium-run effects on real output, but not long-run effects. Supply shocks (productivity shocks, bad harvest, etc.) are typically assumed to have short-, medium- and long-run effects on the real output. In the context of open economies such shocks could also be classified into foreign (world) supply shocks and home country (domestic) supply shocks. Our model follows this simple approach.

Consider a dynamic system where the true model could be represented by an infinite average representation of a vector of variables and a vector of exogenous shocks as follows:

(1a) $\qquad \Delta y^c_t = a_1(L)u^c_t + a_2(L)u^p_t + a_3(L)u^d_t$

(1b) $\qquad \Delta y^p_t = b_1(L)u^c_t + b_b(L)u^p_t + b_3(L)u^d_t$

(1c) $\qquad \Delta p^p_t = c_1(L)u^c_t + c_2(L)u^p_t + c_3(L)u^d_t.$

In these equations, y^c_t represents real output of a core countries, y^p_t is an output of a periphery country, p^p_t is the price level of a periphery country, u^c_t is a structural supply shock originating

from the core countries, u^p_t is a country specific structural supply shock originating from a

periphery country, u^d_t is a country specific demand shock originating from a periphery country, Δ

is a first-difference operator, and $a_i(L)$, $b_i(L)$, $c_i(L)$ are polynomials in the lag operator L.[13]

The above model can be rewritten in a more compact form as

(2) $\Delta x_t = A(L)u_t$,

where $\Delta x_t = [\Delta y^c_t, \Delta y^p_t, \Delta p^p_t]'$ and $u_t = [u^c_t, u^p_t, u^d_t]'$.

Model (1) is a structural moving average model where y^c_t, y^p_t, p^p_t are observable variables

and u^c_t, u^p_t, u^d_t are exogenous shocks which cannot be directly observed. Rather, the exogenous

shocks are observed through their effects on components of the vector Δx_t. A structural vector

auto-regressive representation of (2) can be obtained by inverting A(L) to get

(3) $\Phi(L)\Delta x_t = u_t$

where $\Phi(L) = \Phi_0 - \sum_{k=1}^{\infty} \Phi_k L^k$. Thus

(4) $\Phi_0 \Delta x_t = \Phi_1 \Delta x_{t-1} + \Phi_2 \Delta x_{t-2} + ... u_t$

or

(5) $\Delta x_t = C_1 \Delta x_{t-1} + C_2 \Delta x_{t-2} + ... + C_p \Delta x_{t-p} + e_t$,

where $C_i = \Phi_0^{-1}\Phi_i$ for i=1, 2, ...,p and $e_t = \Phi_0^{-1}u_t$.

Since the elements in the Δx_t are assumed to be stationary, (5) can be written as a moving

average representation

(6) $\Delta x_t = e_t + B_1 e_{t-1} + B_2 e_{t-2} + ... = B(L)e_t$.

The question naturally is whether the structural parameters from (5) will make the system

identifiable,[14] in other words, can we obtain from (5) the structural parameters for (1).

Normalization of the diagonal elements of Φ_0 to unity leaves us with n(n-1) restrictions which

must be imposed based on some theoretical considerations. After Sims (1980) critique of

imposing zero restrictions, as was typical in simultaneous equation models, the usual way to go is to assume that the exogeneity of disturbances implies that the covariances between different shocks equal zero, thus $corr(u^c_t u^p_t) = 0$, $corr(u^c_t u^d_t) = 0$, and $corr(u^p_t u^d_t) = 0$. This leaves us with $n(n-1)/2$ restrictions. Sims (1980) suggested relying on the Choleski decomposition which produces results dependent on the ordering of variables in the vector Δx_t. This restriction, while advisable in certain situations, is generally considered to be inadequate (Cooley and LeRoy, 1985) and inferences from such an identification procedure could be misleading (Darnell, 1994, p. 423). In this paper, a different identification scheme is used, one based on the summary of long-run impulse responses as proposed first by Blanchard and Quah (1989) and consequently applied in a variety of papers, among others Ahmed, et al. (1993), Bayoumi and Eichengreen (1992), etc. This identification procedure is outlined below.

In our case three long-run restrictions are assumed. First, assume that country specific supply and demand shocks of the periphery countries have no long-run impact on the real output of the countries of the core.[15] This could be expressed as

$$\lim_{k\to\infty} \frac{d(y^c_{t+k})}{d(u^p_t)} = \sum_{k=0}^{\infty} a_{2,k} = 0$$

(7)

$$\lim_{k\to\infty} \frac{d(y^c_{t+k})}{D(u^d_t)} = \sum_{k=0}^{\infty} a_{3,k} = 0,$$

where

$$\frac{d(y_{t+k}^{c})}{d(u_t^{p})} = \sum_{k=0}^{i} \frac{d(\Delta y_{t+k}^{c})}{d(u_t^{p})} = \sum_{k=0}^{i} a_{2,k}$$

(8)

$$\frac{d(y_{t+k}^{c})}{d(u_t^{d})} = \sum_{k=0}^{i} \frac{d(\Delta y_{t+k}^{c})}{d(u_t^{d})} = \sum_{k=0}^{i} a_{3,k} \ .$$

This leaves the last restriction that in the long-run the effect of domestic demand shocks in periphery countries do not affect their long-run output (the long-run supply curve is vertical). Thus similar to the above restrictions

(9) $$\lim_{k\to\infty} \frac{d(y_{t+k}^{p})}{d(u_t^{d})} = \sum_{k=0}^{\infty} b_{3,k} = 0$$

This restriction then means that A(1) is lower triangular and thus also B(1) is lower triangular, which will allow us to identify the parameters in A(L), since $A(1) = B(1)A_0$.

What can this model tell us about the effect which core countries have on the output of periphery countries? The short-run, medium-run, and long-run effects of exogenous shocks originating from core countries on the output of periphery country is hidden in the behavior of the polynomial $b_1(L)$. More precisely, the effect of the one unit of exogenous shocks coming from core countries on the level of output of a periphery country through k years is given by

(10) $$\frac{d(y_{t+k}^{p})}{d(u_t^{c})} = \sum_{k=0}^{i} b_{1,k}$$

where k could be chosen for a short-run period of one year, for a medium-term period, say three to five years, and a long-run period of say 10 or 20 years. The path of the $b_{1,k}$ from (10) describes the typical response (and the optimal linear forecast) of the y_t^p to a normalized innovation u_t^c. Since u_t^c is not correlated with u_t^p and u_t^d by construction it follows that $b_{1,k}$ is the pure response

of output in the periphery to a shock originating from the core alone. If the sum is negative, the
fear of dependency theorists would be confirmed, shocks coming from the core decrease the level
of output in the periphery countries.

The model also helps to answer another question. What is the weight of domestic and
foreign factors in determining domestic output? In other words, even if the effect of shocks
originating from the core countries on the periphery country is negative, the impact would be
small if such effects play a small role in determining variations in output in the periphery. Thus
one must be able to assess the relative importance of these shocks. This could be obtained in the
following way:

(11)
$$\frac{\sum_{k=0}^{i} b_1^2}{\sum_{j=1}^{n} \sum_{k=0}^{i} b_{j,k}^2},$$

where n represents the number of sources of shocks. In this case n would be three. The three
types of shocks are: supply shocks originating in the core and impacting on a peripheral nation,
supply shocks within the peripheral nation, and demand shocks within the peripheral nation.
Thus equation eleven indicates the proportion of variation in output for a particular peripheral
nation which is the result of shocks emanating from the core.

From the above analysis one can then construct the following classification system.
Countries can be thought of as strongly dependent if the cumulative sum in equation (10) is
negative and if the variance decomposition in equation (11) indicates shocks from the center
explain forty percent (or more) of the total variation in the output of the periphery country.
Second, countries can be thought to be weakly dependent on the core if the cumulative sum in
equation (10) is positive and if the variance decomposition in equation (11) indicates that shocks

from the center account for forty percent or more of the total variation in output in the peripheral countries. Finally, one can classify peripheral countries as being independent of the core if the cumulative sum in equation (10) is positive or negative and the variance decomposition in equation (11) indicates that shocks from the center explain less than forty percent of the variation in output in the peripheral countries. Of course the designation of forty percent as the cutoff point is arbitrary, but it will give some indication of the relative importance of shocks from the center.

There are a number of important questions which, of course, the above model cannot answer. One could ask whether a small, unindustrialized country of the periphery could gain from belonging to the system where 'core' countries dominate? "It may do so in the narrow sense that its income is likely to be higher than it would otherwise be, but at the cost of structural dependence; proximity brings dangers of subjection to economic, military and cultural hegemony" (Seers, 1979, p. xviii). Our model measures only the effect of the interaction of the periphery economy with the core countries on the real income of periphery countries. Naturally, important points of hegemony and other qualitative characteristics could not be assessed by this model. Second, this study cannot measure the impact of core countries on economic inequality within the periphery countries and through this on growth.

4. Empirical Analysis

The core countries are assumed to be the G-7 countries: United States, Japan, England, Germany, France, Canada, Italy. The total output of these countries represents approximately eighty percent of the output of the OECD. The periphery countries are assumed to include most of the countries of South and Central America, Africa, and Asia for which data were available.

These were the following eighty-seven countries: Algeria, Argentina, Bahamas, Bangladesh, Barbados, Belize, Benin, Bermuda, Bolivia, Botswana, Brazil, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Chile, Columbia, Congo, Costa Rica, Dominica, Dominican Republic, Egypt, El Salvador, Ethiopia, Fiji, Gabon, Gambia, Ghana, Guatemala, Guyana, Haiti, Hondouras, Hong Kong, India, Indonesia, Iraq, Israel, Ivory Coast, Jamaica, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Malaysia, Mali, Mauretania, Mauritius, Mexico, Morocco, Myanmar, Nepal, Nicaragua, Niger, Nigeria, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Puerto Rico, Rwanda, St. Vincent, Senegal, the Seychelles, Singapore, Somalia, South Africa, South Korea, Sri Lanka, Sudan, Swaziland, Tanzania, Thailand, Togo, Tunisia, Turkey, Trinidad, Uruguay, Venezuéla, Zaire, Zambia, and Zimbabwe. The data utilized for the G-7 and periphery countries was drawn from World Bank sources and included information on real Gross Domestic Product (GDP) and the GDP deflator. The time period extended from 1960 to 1992.

For each nation the results from equations ten and eleven above were generated.[16] If the reader will remember, equation ten shows the effect of a one unit exogenous shock coming from the core countries (G-7) on the level of output of the periphery country under consideration. By setting k, the number of lags, one can see the cumulative impact through the specified number of periods.[17] The key factor here is the sign attached to equation ten through the years. If it is negative, then this implies that shocks emanating from the core reduce the level of income of the country under consideration. The following countries exhibited this characteristic: Bahamas, Bangladesh, Belize, Benin, Botswana, Burkina Faso, Cameroon, Chad, Chile, the Congo, India, Indonesia, Lesotho, Malaysia, Mauritius, Myanmar, Nepal, Paraguay, Rwanda, Senegal, the Seychelles, Singapore, Sri Lanka, the Sudan and Tunisia. These results are presented in Table

1.A in the appendix. There were several other countries for which there were negative impacts

for the short-run, but these disappeared as the time period increased.

In order to determine the relative importance of these results, the variance decomposition

for each country, as illustrated in equation (11), was examined. Equation (11) allows one to

determine the extent to which variations in output in the periphery were the result of shocks

emanating from the core. These results are especially important for those nations listed above for

which the shocks emanating from the core had a negative impact on output. For even if shocks

from the core had a negative impact on a country's output, this may not be of great importance if

such shocks only accounted for a small part of the variation in output in a peripheral country.

The results of the variance decomposition for the countries for which equation (10) was

negative are also presented in Table 1.A in the appendix. In the long-run (ten years or more) the

variation in output due to shocks from the core was five percent or less for the Bahamas,

Bangladesh, Belize, Benin, Chad, Chile, Lesotho, Myanmar, Paraguay, Rwanda, and Singapore.

In addition, for India, Senegal, Cameroon, and the Sudan, the variation in output accounted for

by shocks from the core was, for the most part, ten percent or less. Thus for this group of

countries, the main source of variation in output was domestic, not foreign in nature.

For Nepal, Sri Lanka, Tunisia, and the Congo, the variation in output accounted for by

shocks from the core ranged from ten to twenty percent, while for the Sychelles, the variation

was approximately thirty percent. Thus this group of countries was moderately influenced by

shocks emanating from the center.

Lastly, there is a group of nations for which shocks from the center greatly influenced

variations in output. Specifically, for Botswana, Burkina Faso, Indonesia, Malaysia, and

Mauritius the variation in output accounted for by shocks from the core was in the forty to fifty

percent range. Thus this last group of nations represents those for which output variations are substantially influenced by shocks from the center and these shocks have a negative impact on output. In terms of the classification scheme outlined in Section Three, these countries are strongly dependent.

So far in this paper dependency is presumed to be characterized by a negative sign for equation (10) combined with a high percentage value for equation (11). More simply, shocks in the center have negative impacts on output in the periphery and that such shocks dominate variations in output in the periphery. From this perspective, dependency relationships would seem to characterize a very few nations. If one accepts the last category of countries discussed in the previous paragraph as representative of dependent nations, then only five nations of our sample of eighty-seven can be characterized as strongly dependent. However, perhaps our definition of dependency is too narrow. Remember, it is presumed that a nation is dependent if shocks from the center have a negative impact on that nation and if these shocks account for a large proportion of the variation in the output of that nation (forty percent or more). One might argue that even if the sign for equation (10) is positive, dependency still exists. In this case dependency would be reflected in the fact that the variation in a country's output is dominated by factors external to the country. Thus what is critical is not the negative sign on equation (10), but the proportion of the variation in a country's output accounted for by shocks from the center. In section three this was called weak dependency and defined to include those countries for which equation (10) is positive and for which forty percent or more of the variation in output is explained by shocks from the center.

Using this broader criteria for defining dependency relations an interesting result emerges. There are a large number of countries for which shocks from the center account for

fifty percent or more of the variation in output in the long-run (ten years). These countries are:

Argentina, Barbados, Bermuda, Bolivia, Brazil, Costa Rica, El Salvador, Ethiopia, Guyana,

Israel, Ivory Coast, Jamaica, Kenya, Liberia Libya, Madagascar, Mauretania, Mexico, Papua New

Guinea, Puerto Rico, St. Vincent, South Africa, Swaziland, Tanzania, Togo, Turkey, Zaire,

Zambia, and Zimbabwe. Then there is another group for which the variation explained by shocks

from the center ranges from forty to fifty percent. These countries are: Ghana, Burundi,

Nicaragua, Malawi, and Guatemala. These results are presented in Table 2.A in the appendix.

Using this broader approach then indicates that a significant part of the developing world is,

given the classification scheme outlined in Section Three, weakly dependent. By dependent here

it is meant that variation in a nation's output is dominated by shocks originating from the core or

center.

The final group of countries to be discussed are those which are classified as independent.

For this group of countries shocks from the center have either a positive or negative effect on

output. However, such shocks explain less than forty percent of the variation in the country's

output. There are forty-eight of these countries and they are listed in Table 3.A in the appendix.

5. Summary and Conclusions

In this paper an attempt has been made to empirically test the implications of the

dependency school. This school argues that the development problems of the periphery are the

result of the expansion of the industrialized center. More generally, the periphery has no

independent economic life in the sense that variations in its economic activity are dominated by

the fluctuations in economic activity on the center. In order to test these propositions, a dynamic

structural vector-autoregressive model was used to identify the shocks affecting output in

developing countries. For each developing country, these shocks were classified into domestic

supply and demand shocks and exogenous shocks coming from the developed center. The results

were used to determine whether the latter-type of shocks, emanating from the center, had a

positive or negative effect on output in the peripheral (developing) nations. Finally, variance

decomposition was used to determine the proportion of the variation of the output of each

developing nation which was due to shocks from the developed center.

The G-7 countries of the OECD were assumed to represent the developed core with a

wide variety of nations from South and East Asia, Africa, South and Central America, and the

Caribbean assumed to represent the periphery. The data on real G.D.P. and prices was drawn

from World Bank data sources.

Two different types of results emerge depending on how one chooses to define the term

dependency. If dependent countries are developing nations that are harmed by increases in

output in the center, harmed in the sense that output in the developing countries declines, then the

results indicate that there are only a few countries for which this is true. In other words, there are

only a few countries where shocks from the center dominate variations in output and the shocks

have a negative impact on the output of the developing nation. These countries were: Malaysia,

Indonesia, Botswana, Burkina Faso, and Mauritius. These countries were classified as strongly

dependent and from this perspective dependency would seem to be a quite limited phenomenon.

However, one can take a broader view of the notion of dependency. If variations in

output in a particular country are dominated by shocks from the center, even if the impact on the

particular country is positive, this could represent a form of dependency. These nations would

find their economies dramatically influenced by forces and events beyond their control. From

this perspective, the analysis above found that there were thirty-three countries for which forty

percent or more of the variation in real G.D.P. was accounted for by shocks emanating from the

center. These countries could then be thought of as being weakly dependent.

References

Ahmed, Shaghil, Barry W. Ickes, Ping Wang and Byung Sam Yoo, "International Business Cycle," *American Economic Review*, Vol. 83, No. 3, June 1993, 335-359.

Bauer, P., *Equality, The Third World and Economic Delusion*, Methuen, London, 1981.

Bauer, P., *Reality and Rhetoric: Studies in Economics of Development*, Weidenfeld and Nicholson, 1984.

Bauzon, Kenneth E. and Charles Frederick Abel, "Dependency: History, Theory, and a Reappraisal," in Mary Ann Tetreault and Charles Frederick Abel, ed., *Dependency Theory and the Return of High Politics*, Greenwood Press, 1986.

Bayoumi, Tamin and Barry Eichengreen, "Shocking Aspects of Monetary Unification," *NBER Working Paper #3949*, January 1992.

Berberoglu, Berch, *The Political Economy of Development: Development Theory and the prospects for Change in the Third World*, State University of New York Press, 1992.

Blanchard, Olivier J. and Danny Quah, "The Dynamic Effects of Aggregate Demand and Supply Disturbances," *American Economic Review*, 1989 September, 655-673.

Cooley, Thomas F. and Stephen F. LeRoy, "Atheoretical Macroeconomics: A Critique," *Journal of Monetary Economics* 16, 1985, 283-308.

Darnell, Adrian C., *Dictionary of Econometrics*, Edward Elgar Publishing, 1994.

Dos Santos, Theotonio, "The Structure of Dependence," in Mitchell Seligson and John T. Passe-Smith, eds., *Development and Underdevelopment: The Political Economy of Inequality*, Lynne Renner Publishers, 1993.

Hirsch, Leonard Paul, "Incorporation into the World Economy: Empirical Tests of Dependency Theory," in Mary Ann Tretreault and Charles Frederick Abel, ed., *Dependency Theory and the Return of High Politics*, Greenwood Press, 1986.

Hout, Wil, *Capitalism and the Third World: Development, Dependence and the World System*, Edward Elgar, 1993.

Seligson, Mitchell A. and John T. Passé, eds., *Development and Underdevelopment: The Political Economy of Inequality*, Lynne Rienner Publishers, 1993.

Sims, C. A., "Macroeconomics and Reality," *Econometrica*, 1980, 48, 1-48.

Tetreault, Mary Ann and Charles Frederick Abel, ed., *Dependency Theory and the Return of High Politics*, Greenwood Press, 1986.

Wallerstein, Immanuel, *The Modern World System: Capitalist Agriculture and the Origins of the European World Economy in the Sixteenth Century*, Academic Press, 1974.

Watson, Mark, "Vector Autoregressions and Cointegration," *Handbook of Econometrics*, 1994, Vol. 4, 2843-2915.

Notes

1. Bauzon and Abel (1986) distinguish between the modernization school and the

    dependency school:

    > Briefly, the modernization school argues that integrating Third
    > World countries into an international capitalist network will result
    > in the progressive modernization of those countries. They will
    > develop economically, socially, politically, and culturally into
    > 'mature' and probably democratic states capable of guiding their
    > own development and securing their own interests. The
    > dependency school argues, on the other hand, that such an
    > integration necessarily inhibits such a transformation.

    Berberoglu (1992) groups these theories into developmentalism and dependency schools.

    Under developmentalism he classifies neoclassical development theory and theories of

    stages of economic growth and what he calls the psychological approach.

2. Hout (1993, p. 43) compares the free trade and dependency position in the following way:

    > The free trade theorists advocate the opening up of countries as a
    > strategy for growth and the development. This development policy
    > is based on the assumption of mutually beneficial trade; those
    > countries having abundant labour would, in this kind of reasoning,
    > benefit from the production and export of commodities for which
    > labour is the main factor of production. Dependency theorists see
    > this as a defective argument since such policies would only serve to
    > prolong exploitative relations of unequal exchange. For this reason
    > the dependency theorists recommend 'dissociation' of Third World
    > countries from the international capitalist economic system in order
    > to counter exploitation and underdevelopment.

3. Neoclassical development economics emphasizes the positive role which markets and

    free trade play in the overall development process and argues that getting prices right is

    extremely important. Although the neoclassical view recognizes that market failures

    occur and may be common in less developed countries, attempts by the state to deal with

these failures often lead to rent seeking types of behavior which often pose further obstacles to rapid growth.

4. In this approach, in order to develop the developing countries must abandon their typical characteristics and adopt the social, institutional, cultural patterns of the developed approach. Thus development is mainly the diffusion of ideas and culture from the developed to the less developed world (dual economy). See Berberoglu (1992) for a discussion of these ideas.

5. Structuralists argue that getting prices right (efficiency) and reliance upon markets may actually make the development process more difficult. Very simply, attaining efficiency does not guarantee a rapid rate of growth. For example, a structuralist would argue that free trade according to the principle of comparative advantage will indeed provide short-run efficiency gains for less developed countries. However, trade according to comparative advantage often consigns poor nations to be exporters of primary commodities, whereas developed nations will specialize in manufactured goods. One might argue that increasing returns are more likely in the latter and thus comparative advantage condemns less developed nations to a path of very slow growth relative to those countries specializing in manufactured goods.

6. We include in the dependency view, the views of dependency theorists, the work of E.C.L.A. (Economic Committee for Latin America) and also the theory of the world-economy as a system, as was developed by Wallerstein (1974). Hout (1993, p. 45) describes these ideas in the following way:

> The division of states in a centre and periphery implies, in both the
> E.C.L.A. approach and dependency theory, a difference in levels of
> development, with the centre being developed and the periphery
> being underdeveloped. Both the E.C.L.A. approach and

dependency theory focus on the relationship of inequality between the centre and the periphery. Although dependency theory goes further than the E.C.L.A. approach, both stress that the centre exploits the periphery. The E.C.L.A. approach focuses mainly on the worsening of the terms of trade for the developing countries; dependency theory stresses the structurally exploitative ties between the centre and the periphery, and their expression in trade, investments, monetary and financial relations, et cetera. The exploitative nature of these relations has a negative effect on the wealth of the periphery: as a consequence of the unequal position of the centre and the periphery, the former takes away a substantial part of the wealth of the latter. The final characteristic of the unequal relationship is that it is a cause of underdevelopment *external* to the developing countries. The problems of the developing countries are interpreted as a corollary of their ties to the centre, not as a consequence of internal factors distorting the development of the periphery. In the central writings of the E.C.L.A. approach, the international system of free trade is interpreted as the main cause of the underdevelopment of the periphery. In contrast to this view, the dependency theory tends to see the free trade system as just one of the elements of the capitalist world system, in which the 'rules of the game' have been unilaterally formulated by the countries of the centre. Therefore it is not just free trade that is responsible for underdevelopment, but rather the entire reality of the existing world system.

7.   In this paper we use the terms developing countries, Third World countries and periphery interchangeably. Similarly, we use the terms developed countries and core countries interchangeably. We define in part four which countries are included in which group.

8.   According to Hirsch (1986, pp. 103-104);

Dependency theories, being theories of *political* economy, stress the power basis of exchange relationships. In classic economic theories, exchange is between equal entities and is entered into freely; therefore, exchange is not a power-based behavior. In dependency theories, power comes from a variety of sources: size, wealth, and concentration of skill or technology. It is assumed that actors can utilize their power to create exchange structures that benefit them to th greatest extent. Thus the differences in the size and resource strength of actors affect the relative freedom of the market. In economic theory, the workings of the marketplace will 'naturally' limit the occurrence of monopolies and oligopolies, thus minimizing the potential for the use of power in the market. In

political economic theory, actors will try to regulate the market to limit and minimize this 'natural' occurrence. Regulation comes in the form of politically originated laws and rules dealing with exchange. These rules and laws may not affect all actors equally. A basic hypothesis of dependency theories is that the more powerful benefit more from these rules and regulations than do the less powerful.

9.   Dependency and world system theories evolved in 1960s and 1970s as a reaction to the classical mainstream interpretation of the development in the Third World. They argued against, what in their opinion was the implied bias in the mainstream 'classic' theories. "These biases were shown to be fundamental to the cores of these theories: the reliance on wealth and/or political pluralism as the definers of development and the examination of individuals (people or nations) as the unit of analysis" (Hirsch (1986, p. 101). Wallerstein (1974) writes that since the sixteenth century the world economy has been divided geographically into three primary zones: core, semiperiphery and periphery. The core countries dominate the world economic system and according to this argumentation the core countries drain the semiphery and the periphery of their economic surplus.

10.   The discussion of Frank's ideas is drawn from Hout (1993, pp. 52-73).

11.   The discussion of Amir's ideas is drawn from Hout (1993, pp. 74-93).

12.   We do not review these studies, we recommend the reader to an excellent survey by Hirsch (1986).

13.   In equations 1a and 1b, shocks from the center (u^c_t) are assumed to influence the output in both the center and periphery. These are supply shocks such as changes in preferences, technology, productivity, the labor market, and investment. Demand shocks (monetary and financial) are excluded since it is presumed that such shocks have no long-run impact on output.

14. For excellent discussion see Watson (1994).

15. This restriction seems quite reasonable since there is no systematic theory which would indicate that the real output of large developed countries is in the long-run determined by disturbances emanating from smaller, less developed countries.

16. The statistical analysis of the data is not reported here. First, using the Ljung-Box test two lags are used in equation (5). Two lags were chosen to achieve symmetry in capturing the dynamic effects of the model. Second, the augmented Dickey-Fuller test was performed with a constant and a trend where lags were calculated according to Akaike information criteria. In more than ninety percent of the results unit roots in the data were confirmed. Third, the Engle-Granger and Johansen's test for cointegration was performed. The results for about half the countries were cointegrated and for about half they were not. Again, to have symmetry the VAR estimation was carried out in first log differences.

17. For all of the calculations the vector moving average representation of the VAR is truncated at thirty-six periods. Similarly, impulse responses and variance decompositions are calculated for thirty-six periods. However, the results usually change little after ten or twelve periods.

Appendix

Table 1.A Countries of the Periphery Which Were Negatively Effected
by Shocks from the Center

	Sign of the Cumulative Effect of Shocks from the Center on the Output in the Countries of Periphery[1]			Short-run and Long-run Importance of Shocks from the Center in the Variation of the Output in the Periphery[2]		
Country	1 year	4 years	10 years	1 year	4 years	10 years
Bahamas	+	-	-	0.11	1.14	1.51
Bangladesh	+	-	-	0.27	2.30	1.83
Belize	-	-	-	39.89	0.04	0.47
Benin	-	-	-	4.61	3.19	1.67
Botswana	-	-	-	33.22	48.60	52.30
Burkina Faso	-	-	-	2.40	32.0	45.82
Cameroon	-	-	-	19.37	9.76	10.11
Chad	+	-	-	6.92	1.17	0.02
Chile	-	-	-	26.98	1.79	0.02
Congo	-	-	-	27.38	17.63	13.77
India	+	-	-	10.72	2.10	7.70
Indonesia	-	-	-	36.20	61.64	53.60
Lesotho	-	-	-	5.88	0.46	3.55
Malaysia	-	-	-	15.65	42.64	39.75
Mauritius	-	-	-	17.62	37.97	53.49
Myanmar	-	-	-	0.07	3.17	4.38
Nepal	-	-	-	4.91	14.33	16.68
Paraguay	-	-	-	7.96	4.94	0.17
Rwanda	-	-	-	23.9	10.53	0.12
Senegal	+	-	-	22.86	26.59	6.91
Seychelles	-	-	-	34.24	29.28	29.85
Singapore	-	-	-	5.12	4.40	3.26
Sri Lanka	+	-	-	0.75	4.89	19.22
Sudan	-	-	-	7.02	5.91	5.19
Tunisia	-	-	-	6.81	16.65	11.95

[1]The sign (+) and (-) indicate the response of the output in the periphery to the cumulative effect of shocks from the center equation (10).

[2]The last three columns are the results of the variance decomposition of the variation in the domestic output of the periphery countries. Only the results due to shocks from core are reported; equation (11). The complete results, including the share of the domestic supply and the domestic demand shocks are available from the authors.

Table 2.A Broader View of Dependency (Weak Dependency)

Country	Sign of the Cumulative Effect of Shocks from the Center on the Output in the Countries of Periphery[1]			Short-run and Long-run Importance of Shocks from the Center in the Variation of the Output in the Periphery[2]		
	1 year	4 years	10 years	1 year	4 years	10 years
Argentina	+	+	+	14.29	54.55	60.89
Barbados	+	+	+	8.01	33.46	49.85
Bermuda	-	+	+	1.05	41.04	70.50
Bolivia	+	+	+	28.19	37.26	52.91
Brazil	+	+	+	3.15	37.69	67.69
Burundi	+	+	+	34.86	43.78	42.96
Costa Rica	+	+	+	24.97	53.42	53.86
Ivory Coast	+	+	+	85.88	92.78	84.59
El Salvador	+	+	+	66.03	50.40	51.76
Ethiopia	+	+	+	15.22	63.52	59.11
Ghana	+	+	+	11.19	36.40	39.41
Guatemala	+	+	+	36.37	44.05	40.14
Guyana	+	+	+	51.76	69.72	74.68
Israel	+	+	+	0.58	44.16	60.40
Jamaica	-	+	+	10.07	36.07	91.20
Kenya	+	+	+	2.48	39.84	50.42
Liberia	+	+	+	72.16	92.81	93.00
Libya	+	+	+	82.09	81.62	88.87
Madagascar	+	+	+	6.43	60.82	58.72
Malawi	+	+	+	9.41	51.39	50.71
Mauritania	+	+	+	20.68	60.97	68.33
Mexico	-	+	+	0.00	28.30	49.75
Nicaragua	+	+	+	32.43	46.16	45.27
Papua N. G.	+	+	+	31.45	94.40	85.68
Puerto Rico	+	+	+	38.14	80.36	77.42
St. Vincent	+	+	+	42.95	44.83	55.28
South Africa	+	+	+	16.34	37.0	66.83
Swaziland	-	+	+	2.74	27.17	52.35
Tanzania	+	+	+	42.89	62.11	67.15

	Sign of the Cumulative Effect of Shocks from the Center on the Output in the Countries of Periphery[1]			Short-run and Long-run Importance of Shocks from the Center in the Variation of the Output in the Periphery[2]		
Country	1 year	4 years	10 years	1 year	4 years	10 years
Togo	+	+	+	18.37	81.46	78.14
Turkey	+	+	+	1.68	42.34	65.10
Zaire	+	+	+	10.22	47.98	54.28
Zambia	-	+	+	0.13	20.83	65.79
Zimbabwe	+	+	+	0.68	9.68	59.85

[1]The sign (+) and (-) indicate the response of the output in the periphery to the cumulative effect of shocks from the center, equation (10).

[2]The last three columns are the results of the variance decomposition of the variation in the domestic output of the periphery countries. Only the results due to shocks from core are reported; equation (11). The complete results, including the share of the domestic supply and the domestic demand shocks are available from the authors.

Table 3.A Independent Countries

	Sign of the Cumulative Effect of Shocks from the Center on the Output in the Countries of Periphery[1]			Short-run and Long-run Importance of Shocks from the Center in the Variation of the Output in the Periphery[2]		
Country	1 year	4 years	10 years	1 year	4 years	10 years
Algeria	+	+	+	6.29	13.67	10.92
Bahamas	+	-	-	0.11	1.14	1.51
Bangladesh	+	-	-	0.27	2.30	1.83
Belize	-	-	-	39.89	0.04	0.47
Benin	-	-	-	4.61	3.19	1.67
Cameroon	-	-	-	19.37	9.76	10.11
Central Africa	+	+	+	5.30	15.14	11.27
Chad	+	-	-	6.92	1.17	0.02
Chile	-	-	-	26.98	1.79	0.02
Colombia	-	+	+	3.35	2.50	29.94
Congo	-	-	-	27.38	17.63	13.77
Dominica	+	+	+	27.87	2.59	3.87
Dominican R.	+	+	+	0.30	9.39	19.66
Egypt	+	+	+	0.21	0.29	0.95
Fiji	-	+	+	4.29	6.01	8.58
Gabon	+	+	+	5.33	1.08	0.59
Gambia	+	+	+	0.17	7.29	14.50
Haiti	-	+	+	0.24	1.32	2.29
Honduras	+	+	+	18.74	9.46	5.95
Hong Kong	-	+	+	0.46	15.46	16.22
India	+	-	-	10.72	2.10	7.70
Iraq	+	+	+	19.82	25.43	24.39
Korea	+	+	+	31.19	15.17	6.68
Lesotho	-	-	-	5.88	0.46	3.55
Mali	+	+	+	17.66	12.91	13.67
Morocco	-	+	+	0.01	2.71	4.21
Myanmar	-	-	-	0.07	3.17	4.38
Nepal	-	-	-	4.91	14.33	16.68
Niger	+	+	+	5.84	9.81	15.89

	Sign of the Cumulative Effect of Shocks from the Center on the Output in the Countries of Periphery[1]			Short-run and Long-run Importance of Shocks from the Center in the Variation of the Output in the Periphery[2]		
Country	1 year	4 years	10 years	1 year	4 years	10 years
Nigeria	-	+	+	0.23	0.92	0.06
Oman	+	+	+	12.56	19.62	27.93
Pakistan	+	+	+	0.98	10.09	10.02
Panama	+	+	+	1.96	9.44	19.94
Paraguay	-	-	-	7.96	4.94	0.17
Peru	+	+	+	4.94	44.14	36.93
Phillipines	-	+	+	0.71	6.02	10.64
Rwanda	-	-	-	23.9	10.53	0.12
Senegal	+	-	-	22.86	26.59	6.91
Seychelles	-	-	-	34.24	29.28	29.85
Singapore	-	-	-	5.12	4.40	3.26
Somalia	+	+	+	9.31	32.79	20.55
Sri Lanka	+	-	-	0.75	4.89	19.22
Sudan	-	-	-	7.02	5.91	5.19
Thailand	+	+	+	4.66	6.66	7.25
Trinidad	+	+	+	0.35	6.21	5.05
Tunesia	-	-	-	6.81	16.65	11.95
Uruguay	+	+	+	11.58	3.91	15.68
Venezuela	+	+	+	35.68	23.11	6.91

[1]The sign (+) and (-) indicate the response of the output in the periphery to the cumulative effect of shocks from the center, equation (10).

[2]The last three columns are the results of the variance decomposition of the variation in the domestic output of the periphery countries. Only the results due to shocks from core are reported; equation (11). The complete results, including the share of the domestic supply and the domestic demand shocks are available from the authors.