Universidad de
San Andres

DEPARTAMENTO DE ECONOMIA

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George T. Mcandless Jr.
Macalester College

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Department of Economics
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Introduction:

When examining the time paths of per capita GDP in Latin America, one is forced to wonder why these time paths look so different from the time paths for per capita GDP in developed countries. That average per capita growth rates are lower in Latin American countries than in OECD countries is not terribly surprising. Average growth rates of population are higher in Latin America. However, even the southern cone countries (Argentina, Chile, and Uruguay), which have had relatively low rates of growth of population, have had low rates of growth of per capita GDP of less than one percent a year. In addition, the variances of the growth rates have generally been much higher in Latin America than in the developed countries. While much of Latin America managed to get through the Great Depression without the percentage declines in output that occurred in the major industrialized countries, the volatility of their output has been higher since then.

Current real business cycle and growth theory provide some framework for examining these time paths of GDP. Real business cycle work has concentrated on the determination of real (supply) shocks versus government policy (demand or monetary) shocks (see Blanchard and Quah (1989)) and on how real shocks might get propagated throughout the economy (see Kynland and Prescott (1982 and 1988) and Murphy, Shleifer, and Vishny (1989)). The new growth theory (Grossman and Helpman (1989), Lucas (1988), and Romer (1986 and 1990)) have been concerned about how endogenous human capital accumulation (which operates under increasing returns) drives the time path of growth.

How much does the growth experience of Latin America reflect the contents of these two theories? With respect to real business cycles, can we decompose these time paths in a way that allows an interpretation of one part as supply shocks and another portion as demand shocks. For small open economies, a major source of supply shocks can be the rest of the world, and a major theme of indigenous Latin American economic writing (known as dependencia theory) is how much the policies of developed countries drive the Latin American economies. If we characterize the demand shocks at those emanating from domestic government policies, we can attribute the portion of variance in output *not* explained by external factors as representing this component. With respect to the growth theory literature, there is considerable discussion about spillovers of technology from the developed countries to the less developed countries. It is not unreasonable to suppose that this spillover would be of a similar size for countries that have similar economies. Domestic policy differences, with respect to education and technology transfer could explain some of the differences in long run growth paths.

Per capita GDP in Latin America:

Since World War II, Latin American countries have fared differently, generally worse, in terms of economic growth than have the major developed countries. Table 1 shows the mean and standard deviations of the growth rates for five OECD and sixteen Latin American countries for the period from 1950 to 1988.

Country	Mean	Standard Deviation
France	3.31	1.69
Germany	3.91	3.08
Japan	6.16	3.43
United Kingdom	2.17	1.94

United States	2.59	3.53
Argentina	0.96	4.39
Bolivia	0.71	5.76
Brazil	3.78	3.90
Chile	0.96	5.36
Colombia	1.98	1.63
Ecuador	2.53	4.13
Paraguay	2.07	3.24
Peru	1.32	4.32
Uruguay	0.37	3.86
Venezuela	1.26	3.79
Costa Rica	1.83	4.09
El Salvador	0.58	3.57
Guatemala	0.91	3.22
Honduras	0.71	2.90
Nicaragua	-.36	8.06
Mexico	3.89	6.23

Table 1

In the above table, several sets of countries stand out. The southern cone countries (Argentina, Chile, and Uruguay) and the Central American countries have experienced particularly low growth rates. Among these countries, only Costa Rica had a growth rate of per capita GDP of greater than one percent. The two countries that experienced the highest growth rates are Brazil and Mexico, the two largest of the Latin American countries. Mexico had the additional advantage of becoming a major oil exporter during this period. Note Colombia, which stands out for the unusually low standard deviation in growth.

Appendix 1 presents graphs of per capita for the above countries. Data for four of the five developed countries is only from 1950, since the time series are not consistent though World War II. The early data from developing countries is either not available or is not to be trusted, since, given the available data for constructing output, they over represent international trade and under represent domestically consumed production. The overall pattern from the graphs is the same as from the statistics: slower growth and greater volatility in that growth.

The above observations on the growth rates of output in Latin American economies are reasonably well known. (Although they are not as well known as they probably should be. This is one of the reasons that the time paths of per capita GDP are included in the Appendix.) What is less well understood are the sources of these low growth rates and high standard deviations. A popular, Latin American, explanation for the high volatility of the growth rates is that they are driven by external -- developed country -- sources and that the economies of Latin America merely respond to shocks that originate in the developed world. Many developed country and some Latin American observers see mismanaged domestic policies as the main source of these low growth rates. This paper is an attempt to determine some broad indications of the sources of growth in Latin America and to separate the domestic from the foreign components. In particular, the results found here can be construed as presenting a lower bound for the external determinants of the growth paths.

There are two stages in this study. First, the auto regressive portion of VARMA representations of the path of output is examined for unit roots to determine if the output paths follow random walks or are trend reverting. Then, some structure is imposed on the moving average portions of VARMA representations to allow estimation of common and idiosyncratic portions of the errors. The common portion is interpreted as representing a lower bound of the share of the growth path coming from external sources.

Stationarity of time paths:

Recently, Cochrane (1988), Campbell and Mankiw (1987a) and Nelson and Plosser (1982) have written about the possibility of a unit root in autoregressive models of the output of the United States. While the results are mixed, they tend to reject the existence of unit roots in the U.S. data. Studies by Campbell and Mankiw (1987b) on several other industrialized countries have produced the opposite results: these countries have strong unit root components.

The sixteen Latin American countries were examined for the possibility of unit roots in the time path of output. The technique used in Cochrane (1988) was used here. This method exploits the knowledge that a unit root concentrates all the power at frequency zero in the power spectra of the data. This test does not need to be carried out in the frequency domain, since Cochrane has shown that the limit of the variance of the kth differences (as k goes to infinity) converges to the zero frequency of the power spectra. The data series is interpreted as having a unit root if the variance of the kth differences are the same size as the variance of the first differences. If these variances grow, the root is larger than one and if the variances go to zero as k increases the process is trend reverting.

For the most part, the data set is restricted to 1950 to 1988. Several countries, particularly Brazil (from 1861) and Argentina (from 1900) have output data that begins much earlier. As mentioned above, one should be suspicious of the very early data on output since the bulk of data available from the earlier periods is trade data and international trade gets overrepresented in the output calculations. A second test was done on the countries with longer data sets, restricting the data to the post 1950 period (in part to provide direct comparison with the other countries).

Graphs of the kth differences, for k = 1 to 20, of each of the sixteen Latin American countries are shown in Figure 1. As can be seen from these figures, there is no single characterization of the growth paths for these countries. The time path of output for Brazil, Mexico, Venezuela, the four Andean countries, and most of the Central American countries appear to contain unit (or larger) roots. The standard interpretation of these observations is that output paths for these countries shows more persistence in response to domestic or exterior shocks than the developed countries (or at least the United States). These results suggest that their long term growth paths are permanently (and for some countries, explosively) altered by one time booms or busts in their growth rate.

Several of the Latin American countries have output paths in which the random walk component is quite small, and for some, smaller than in the United States. The most striking of these is Chile with a random walk component of less than 25 per cent. (Cochrane found the random walk component of the United States to be about 33 per cent.) Their graphs in Figure 1 suggest that Argentina, Paraguay, Uruguay, and Costa Rica are trend reverting. Note that for Argentina, Uruguay, and Chile the growth rate to which they are reverting is not very large.

Domestic versus External sources of shocks;

As mentioned above, we would like to separate the domestic from the external component of the shocks. How to do this is, of necessity, a bit arbitrary but if one assumes that external shocks fall on at least several countries at a time and that domestic shocks are independent across countries, there is a possibility of separating these components. Suppose that the general form of a time series for each country can be written as

$$\Phi^i(L)Y_t^i = \Psi^i(L)\mu_t + \Xi^i(L)\epsilon_t^i,$$

where $\Phi^i(L)$, $\Psi^i(L)$, and $\Xi^i(L)$ are polynomials in the lag operator for country i, Y_t^i is the time series of the log of per capita output in country i, ϵ_t^i is the country i specific shock, and μ_t is the common shock. The common shock is what we are interpreting as being generated in the exterior. We want to estimate the size of the common shock and to examine its time series properties.

There are at least two ways of doing this. Standard multivariate tests for cointegration can be applied to either the full set of thirteen countries or to selected subsets (there are a priori reasons for choosing certain subsets as responding to similar external shocks). In this method, the variance-covariance matrix of the log levels of per capita output for the subset is examined for zero eigenvalues. A single zero eigenvalue indicates a single cointegrating factor and the corresponding eigenvectors are the cointegrating vectors (see, Cochrane and Sbordone, 1988). Multiple zero eigenvalues indicate multiple cointegrating factors and corresponding cointegrating vectors.

A second way permits other than unit roots to be common and permits clearer separation of the domestic and external components. The general form of the time series process for a group of countries can be restricted to be

$$\phi(L)IY_t = \Xi(L)\epsilon_t, \qquad (1)$$

where $\phi(L)$ is a scalar lag polynomial which is multiplied by an n by n identity matrix, there are n series in Y, $\Xi(L)$ is a matrix lag polynomial (n+1 x n), and there are n+1 error terms. Each of the $\Xi^i(L)$'s is of the form

$$\Xi^i = \begin{bmatrix} a^i_{11} & a^i_{12} & 0 & \cdots & 0 \\ \cdot & 0 & a^i_{23} & 0 \cdots & 0 \\ \cdot & \cdot & 0 & \ddots & \\ \cdot & \cdot & \cdot & & \\ a^i_{n1} & 0 & 0 & & a^i_{n,n+1} \end{bmatrix} \qquad (2)$$

so that the first error term is the common one (the μ_t used above) and the rest are independent. The coefficients on the diagonal are the coefficients of the own error term. The ϕ polynomial captures the common roots of the common error term and the a_{j1} coefficients capture the roots that are specific to each country. The importance of the common error term can be deduced from this structure and the nature of the common long run effects of this error term can be deduced from the roots of the ϕ polynomial.

A first approximation of the importance of the common component can be found by looking at the variance-covariance matrix of the growth rates (the first differences of the logs of the levels). If we assume that all the countries have the same $\phi(L) = 1-L$ and restrict the MA portion to be of order zero, the coefficients given above are just identified when we have three countries. The structure of the model when there are three counties is

$$(1-L)Y_t = \begin{bmatrix} a_{11} & a_{12} & 0 & 0 \\ a_{21} & 0 & a_{22} & 0 \\ a_{31} & 0 & 0 & a_{32} \end{bmatrix} \cdot \begin{bmatrix} \epsilon_c \\ \epsilon_1 \\ \epsilon_2 \\ \epsilon_3 \end{bmatrix}$$

where ϵ_c is the common noise and ϵ_i, for i = 1 to 3 are the independent noises. Normalize the above equation so that the variances of the ϵ_i's , i = 1,2,3,c, are all equal to one. Some simple calculations give us that the variance-covariance of $(1-L)Y_t$ is equal to

$$\begin{bmatrix} (a_{11}^2+a_{12}^2) & a_{11}\cdot a_{21} & a_{11}\cdot a_{31} \\ a_{11}\cdot a_{21} & (a_{21}^2+a_{22}^2) & a_{21}\cdot a_{31} \\ a_{11}\cdot a_{31} & a_{21}\cdot a_{31} & (a_{31}^2+a_{32}^2) \end{bmatrix},$$

from which we can calculate the a_{ij}'s. For systems with more than three countries, it is possible to calculate the least squares estimate of the a_{ij}'s. The most natural way to report the results of these calculations is to give the percentage of the variance for each of the countries that comes form the common noise, ϵ_c.

Table 2 gives the percentage of the variance that comes from the common noise for several subsets of Latin American countries. The number given is $a_{i1}^2/(a_{i1}^2+ a_{i2}^2)$, for each country, i. This method of calculating the common noise does not permit one country to have a negative covariance with one other country. In that case, we can not solve for the a_{ij}'s. Subsets in which one covariance was negative were dropped. (Colombia and Mexico had negative covariances with a number of other countries.) Subset A contains the three largest countries. Subsets B and C are the Andean countries, C with Venezuela included. Subset D includes the coffee producing countries. D is Central America with out Nicaragua (whose growth path is strange for obvious reasons). Subgroup F contains the largest number of South American countries that could be used (for lack of negative covariances). Group G is the most interesting for the Dependencia theory folks. It contains the United States and the two South American countries which have the most trend reverting growth paths. The common component reflects a large percentage of the variance of the U.S. growth rate, but fairly small percentages of the other two countries. This result is for a data set that begins in 1909 so what one normally thinks of as major world events, such as the Great Depression, are included.

It is possible to estimate the model given in equation 1 with somewhat weaker restriction on the form of the $\phi(L)$ polynomial and allowing the MA portion to be longer polynomials and to include an estimation of a common growth rate. The particular form of the $\Phi^i(L)$'s that we use is

$$\Phi^i(L) = (1-aL)[(1-L)Y^i(t) - n)$$
$$= (1-aL)(1-L)Y^i(t) - (1-a)n.$$

The coefficients a and n are the same for all countries in each group. The common growth component is included to capture the stationary component of the growth rates.

The estimation is done by using a state space representation technique given in Hansen and Sargent (1989), chapter 7. This state space representation requires writing the model in the form,

$$x_{t+1} = Ax_t + C\epsilon_t$$
$$y_t = Gx_t + v_t,$$

where x_t is the vector of state variables (standard for VARMA models), y_t is a vector of adjusted data, where $y_t = (1-L)Y_t - nI$, A is a matrix of the stacked AR polynomials, C is a matrix of the stacked MA matrices (equation 2 stacked), and G picks off the state variables that match the data.

Actual estimation is done with an innovations representation of this system is of the form

$$a_t = y_t - G\hat{x}_t \qquad (3)$$
$$\hat{x}_{t+1} = A\hat{x}_t + Ka_t,$$

where $\hat{x}_t$ is the expected value of the state variables given the y_t's, a_t is a vector of white noises with $\Omega = Ea_ta_t'$. A Kalman filter is used to find the Kalman gain, K, and state covariance matrix $\Sigma = E(x_t-\hat{x}_t)(x_t-\hat{x}_t)'$. The C matrix is not lost, it is an important input into the Kalman filter. For a given set of parameter estimates, and an initial $\hat{x}_0$, equations 3 are used to generate a series of innovations, a_t's, which are used in the maximum likelihood function

$$L = -(T+1)\ln 2\pi - .5(T+1)\ln|\Omega| - .5\sum_{t=0}^{T} a_t'\Omega^{-1}a_t,$$

where T is the number of observations. The parameters of the model are found by maximizing the likelihood function given above.

The results of the above estimations are presented in several forms. It is straightforward to calculate, from the coefficients of the estimation of each set of countries, the percentage of the variance explained by the common noise. When the MA component is of order zero, this percentage is given by $(a^0_{j1})^2/[(a^0_{j1})^2 + (a^0_{jj+1})^2]$. For the case with MA components of order one, the variance in the output of country j explained by the common noise is $[(a^0_{j1})^2 + (a^1_{j1})^2]/[(a^0_{j1})^2 + (a^1_{j1})^2 + (a^0_{jj+1})^2 + (a^1_{jj+1})^2]$.

Figures 2.a, 3.a, and 4.a presents the common index and the residual idiosyncratic component
for each country in a set estimated with MA order zero. The estimations with MA order one are presented in Figures 2.b, 3.b, and 4.b as the component of the output path
that is explained by the common index and the component explained by the own noise. These results are discussed below.

Results:

Tables 3 - 9 gives the results of the estimations for seven groups of countries. The calculated common and idiosyncratic signals are presented for three of these groups and are given in Figures 2 - 4. The United States has been added to a number of groups to represent the developed world business cycle.

Group A is composed of the three largest Latin American countries, Argentina, Brazil, and Mexico, and the United States. The estimated coefficients are given in Table 3. Data for all four of these countries go back to 1920, so this set captures some of the longer run relationship between Latin America and the rest of the world. There are two versions of the estimation with order zero for the MA portion, one for the whole set of data and another restricted to the post 1950 portion of the data. In the full data set, the common signal represents 37 percent of the variance in the output path of the United States and fairly large portions of the output path for the three Latin countries. The results for the MA one estimation are very similar. The restricted data set gives a very different relationship between the United States and these three countries. The common signal has almost no effect on the time path of the United States. Consider the graphs of the common and own signals given in Figures 2.a and 2.b. The first is the MA zero results for which we can represent the common signal alone. The second is the MA one results and we show the time path that the common and own noises give for each country. Notice that the boom of the twenties and the Great Depression are major aspects of the common signal. The own noise for the Great Depression period is large and negative for the United States, but the U.S. has a much smoother path after World War II than do the other three countries.

Group B is made up of the four Andean countries. Table 4 gives the estimation results and Figure 3.a and 3.b give the graphs of the common and own noises. The common signal captures a minimum of 51 percent of the variance in Bolivia and between ten and twenty percent of the variance of the other countries. The inclusion of the United States does change the normalization of the common signal (more for other countries, less for Bolivia), but the common signal does not explain much of the variance in the United States. The MA one estimations are again quite similar to the MA zero ones. The graph of the common signal supports the casually held notion of the post war behaivor of Latin America: a big boom in the 1970's followed by the 1980's bust. The big jump in Ecuador is the development of oil and the own noise for Peru shows that it began to decline long before the rest of the group.

The four Central American countries that did not experience a revolution comprise Group C. (Appendix 1 contains the per capita output path for Nicaragua. It is very different from the rest of Latin America.) The results of the estimations are given in Table 5 and the graphs of the effects of the common and own noises are given in Figures 4.a and 4.b. The estimations show that El Salvador, with its ongoing war, has followed a path generally independent of the rest. This observation is supported by the effects of the common signal on El Salvador given in Figure 4.b. Notice the small size of the common noise relative to the own noise. This is not the case for the other countries, especially Guatemala and Honduras, which have large percentages of their output paths explained by the common signal. The common signal for Central America follows the same bell shape as does the one for the Andean countries (it is somewhat different during the first few years).

Group D, given in Table 6, is something of a mixed bag with some Andean and some Southern Cone (marked with an *) countries. This estimation indicates that to capture all of Latin America in one estimation requires at least a two index model. The Andean group follow a different pattern from that of the Southern Cone. Unfortunately, there are only 39 observations for many of the countries and this is not sufficient for more than one index. Figure 1 may help explain why there might be at least two indices for Latin America. In that figure, Argentina, Paraguay and Uruguay are shown to have much stronger trend reverting characteristics than do Bolivia, Ecuador, and Venezuela.

Table 7 give the results for the southern beef producers. Not surprisingly, Uruguay (which was once an Argentine providence) has 27 percent of the variance of its output explained by a common signal that captures 62 percent of Argentina's variance. Notice that the output for the United States has little relationship with this common signal.

Table 8 gives the estimations for the oil producing countries. Venezuela (in the MA zero estimation) is the entire common signal; either Venezuela is driven entirely by oil during this period, or the index normalized on the Venezuela output path. In the MA one estimation, the common signal explains 60 percent of the variance of output in Venezuela and significantly smaller portions of the other countries. Both Ecuador and Mexico became major oil exporters much more recently than did Venezuela and the earlier portion of their output paths have very small oil components.

TAble 9 gives the estimates for three southern cone countries and the United States. Argentina, Chile, and the United States appear to be strongly trend reverting in their graphs in Figure 1, while Brazil seems to have a (possibly greater than) unit root. Notice that the MA coefficients for Argentina and Chile are removing much of the first difference in their own signal.

One last sequence of estimations was done and are presented in Table 10. The index for five OECD countries and each Latin American country, separately, were estimated to see if there was a developed country business cycle that could drive output in the developing countries. Quite strongly, these estimations indicate that there is not a strong developed country signal that explains (at least contemporaneously) much of the variance in output in the Latin countries. The largest is Venezuela, for which the common path of developed countries explains 20.82 percent of the variance of output. Of course, Venezuela is a major oil exporter and increased use of oil in the developed countries translates to increased sales (and imports) for Venezuela.

Conclusions:

How might these results be interpreted with respect to recent theories of business cycles, such as Kydland and Prescott (1982), and of growth, such as Romer (1986) and Lucas (1988). These real business cycle theories focus on the compounding of small real technology or preference shocks on an economy in generating business cycles. The common external components of business cycles in Latin America might be attributed to such shocks. If the relationship observed between the common signal in output of the United States and that of Argentina and Chile holds for other Latin countries, then the United States can be viewed as one of the important sources of the real shocks that occur in Latin America. This would fit into the real business cycle framework if the United States could be viewed as a source of demand shocks.

Recent growth theories make much of human capital accumulation and innovation as the main sources of growth. The time path of growth for the United States seems to be in agreement with these theories, but they do not seem to go very far in explaining the growth paths of Latin America, especially in the last few years. It is difficult to view the common portion of the growth paths as coming from human capital accumulation. There is little reason to believe that these countries have similar changes in their rates of human capital growth. One possible interpretation of the fairly large common component of the growth paths is that groups of countries are receiving technology from the developed countries at about the same rate. Another is that other, real, shocks determine the rate at which the developed countries' technology can be incorporated into the domestic industries.

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Table 2
Percentage of Variance from Common Signal

	Members of Subset	% of Variance in Common Signal
A.	Argentina	38.89
	Brazil	33.59
	Mexico	13.66
B.	Bolivia	32.11
	Colombia	22.23
	Ecuador	46.92
	Peru	29.36
C.	Bolivia	37.57
	Colombia	14.03
	Ecuador	40.80
	Peru	46.40
	Venezuela	26.79
D.	Brazil	13.30
	Colombia	19.56
	Costa Rica	10.28
	Guatemala	83.43
	Venezuela	33.05
E.	Costa Rica	41.30
	El Salvador	20.08
	Guatemala	48.21
	Honduras	23.62
F.	Argentina	17.25
	Bolivia	34.47
	Brazil	25.66
	Ecuador	21.53
	Paraguay	16.11
	Peru	46.81
	Uruguay	23.05
	Venezuela	27.61
G.	Argentina	27.86
	Chile	16.54
	U.S.A.	7.49

Table 3

Group A: Argentina, Brazil, Mexico, United States

MA0 (1920-1988)

$n = 1.87$ $a = -.347$

	Common	Own	%Var in Common
Arg	2.15	4.19	20.93
	(3.10)	(9.78)	
Bra	3.57	3.77	47.24
	(4.23)	(5.60)	
Mex	2.32	5.06	17.46
	(2.76)	(10.09)	
USA	3.17	4.13	37.08
	(3.91)	(7.29)	

MA0 (1950-1988)

$n = 2.34$ $a = -.302$

	Common	Own	%Var in Common
Arg	2.52	4.12	27.32
	(3.12)	(3.05)	
Bra	1.80	3.39	21.97
	(1.13)	(3.93)	
Mex	1.43	5.39	6.61
	(0.96)	(7.76)	
USA	0.09	2.54	00.12
	(0.13)	(8.58)	

MA1 (1920-1988)

$n = 0.79$ $a = -.549$

	Common	Own	Com-1	Own-1	% Var
Arg	2.61	3.70	-1.01	-2.12	33.16
	(4.13)	(8.76)	(1.43)	(2.95)	
Bra	3.76	3.44	0.84	-0.55	54.98
	(4.79)	(4.87)	(1.01)	(0.48)	
Mex	2.37	5.06	-0.21	-1.11	17.40
	(2.79)	(10.13)	(0.25)	(1.26)	
USA	2.89	4.31	0.41	-0.18	31.43
	(3.71)	(8.58)	(0.51)	(0.21)	

Table 4

Group B: Andean - Bolivia, Colombia, Ecuador, Peru (USA)

MAO

$n = 2.05$ $a = -.241$

	Common	Own	%Var in Common
Bol	5.03	2.09	85.28
	(2.17)	(0.09)	
Col	0.49	1.42	10.64
	(1.19)	(7.19)	
Ecu	1.67	4.13	14.00
	(1.76)	(7.59)	
Per	1.53	4.59	9.96
	(1.64)	(8.20)	

$n = 2.04$ $a = -.199$

	Common	Own	%Var in Common
Bol	4.35	3.37	62.50
	(2.50)	(1.62)	
Col	0.63	1.38	17.42
	(1.60)	(6.48)	
Ecu	1.91	4.02	18.41
	(2.02)	(7.23)	
Per	1.61	4.54	11.19
	(1.72)	(8.16)	
USA	0.48	2.46	3.63
	(0.85)	(8.38)	

MA1

$n = 1.74$ $a = -.781$

	Common	Own	Com-1	Own-1	% Var
Bol	3.43	3.65	-2.15	-1.43	51.64
	(2.17)	(2.39)	(1.41)	(0.85)	
Col	0.67	1.19	-0.03	-1.19	13.83
	(1.94)	(5.21)	(0.10)	(5.21)	
Ecu	1.82	3.44	-0.26	-3.44	6.35
	(2.19)	(6.79)	(0.26)	(6.79)	
Peru	1.24	4.59	-0.89	-3.34	6.72
	(1.22)	(8.23)	(0.76)	(4.51)	

Table 5

Group C: Central America - Costa Rica, El Salvador, Guatemala, Honduras, (USA)

MAO

$n = 1.07$ $a = -.373$

	Common	Own	%Var in Common
Cos R.	1.86	3.01	21.07
	(2.39)	(7.46)	
El S.	0.36	2.86	1.63
	(0.66)	(8.37)	
Gua	1.30	2.21	25.82
	(2.73)	(7.56)	
Hon	2.30	1.61	67.16
	(4.37)	(2.86)	
USA	1.60	2.08	36.22
	(3.38)	(6.81)	

MA1

$n = 0.84$ $a = -.431$

	Common	Own	Com-1	Own-1	% Var
Cos R.	1.72	3.49	0.60	-1.43	19.55
	(2.51)	(8.10)	(0.80)	(1.68)	
El S.	0.26	2.71	0.23	0.57	1.63
	(0.50)	(8.66)	(0.35)	(1.00)	
Gua	1.55	1.38	1.53	-0.43	69.31
	(3.95)	(2.38)	(2.70)	(0.69)	
Hon	2.47	1.28	-0.27	-0.02	79.14
	(4.16)	(1.48)	(0.48)	(0.02)	

Table 6

Group D: Argentina, Bolivia, Brazil, Ecuador, Paraguay, Uruguay, Venezuela

n = 1.67   a = -.357

	Common	Own	%Var In Common
Arg*	-0.38	4.80	0.62
	(0.26)	(8.56)	
Bol	3.17	4.28	35.42
	(2.56)	(4.98)	
Bra*	0.40	3.93	1.02
	(0.36)	(8.47)	
Ecu	2.63	3.70	33.56
	(2.21)	(4.64)	
Par*	0.37	2.92	1.58
	(0.50)	(8.54)	
Uru*	0.01	3.72	0.00
	(0.00)	(8.65)	
Ven	1.66	2.60	28.89
	(2.07)	(5.28)	

Table 7

Group E: Argentina, Brazil, Uruguay, (USA)

MA0

n = 2.11   a = -.281

	Common	Own	%Var In Common
Arg	3.77	2.95	61.90
	(2.86)	(1.92)	
Bra	1.55	3.67	15.16
	(2.15)	(8.72)	
Uru	2.34	3.83	27.18
	(2.50)	(6.56)	
USA	0.16	4.07	0.16
	(0.23)	(10.27)	

Table 8

Group F: Oil - Ecuador, Mexico, Venezuela, (USA)

MA0

n = 1.99   a = -.388

	Common	Own	%Var In Common
Ecu	1.37	4.34	9.07
	(1.89)	(8.65)	
Mex	2.16	5.04	15.60
	(2.44)	(8.67)	
Ven	3.07	0.00	100.00
	(8.44)	(0.00)	
USA	0.48	2.52	3.46
	(1.15)	(8.60)	

MA1

n = 1.89   a = -.778

	Common	Own	Com-1	Own-1	% Var
Ecu	1.68	4.14	-1.26	-2.61	15.55
	(1.87)	(7.92)	(1.46)	(3.05)	
Mex	2.31	3.72	0.65	-3.72	17.22
	(2.21)	(1.38)	(0.52)	(1.38)	
Ven	2.15	1.87	-0.93	-0.18	60.86
	(2.85)	(2.06)	(1.29)	(0.15)	
USA	0.86	2.20	-0.81	-2.20	12.60
	(1.47)	(7.39)	(1.41)	(7.39)	

Table 9

Group C: Argentina, Brazil, Chile, (USA)

MA1

n = 0.55 a = -.523

	Common	Own	Com-1	Own-1	% Var
Arg	3.25	3.84	-1.44	-2.06	39.96
	(5.15)	(8.72)	(2.31)	(3.27)	
Bra	3.42	1.09	2.18	3.46	55.55
	(4.71)	(1.09)	(2.81)	(4.15)	
Chi	3.71	7.57	-2.36	-6.67	15.96
	(3.40)	(11.05)	(2.15)	(6.39)	
USA	3.09	5.03	-0.70	-0.61	28.11
	(3.91)	(9.92)	(0.85)	(0.57)	

Table 10

	Common	Own	%Var.
Argentina	0.276893	5.146969	0.002886
	(-0.294782)	(8.465222)	
Bolivia	0.281722	5.470098	0.002645
	(0.265362)	(8.648756)	
Brazil	0.374351	3.864054	0.009299
	(-0.529021)	(8.616323)	
Chile	1.356042	5.231443	0.062960
	(-1.366775)	(8.520178)	
Columbia	0.319112	1.493211	0.043677
	(-1.156170)	(8.448952)	
Costa Rica	0.759508	4.168464	0.032131
	(-0.973536)	(8.513979	
Ecuador	1.191946	4.559767	0.063783
	(-1.422200)	(8.466575)	
El Salvador	-.025125	2.823132	.000079
	(0.049444)	(8.521258)	
Guatemala	0.236224	2.487256	0.008939
	(-0.525893)	(8.480699)	
Honduras	.914745	2.914686	0.089664
	(-1.493678)	(8.429371)	
Mexico	1.813272	4.939369	0.118762
	(-1.886246)	(8.395332)	
Paraguay			
Peru	0.317630	5.118951	0.003835
	(-0.336824)	(8.572859)	
Uruguay	0.611223	3.790726	0.025340
	(-0.870661)	(8.617363)	
Venezuela	1.371819	2.675464	0.208173
	(-2.437719)	(7.891056)	

Figure 1

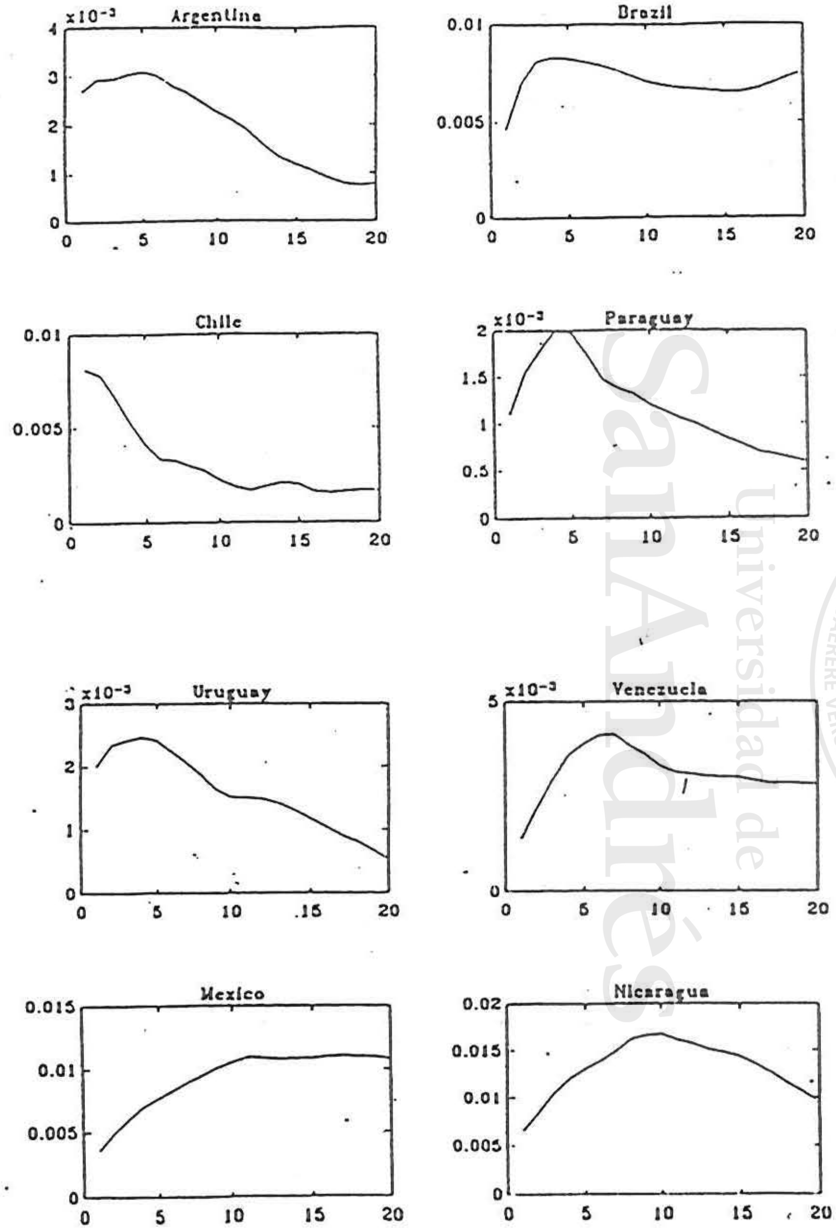


Figure 1 (continued)

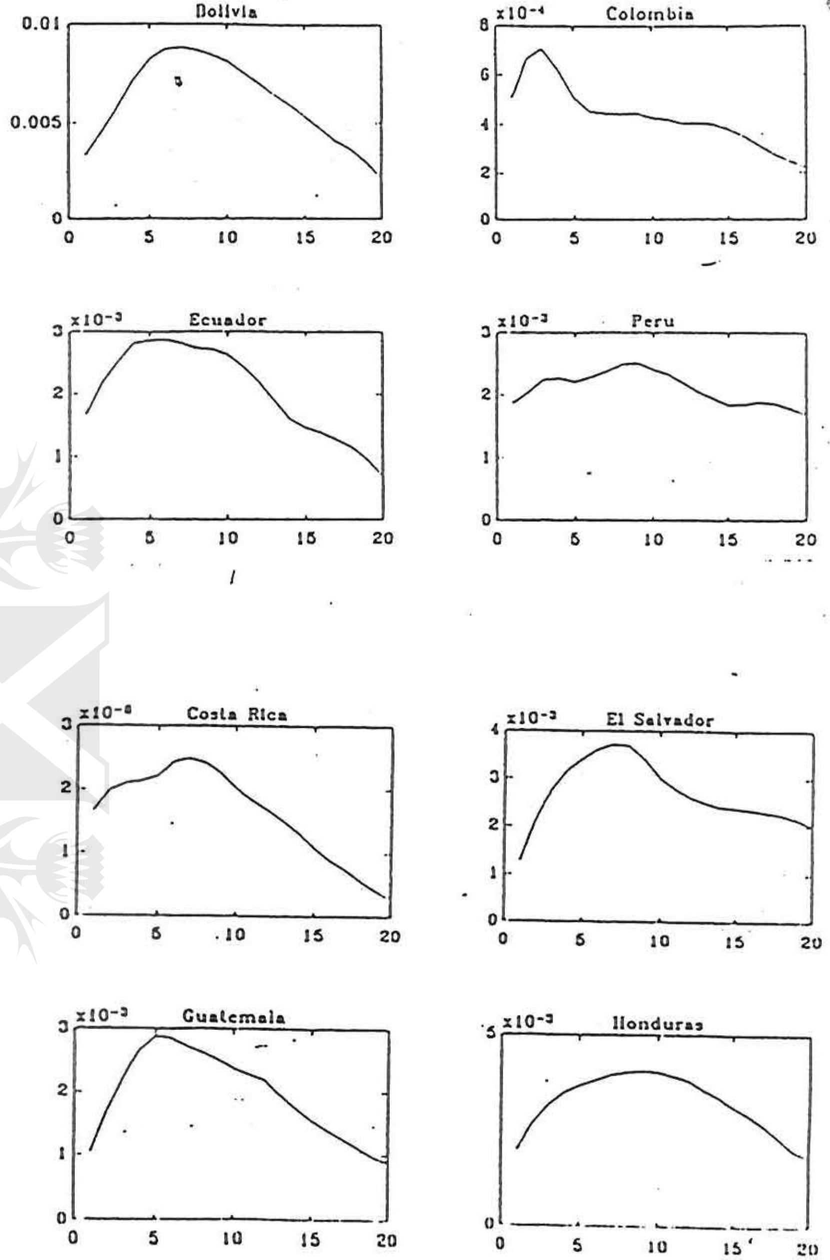


Figure 3a

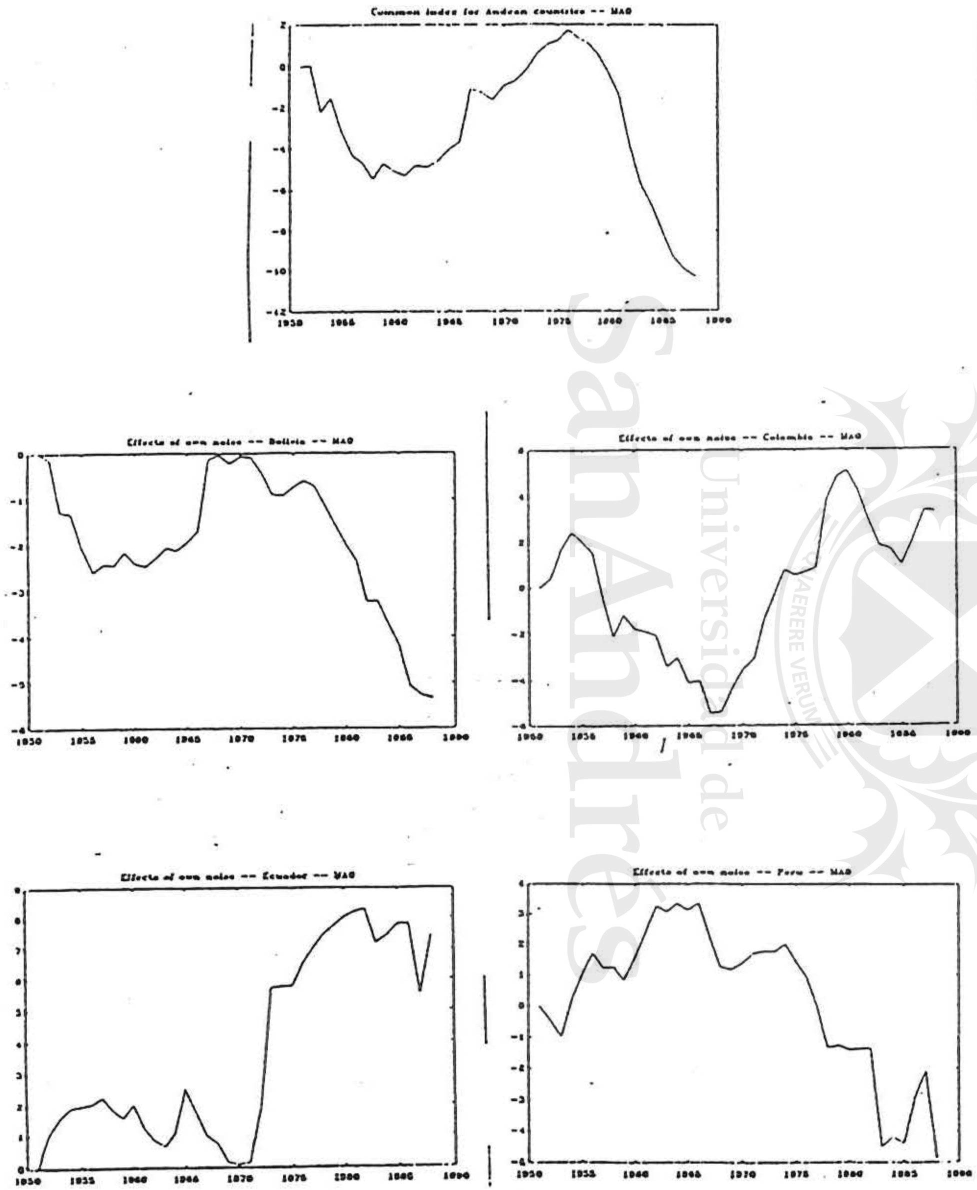


Figure 3b

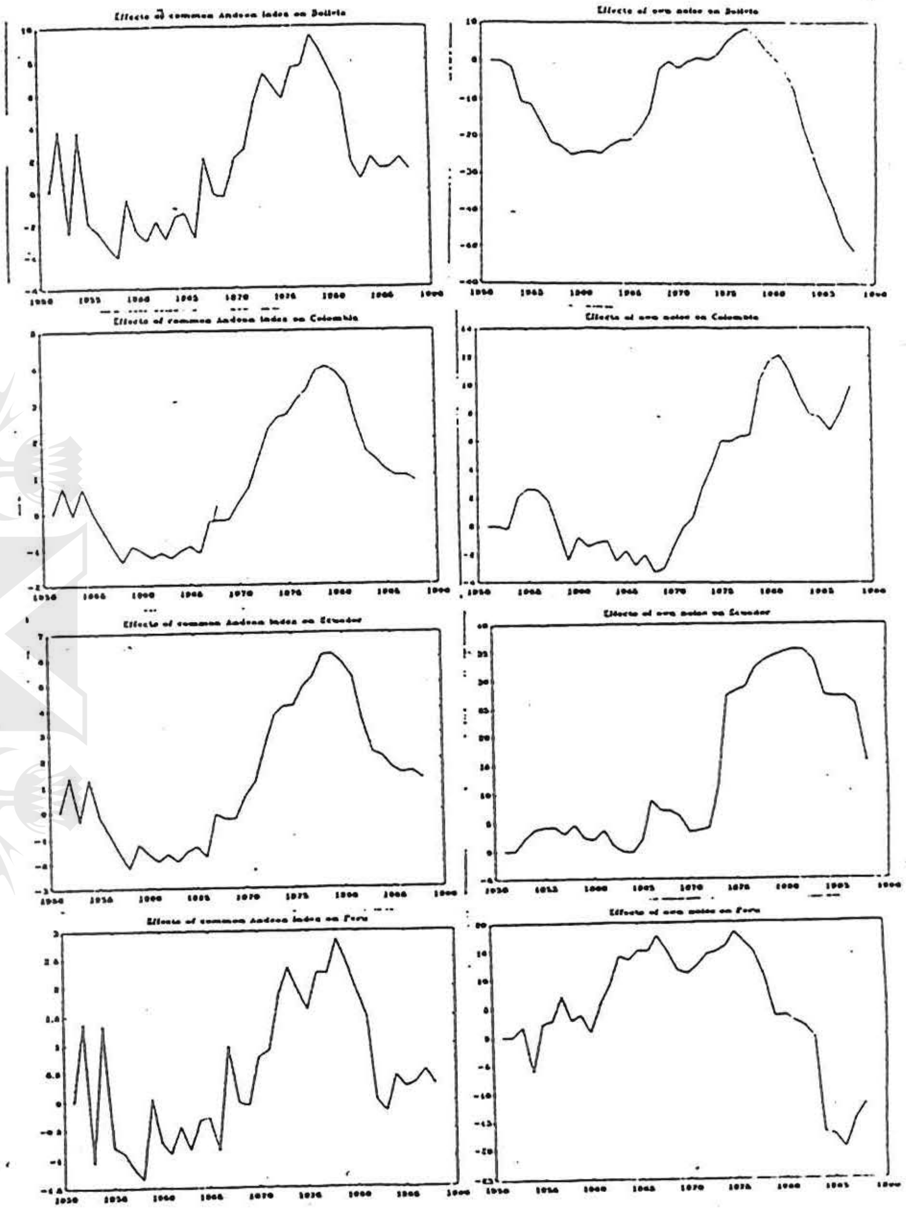


Figure 3a

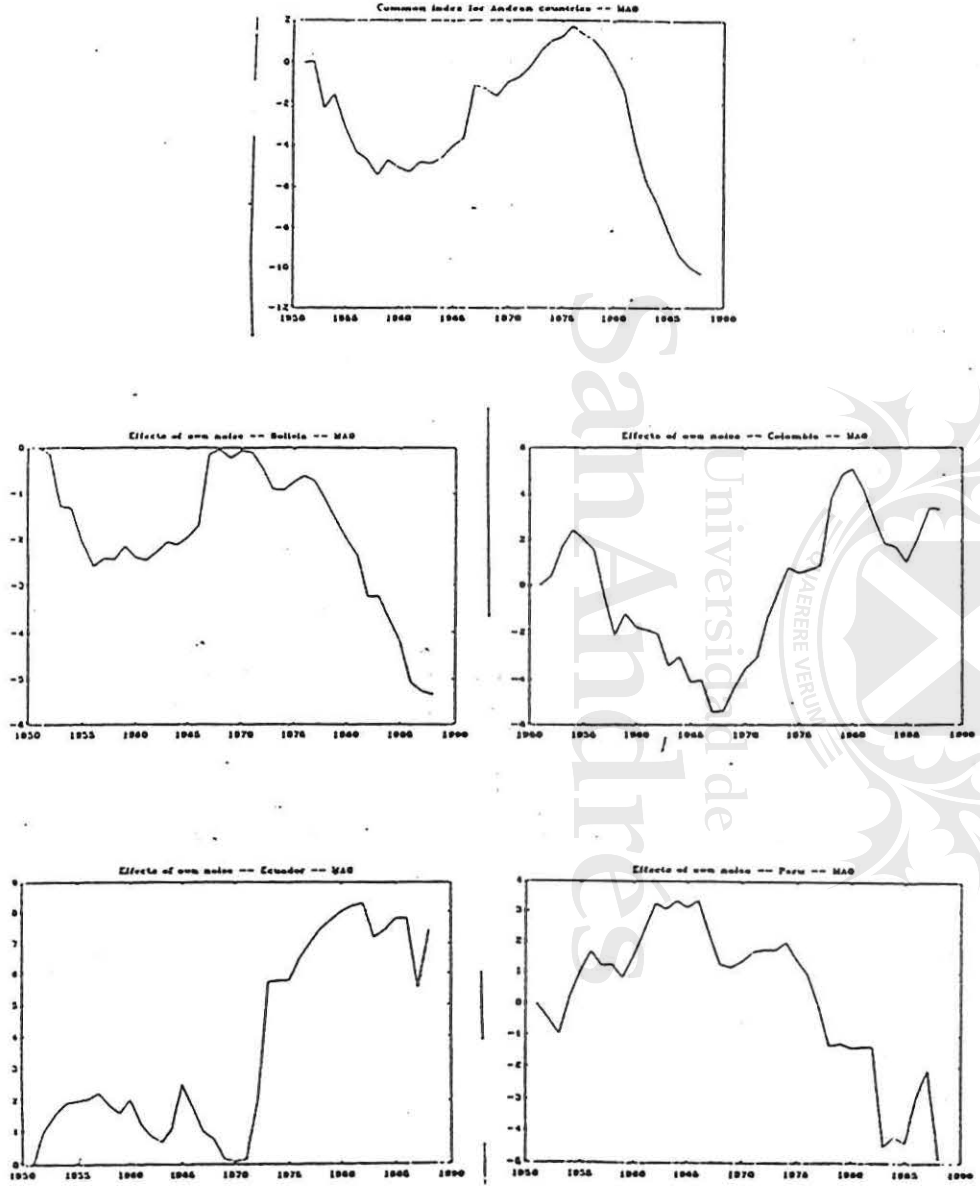
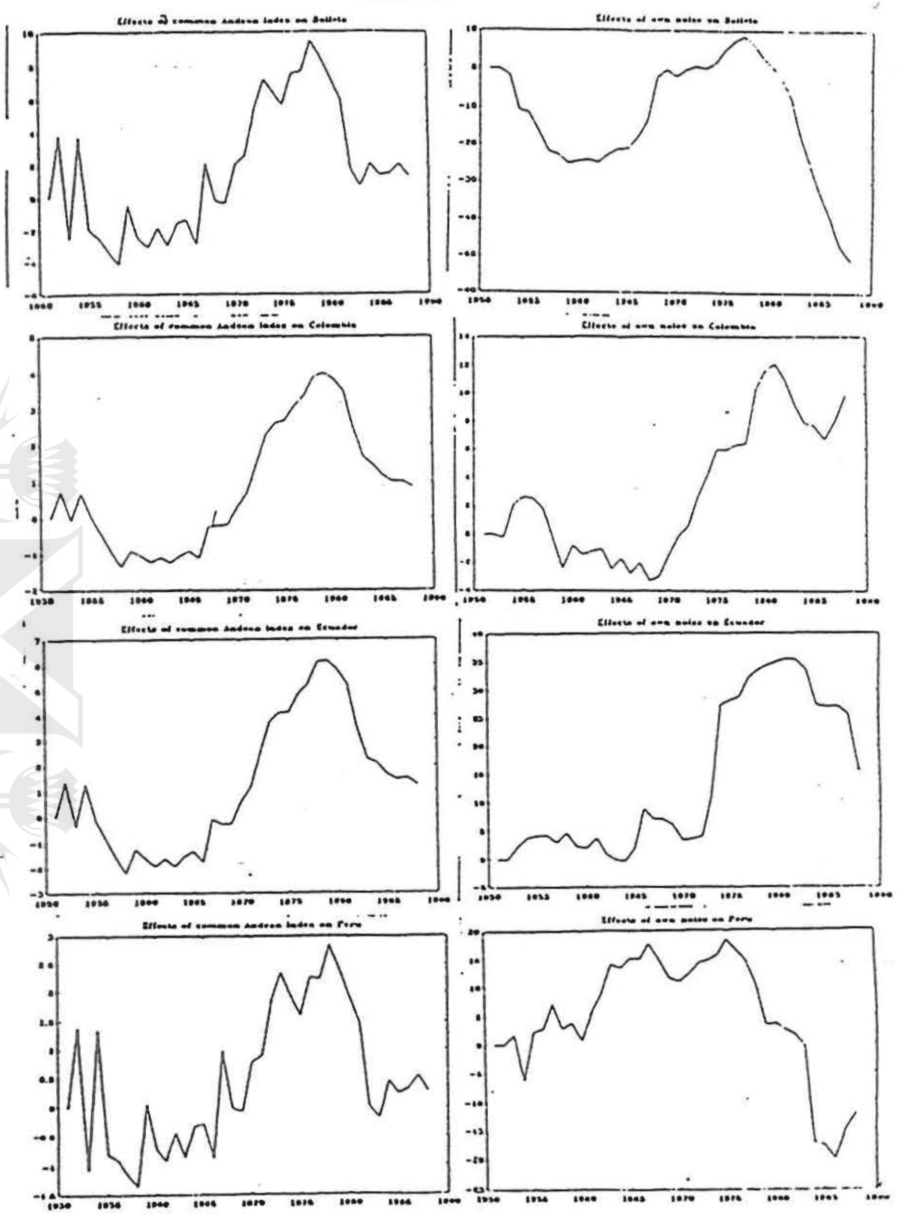
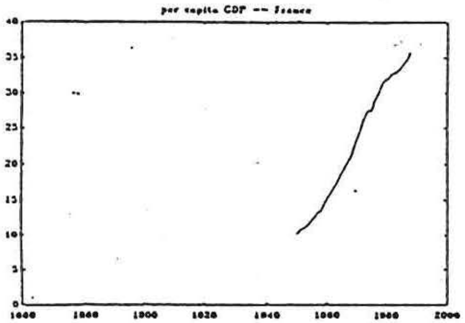
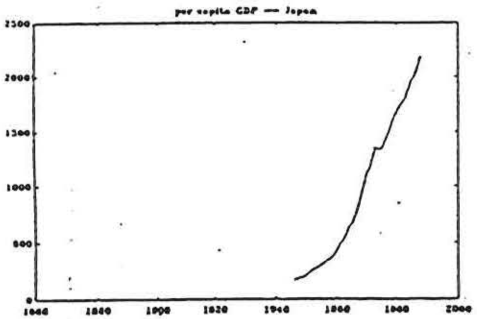


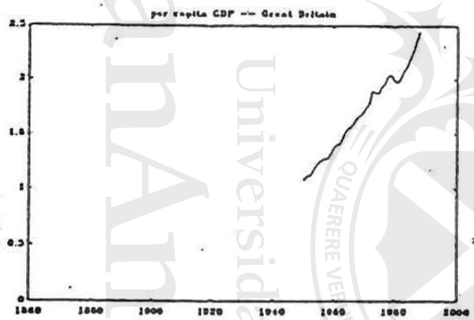
Figure 3b



Appendix 1







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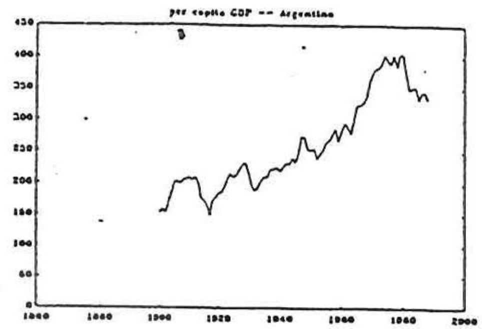
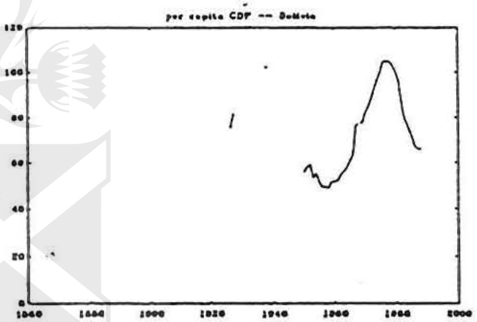
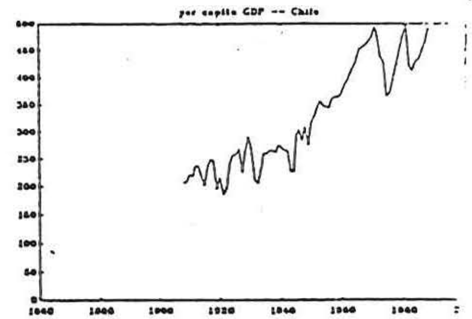
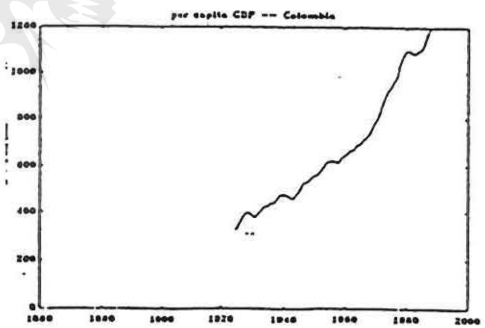
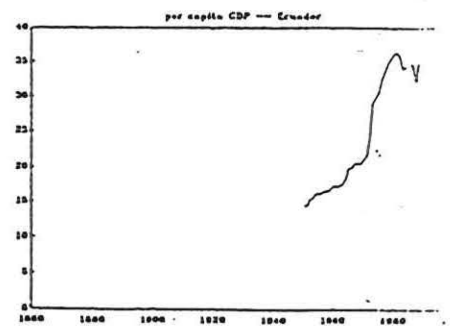


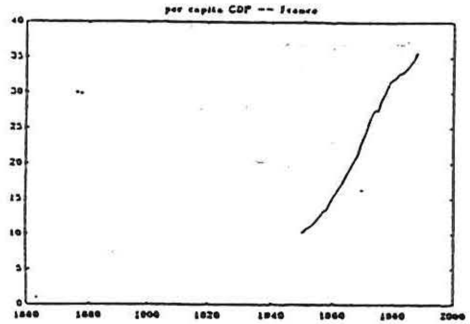


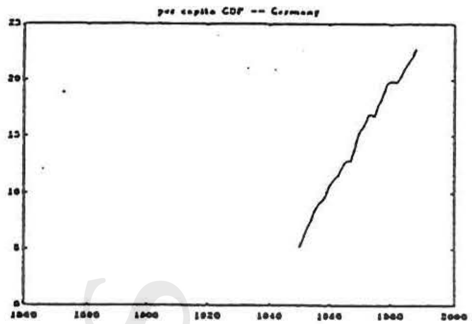


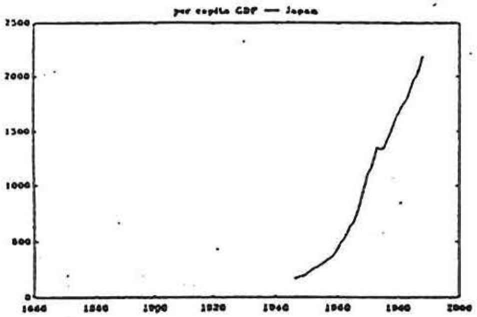


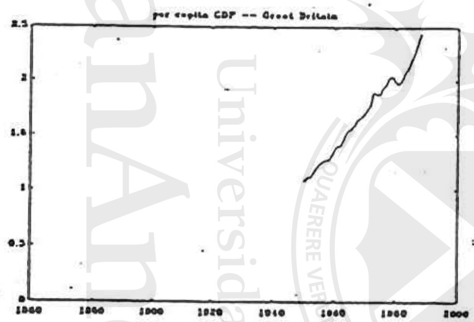


Appendix 1









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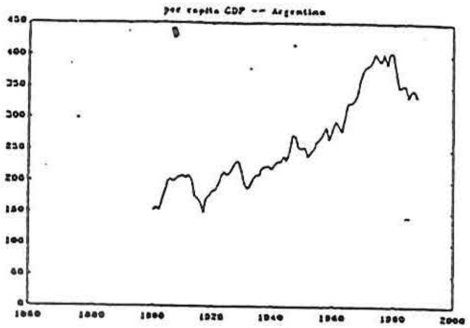

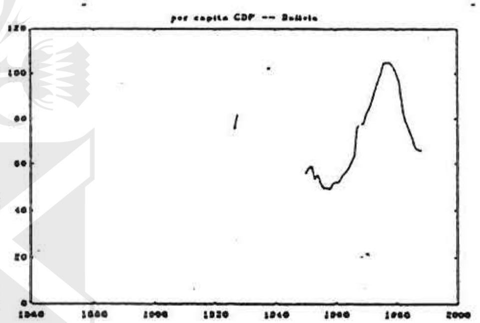

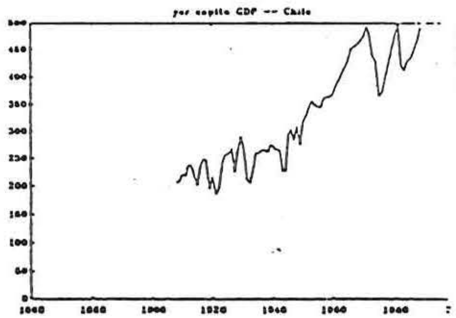

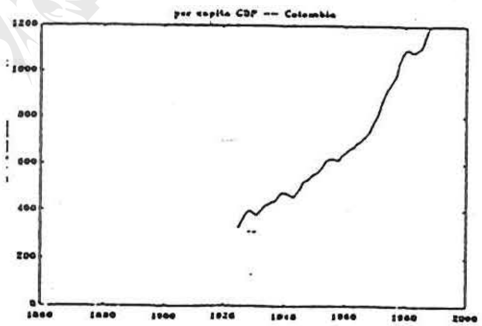

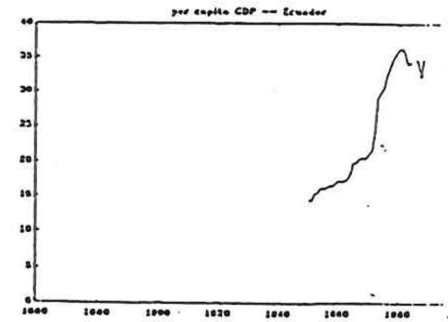

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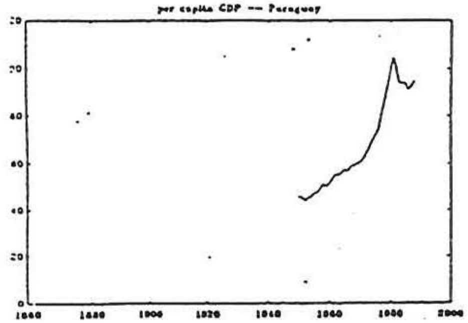

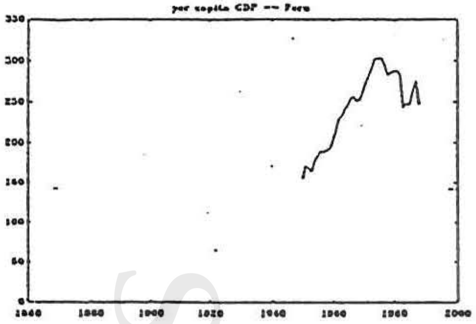

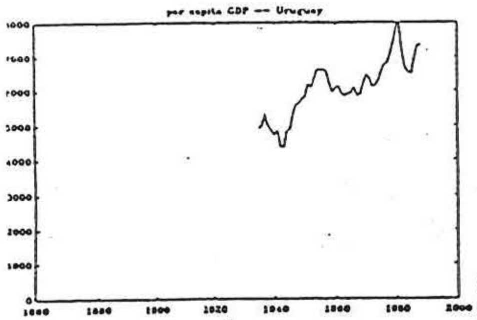

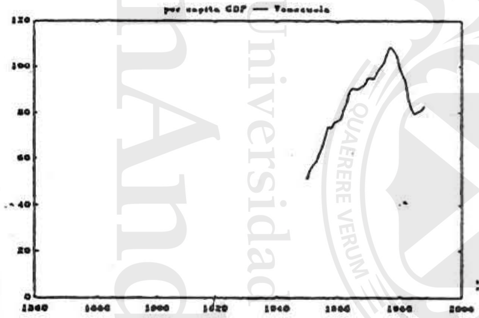

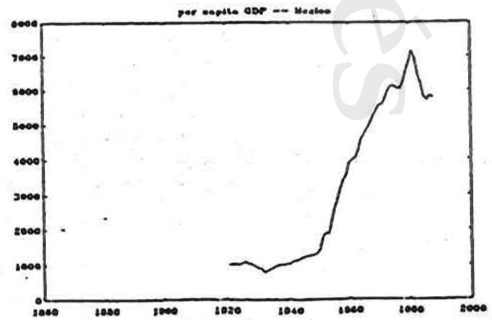

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