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**REAL EXCHANGE RATES, COMPETITIVENESS AND
MACROECONOMIC ADJUSTMENT IN NICARAGUA**

by

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EXECUTIVE SUMMARY

The purpose of this paper is to develop a general framework for evaluating the international competitive position of Nicaragua. The paper is divided into three parts. Part one (Chapters II and III) provides an analytical framework for analyzing whether a country's real exchange rate is overvalued. This framework is developed with the case of Nicaragua in mind, and it is suggested that the BCN adopts it as a comprehensive part of its analytical apparatus. Part two (Chapters IV and V) deals with the construction of competitive indicators for Nicaragua. These chapters present data on a series of competitive indexes, including bilateral real exchange rates, multilateral (or effective) real exchange rates and several real wage rate indicators. Part three (Chapters VI through VIII) deal with the current Nicaraguan situation.

The analysis of the external sector data --including the evolution of real exchange rate series-- clearly shows that the current imbalance is not sustainable in the medium to long run. It is calculated that, from a long run sustainability perspective, the real exchange rate is overvalued by approximately 50%. There is little doubt, thus, that in the next year or so a substantial real exchange rate adjustment will be required to address this situation.

It is argued that, given the magnitude of the overvaluation, it is unfeasible to fully solve this problem through gains in domestic productivity. This means that in the near future a significant nominal devaluation package should be considered. Two key questions in this area are: (1) What should be the timing of the devaluation; and (2) what should be its magnitude. In addressing these issues the government should try to maximize the degree of effectiveness of the devaluation package. The exact timing of the required adjustment will depend on a number of factors, including the future behavior of Nicaragua's terms of trade and, very especially, the future evolution of aid flows into the country.

In order for a devaluation to be effective, in the sense of generating a sizable real exchange rate depreciation, it is necessary to urgently implement a number of structural and institutional reforms affecting, in particular, the labor market. Until these reforms are implemented it would be advisable to postpone the nominal exchange rate adjustment. In fact, given the existing and planned levels of foreign capital inflows it seems, at the present time, that it would be possible to maintain the current parity, at least for some months. This view, however, has been somewhat affected by the recent withholding of part of the US aid package by the US congress.

The postponement of a devaluation will also help consolidate the gains obtained in the anti inflationary battle. The fixed exchange rate has provided an effective anchor to prices and, as such, has been a fundamental component of the stabilization strategy. The high degree of dollar-indexation that still exists in the Nicaraguan economy indicates that there is some danger that a nominal devaluation will be translated into wage and price increases that would greatly reduce the degree of effectiveness of the exchange rate adjustment. One of the most urgent areas for the short run policy agenda is to address those institutional and structural features of the economy --and very especially the labor market rigidities-- that have rendered the nominal exchange rate policy an ineffective corrective policy tool.

Of course, in order for this policy of (temporarily) maintaining the current parity to be viable, it is necessary to implement consistent fiscal and credit policies. In that regard, data on the recent evolution of the financial and credit sector provide a cause for some concern. The level of credit recuperation has been, in the first half of 1992, significantly below what was anticipated, and the operations of credit restructuring undertaken by the Central Bank have affected the process of financial programming. Additionally, the recent behavior of international reserves are signalling the need to closely monitor the supporting macro policies.

There is wide spread agreement among both traditional and nontraditional exporters that a final resolution of property rights problems is still a pre-condition for a rapid expansion in exports. In addition to tackling this institutional issue, the authorities could implement a number of policies that would directly, or indirectly, help improve competitiveness. A fundamentally important area is related to public investment in infrastructure, such as ports and roads. However, the recent tendency towards falling short on credit recuperations from the private sector may put this goal in jeopardy, through "private crowding out". Additionally, greater efforts at deregulating the economy, and in particular services related to the, external sector (such as ports and transportation, would greatly help improve the overall level of competitiveness.

The current segmentation of the labor market in Nicaragua is possibly one of the greatest constraints for increasing competitiveness and exports. It is recommended that the authorities make a serious effort to eliminate (or at least reduce) this fragmentation. However, the Labor Code project prepared by the National Assembly shows a tendency of moving in the wrong direction, by introducing highly rigid labor market regulations. It is strongly recommended that the administration makes a serious effort to work at amending this Labor Code project. An important first step in the modernization of the labor market would be to de-link nominal wages from the current 53 products "canasta".

A reduction in the level of distortions in the labor market will result in an increase in global employment, as well as in

informal sector wages. However, in spite of this, the social conditions of a large number of Nicaraguan families will continue to be extremely difficult. A way to deal with this problem is that government institutions, possibly with donors funds, set up a relief program targeted at the most poor segments of the population, and preferably at children. In designing such program, however, it is important to make sure that it does not distort the incentives structure by discouraging employment.

It is recommended that once the wages are de-linked from the "canasta básica", and no after one year from now, an adjustment program based on a nominal devaluation of the order of 80% is implemented. An important question is what exchange rate regime should be adopted after the nominal devaluation is implemented. Although the answer to this question is not straightforward, given the current economic conditions in Nicaragua my inclination is that this devaluation should be followed by the readoption of a fixed exchange rate. This measure should be supported by consistent credit and fiscal policies, and, of course, should not be accompanied by a massive wage rate adjustment. It is recommended that as a way to partially compensate labor, a bonus of a fixed amount in cordobas is granted to workers. There are several variants of this measure that can be considered, including supplementary bonuses per each children in the household. In this way the poorer segments will be relatively more protected. To the extent that the bonus is not strictly proportional to the devaluation, the goal of (at least partially) delinking wages from exchange rate changes will be achieved. This will go a long way towards helping improve the degree of international competitiveness in Nicaragua.

CONTENTS

I. Introduction

PART ONE: THE ANALYTICS OF REAL EXCHANGE RATES AND INTERNATIONAL COMPETITIVENESS

II. External Sector Adjustment and Alternative Measures of International Competitiveness: An Analytical Perspective

II.1 Real Exchange Rates as Measures of Competitiveness

II.2 Relative Factor Costs

II.3 Real Wages and Competitiveness

II.4 Productivity and Unit Labor Costs as Measures of Competitiveness

II.5 Summary

III. Competitiveness and External Misalignment: Analytical Issues and Policy Angles

III.1 Real Exchange Rate Misalignment

III.2 Equilibrium Real Exchange Rates and Structural Misalignment

III.3 Macroeconomic Policies and Real Exchange Rate Misalignment

III.4 Restoring Real Exchange Rate and Macroeconomic Equilibrium: The Analytics of Devaluations

III.5 Monitoring Real Exchange Rate and Competitiveness Misalignment

PART TWO: CONSTRUCTING INDICATORS OF REAL EXCHANGE RATES AND INTERNATIONAL COMPETITIVENESS IN NICARAGUA

IV. The Recent Evolution of Nicaraguan Competitiveness Indices: 1988-1992

IV.1 Introduction

IV.2 Recent Evolution of Bilateral Real Exchange Rates

IV.3 Recent Evolution of the Multilateral Real Exchange Rate

IV.4 Real Wage Indices as Measures of Competitiveness

IV.4.2 Wages in Real Cordobas: December 1988-January 1992

IV.4.3 Wages in Real Dollars

- IV.5 The Recent Evolution of Nicaraguan Competitiveness in a Central Central American Context
- IV.6 Competitiveness and Other Costs of Doing Business: A Partial and Preliminary Analysis
- IV.7 Summary
- V. A Longer Term Perspective on Nicaraguan Competitiveness
 - V.1 Introduction
 - V.2 Historical Behavior of Nicaragua's Price Levels: A Statistical Mystery
 - V.3 The Long Run Evolution of the Multilateral Real Exchange Rate
 - V.4 Long Run Evolution of Real Wages
 - V.5 Summary

PART THREE: COMPETITIVENESS AND MACROECONOMIC MANAGEMENT IN NICARAGUA

- VI. Real Exchange Rates and Competitiveness in Nicaragua: Current Situation
 - VI.1 The Evolution of Some Basic Indicators of the External Sector
 - VI.2 Fundamentals Behavior
 - VI.3 For How Long Can the Current Parity be Sustained?
 - VI.4 Labor Market Distortions and International Competitiveness
- VII. Policy Options for Regaining Competitiveness in Nicaragua
 - VII.1 Estimating the Magnitude of Real Exchange Rate Overvaluation
 - VII.2 The Requirements for a Successful Adjustment
 - VII.3 The Nominal Devaluation and the Exchange Rate System for Nicaragua in the Medium and Long Runs
- VIII. Concluding Remarks and Summary of Policy Options
 - VIII.1 Policy Assignment in The Short Run
 - VIII.2 The Magnitude of the RER Disequilibrium.
 - VIII.3 Institutions, Productivity Enhancing Policies and Competitiveness
 - VIII.4 Credit and Fiscal Policies

VIII.5 Labor Market Rigidities and International Competitiveness

VIII.6 The Proposed Exchange Rate Adjustment

APPENDIX I: Real Exchange Rate Data Base

I.A: Lotus File MRERDATA: Data Set

I.B: Lotus File BRERDATA: Data Set

APPENDIX II: The Construction of Basic "Baskets" and Poverty Lines

APPENDIX III: The Trade Balance and Competitiveness: A Minimal Framework

I. Introduction

In the last 15 months the government of Nicaragua has achieved important results in the stabilization front. A major hyperinflationary process has been defeated, virtual price stability has been attained, and private consumption has recovered. The most important elements of the Nicaraguan stabilization program have been a strict control of fiscal finances, tight credit policy and a fixed exchange rate that has provided -- at least until now-- an effective anchor for prices.

Presently, the Nicaraguan government is engaged in the initial steps of a grand scale structural reform program, which concerns about every aspect of the Nicaraguan economy, as well as in the consolidation of macro-stability. Besides safeguarding against renewed inflationary expectations, the most urgent policy objectives are reactivating economic growth and diminishing the foreign trade deficit. In fact, the impressive accomplishments in terms of macro-discipline begin to be overshadowed by a mounting preoccupation about the large external imbalance -- the trade deficits borders U.S. \$600 million, the stagnant levels of economic activity and the extremely large levels of unemployment. Table 1 contains some summary macroeconomic statistics for the period 1988-92. These figures vividly capture the fact that although inflation has indeed been defeated, the rest of the macroeconomic indicators depict a serious and precarious situation. In June of 1992 this situation became even more serious, as foreign aid from the U.S. was suspended.

A source of deep preoccupation for observers, including a number of government officials and experts from international agencies, is the uncertainty whether the current structure of exchange rates, prices, interest rates and wages are indeed conducive to a situation where price

A

TABLE 1
Selected Macroeconomic Indicators in Nicaragua: 1988-1992

	<u>Rate of Inflation^a</u>	<u>Rate of Devaluation^b</u>	<u>Rate of Growth of Money (M1)</u>	<u>Deficit (accrual basis as % of GDP)</u>	<u>Real Exchange Rate Index^c</u>	<u>Trade Account^d</u>	<u>Real GDP Growth %</u>
1988	33,657	59,985	-	50.1	52.7	-532	-13.4
1989	1,689	2,396	2,099	33.2	100.0	-319	-5.2
1990	13,490	6,907	7,239	30.5	82.0	-327	0.1
1991	773	906	960	7.0	73.6	-434	-0.7
1992.Q1	-	0.0	-	-	-	-	-

Sources: Banco Central de Nicaragua (BON), IMF and World Bank.

^aCPI in Managua, end of period.

^bEnd of year.

^cMultilateral real exchange rate, period average. An increase in this index denotes real devaluation. In computing this index the CPI was used as the relevant domestic price deflator. The currencies in the SDR were used to define the basket of trade partners.

^dMillions of dollars.

stability and the recovery of growth are compatible. More specifically, there are questions of whether the exports sector will be able, in the short run, to lead the economy out of stagnation. The discussion has been centered, and correctly so, around the merits of the current exchange rate system. While some argue that the real exchange rate is overvalued and that a (nominal) devaluation is required to regain competitiveness and spur growth, others point out that an adjustment of the nominal rate would reintroduce an inflationary spiral and would have no lasting effect on real exchange rates and competitiveness. In short, they fear a self-defeating devaluation which would upset the crucially important macro-stability.

The current debate on exchange rate policy in Nicaragua largely reflects the fact that (nominal) exchange rate policy plays a dual role in macroeconomic adjustment processes. On the one hand the nominal exchange rate can provide an anchor to domestic prices and thus, jointly with other policies, can help generate price stability. Recent theoretical and empirical studies on stabilization experiences around the world have suggested that, when supported with appropriate credit and fiscal policies, exchange rate based stabilization programs are extremely effective in inducing price stability.¹ On the other hand, exchange rate policy and, specifically, nominal devaluations, can be an important component of adjustment packages aimed at eliminating serious balance of payments difficulties.

The purpose of this paper is to provide a unified framework for evaluating the appropriateness of exchange rate policies in Nicaragua. Although the analysis is mostly macroeconomic in nature, it also considers some important microeconomic issues related to the improvement of international competitiveness in the country. In particular, the report

¹See Aghevli et al. (1991).

emphasizes the connection between labor markets, productivity and competitiveness. The analysis explicitly recognizes the policy dilemma between "competitiveness" and stability mentioned above, and will discuss exchange rate policy in conjunction with other macroeconomic measures.

The paper covers the following areas: (i) An analysis of the role of exchange rate policy as a macroeconomic policy instrument. This discussion explicitly deals with the existence of tradeoffs between different goals of exchange rate policy. (ii) It addresses the way in which changes in the economy's structure -- or changes in "fundamentals" -- are likely to impact the evolution of the equilibrium real exchange rate in Nicaragua. In this part we emphasize the importance of distinguishing between permanent and transitory changes in "fundamentals". This analysis focuses in particular on changes in trade policy, changes in international terms of trade, and changes in capital flows. (iii) The report analyzes the merits of opening the capital account to capital inflows and outflows in the short and medium runs. (iv) The report proposes a specific methodology for monitoring real exchange rate -- or, more broadly, competitiveness -- developments in Nicaragua. The User's Manual for the data base includes specific instructions on how to periodically update a set of macroeconomic indicators using standard spreadsheet software. (v) The analysis also deals with the design of an appropriate exchange rate system in Nicaragua in the short and medium runs.

The paper is divided into three distinct parts. Part One -- comprised of Chapters II and III -- deals with some analytical aspects of international competitiveness and real exchange rate behavior. Although these two chapters address general questions, including the definition of alternative competitive indices, an effort is made to focus the discussion on the specific case of Nicaragua. An important objective of this part is to

develop an analytical and empirical framework that can (and should) be adopted by the different agencies of the GON in their monitoring of the economy. The two chapters in this part provide the appropriate framework for the detailed discussion on the Nicaraguan external sector that is presented in the rest of the paper. The second part of the report -- which contains two chapters -- deals with the construction of alternative competitiveness indicators for Nicaragua. The analysis deals both with real exchange rates and real wages. Comparisons are made with other Central American countries, and some serious difficulties encountered in the construction of long-term indices are discussed. Part Three of the paper is devoted to the evaluation of the current competitive situation in Nicaragua. Chapter VI deals with the magnitude of the external disequilibrium in Nicaragua. In this chapter it is argued that the existing distortions and segmentation in the labor market represent a serious obstacle to any effort to correct the current external disequilibrium. Chapter VII discusses alternative policy options -- including a nominal devaluation -- for rectifying the external imbalance. Finally, Chapter VIII contains a brief summary of the analysis and policy recommendations.

PART ONE
THE ANALYTICS OF REAL EXCHANGE RATES
AND INTERNATIONAL COMPETITIVENESS

II. External Sector Adjustment and Alternative Measures of International Competitiveness: An Analytical Perspective

One of the most important aspects of macroeconomic policy evaluation is the measurement of the international competitive position of the country in question. In general, when analyzing "international competitiveness" we are interested in knowing if the country will be able, over the long run, to maintain simultaneously an equilibrium external position -- where current account deficits are financed by sustainable capital inflows -- and internal equilibrium, where unemployment does not deviate from its "natural" rate. That is, much of the focus is on the ability to compete successfully in international markets, in the sense of avoiding external disequilibria and external crises. This means that the measurement of competitiveness entails analyzing the incentives faced by domestic firms to produce exportables and import-competing goods, as well as investigating demand pressures on these types of goods. In this Chapter, I present a discussion on the analytics of measuring international competitiveness. This will serve as the basis for the empirical analysis of the Nicaraguan case presented in Chapters III and V.

Although there are many possible ways of actually measuring competitiveness, the following four indicators are the most useful ones:

- (1) Real exchange rate indices;
- (2) Relative factor costs;
- (3) Real wages;
- (4) Unit labor costs.

Throughout the chapter, I present the merits and limitations of each indicator, I discuss the ways in which they are related to each other, and I point out some of the practical difficulties faced in the actual computation of

11

these indices. In the next chapter I present the evolution of some of these indicators in Nicaragua (appendix A contains a detailed description of the procedure used to construct some of these indices).

II.1 Real Exchange Rates as Measures of Competitiveness

The real exchange rate is traditionally defined as the relative price of tradables to nontradables, and this is, perhaps, the most popular analytical definition of international competitiveness.² Models that distinguish between tradables and nontradables -- the so-called "dependent economy" models -- have, in fact, become the central paradigm of modern open economy macroeconomic discussions. According to this definition, the RER measures the incentives faced by national firms to produce tradable goods, or goods that compete internationally:³

$$\text{RER} = \frac{\text{Price of Tradables}}{\text{Price of Nontradables}} \quad (1)$$

An increase in the real exchange rate means that the opportunity cost of producing tradables, measured in terms of foregone output of nontradables, has declined, making the production of tradable goods more attractive. As a result of this, resources will tend to move towards the tradables sector, whose output will increase.⁴ Conversely, a decline in the RER will reflect a reduction in the attractiveness of tradables

²"Tradable goods" represent a composite of importables and exportables. A large number of authors have used this definition including Frenkel and Mussa (1981), and Frenkel and Razin (1987).

³An amusing, and confusing, element of RER analysis is that some authors (including the IMF staff) define the RER as the relative price of nontradables. Under this definition, then, an increase in the RER index means that there has been a loss in competitiveness.

⁴The extent to which resources will indeed be reallocated will depend, to a large extent, on whether observed changes in the RER are perceived to be permanent or temporary.

production. It is in this sense, then, that real exchange rate changes capture changes in the country's degree of international competitiveness: if other things remain constant (including other countries policies) a more appreciated RER will reflect a lower degree of competitiveness, and will be translated into a decline of investment in tradables. The lower RER will also generate an increase in domestic demand for these type of goods. The combination of these two forces -- lower output and higher consumption of tradables -- will, of course, result in a worsening in the international position of the country (i.e., a trade account deficit).

However, in spite of the simplicity and analytical cleanness of this measure of international competitiveness, it has a number of limitations for real and practical policy analysis. First, it is difficult to define empirically "tradable" and "nontradable" sectors, and thus it is not easy to measure tradable and nontradable price indices. As a way to get around this problem, many analysts have used the country's CPI as a proxy of nontradable prices, and a weighted average of the trade partners wholesale prices (WPIs) (expressed in domestic currency) as a proxy for tradable prices. The multilateral RER can then be computed as follows:⁵

$$MRER = \frac{MNER \text{ WPI}^*}{CPI}, \quad (2)$$

where MNER is a weighted average of the nominal exchange rates of the most important trade partners, WPI* is a weighted average of these partner countries WPIs, and CPI is Nicaragua's consumer price indices. The multilateral nominal real exchange rate is defined as follows:

$$MNER = \sum \alpha_i E_{N_i} \quad (2')$$

where the E_{N_i} 's are indices of the bilateral nominal exchange rate between

⁵Multilateral here means that the RER is computed relative to a basket of currencies. This is also called the effective real exchange rate.

the cordoba Nicaragua's i^{th} trade partner, and the α_i 's are weights that capture the importance of country i in Nicaragua's trade. The WPI^* is defined as:

$$WPI^* = \sum \alpha_i WPI_i,$$

where WPI_i denote the wholesale price indices for the individual trade partner countries. When the weight of one of the partners -- say, the United States -- is set equal to one, the equation on the multilateral real exchange rate becomes a bilateral real exchange rate index.⁶

Some authors have criticized the use of WPIs and CPIs as proxies for tradables and nontradables and have, instead, decomposed existing price indices into subindices in an effort to obtain tradable and nontradable price indices. These two methods, however, have some problems. On the one hand, both CPIs and WPIs include collections of tradables and nontradable goods, while, on the other, the decomposition of these indices into tradables and nontradable components always implies a considerable element of arbitrariness.

A second limitation of the RER as a measure of competitiveness is that the categories of "tradable" and "nontradable" goods are very broad, and do not allow us to deal with a more detailed analysis. In particular, many times the analyst is interested in examining the consequences of changes in the relative price between importables and exportables, such as those generated by changes in the external terms of trade, on the country's external position. This type of analysis, however, would require a finer decomposition of goods, such as the one suggested in subsection II.2.

⁶See Chapter 4 of Edwards (1989) for detailed discussions on the measurement of real exchange rate indices.

On the positive side, the RER is rooted in a simple and powerful theoretical framework, and summarizes in a single indicator important information regarding the evolution of the external sector. A large number of empirical studies have found that the more common measures of RER indices track relatively well important macroeconomic developments, including the evolution of the trade account, balance of payments crises and external sector adjustment.⁷ However, as explained in detail in Chapter IV, in order for the RER to be a useful indicator of the evolution of international competitiveness it is necessary to: (1) define a benchmark period with respect to which the observed RER is compared; (2) to distinguish between "equilibrium" and "disequilibrium" changes in this relative price; and (3) to use other indicators to supplement the overall analysis.⁸ As is pointed out below, this is particularly troublesome in the case of Nicaragua where fundamental structural and political changes and a hyperinflation have introduced serious difficulties in the use of historical benchmarks (see Appendix I and Chapter III for details).

Using broad categories such as tradable and nontradable goods allows the analyst to get a general picture of how different forces -- and in particular, macroeconomic shocks -- affect a country's external position. However, as mentioned above, in many cases we are interested in more detailed questions, such as how given disturbances affect the incentives to produce import-competing or exportable goods. Other times we are interested in addressing the issue of how the nontraditional exports sector is impacted by specific shocks. Naturally, an analytical framework that focuses on the difference between tradables and nontradables is not suited for dealing with

⁷See, for example, Goldstein and Khan (1985).

⁸See the discussion in the rest of this report for greater details.

these type of questions.

For this reason, many newer theoretical models of the open economy use a finer classification of goods, including exportables, importables and nontradables. From an analytical perspective, in this case the traditional concept of "the" RER loses some meaning; in fact, it is now possible to think that there are two "real exchange rates". The first one is the relative price of importables to nontradables (or importables real exchange rate) and the other is the relative price of exportables to nontradables, or exportables real exchange rate.

Naturally the three indices of competitiveness discussed until now -- the real exchange rate and the relative prices of importables and exportables with respect to nontradables -- are related in simple ways. Since the price of tradables is a weighted average of the price of importables and exportables, with weights β and $(1-\beta)$ we have that:⁹

$$RER = \beta RERM + (1-\beta)RERX, \quad (3)$$

where $RERM = (P_M/P_N)$ is the relative price of importables with respect to nontradables and $RERX = (P_X/P_N)$ is the relative price of exportables to nontradables.

It is interesting to note that in a stylized world with three sectors -- exportables, importables and nontradables -- some common shocks, such as an imports tariff reduction, will generate movements in RERM and RERX in opposite directions: while RERM will decline, RERX will experience an increase.¹⁰ This clearly suggests, then, that under some circumstances using a single RER indicator can be quite misleading.

⁹See Dornbusch (1974) and Edwards and van Wijnbergen (1986).

¹⁰Edwards and van Wijnbergen (1987).

To the extent that the analyst is interested in understanding how macroeconomic and other policies affect overall incentives in the economy, it is recommendable to construct, whenever possible, a set of alternative relative price indices. Within this context the construction of "real exchange rate" indices both for importables and exportables will in some cases provide important information not available through the analysis of traditional RER measures. However, in many countries, including Nicaragua, the lack of appropriate data precludes the analyst from constructing as many historical indices of RERs as it would be desirable. It is perhaps surprising that although the use of a set of relative price indicators has been suggested for quite some time, very few applied analysts do it.¹¹ From a practical point of view, the actual measuring of RERM and RERX encounters similar difficulties as those faced with the traditional concept of RER.

II.2 Relative Factor Costs

Although the real exchange rate is the most popular measure of competitiveness, it is not necessarily the most appealing one. Perhaps, the most "natural" way to think about international competitiveness is in terms of the country's ability to produce an international good at a "low cost". Although this is fundamentally a microeconomic concept that is more relevant to a particular good than to the economy as a whole (or a large sector), it is still permissible to think of it at a more aggregate level. It is possible, for instance, to refer to aggregate (or average) factor costs for importables or exportables as a group.

For this cost based concept of competitiveness to be operational, it is necessary to compare domestic production costs to some benchmark. There are

¹¹There are, of course, a number of exceptions. See, for example, Corbo (1985).

two possible (and closely related) points of reference: the first is the good's international price and the second is the cost of production in competing economies, such as other Central American countries for the case of Nicaragua.

The comparison of domestic costs to international prices focuses on the degree of profitability of producing particular goods at home.¹² If the difference between international prices and domestic costs widens, one would expect that profits involved in producing this good (or goods) domestically will increase, and that resources would move towards this type of activity. More specifically, we would expect that higher international profitability would result in a shift in investment towards these internationally oriented sectors. As competitiveness and investment increase in these outward-looking sectors, they will tend to become the leading sectors pulling growth along with them.

Independently of the benchmark used for comparison -- the international price, or foreign competitors costs -- this type of analysis requires the computation of unit factor costs (UFC). In terms of domestic currency, the domestic factor cost of good i will be given by:

$$UFC_i = \sum a_{ij} c_j \quad (4)$$

where c_j is the domestic cost of factor j and a_{ij} is the optimal input-output coefficient of factor j , which is equal to the inverse of its average productivity.

Two examples of measures of competitiveness based on factor costs can be expressed as follows:

$$CI = (EP_i - \sum a_{ij} c_j) \quad (5)$$

¹²See Maciejewski (1983).

no'

$$C2 = \frac{\sum a_{ij} c_j}{\sum \sum a_{ij}^* c_j^*} \quad (6)$$

where, as before, E is the nominal exchange rate and an asterisk refers to a foreign variable. In equations (5) and (6), $C1$ measures domestic production costs relative to international prices, while $C2$ compares production costs in both countries when expressed in a common currency.

Both of these measures have some important implicit assumptions. Perhaps the most important one is that the $C1$ concept of competitiveness assumes that there is some kind of imperfect competition that allows the unit cost of a particular good to differ from its price. This concept of competitiveness, then, is measuring the (potential) markup measured in terms of foreign prices. Notice that if we assume that there is perfect competition, $EP_1^* = \sum a_{ij} c_j$ and thus $C1 = 0$. Moreover, in this case $C2 = P_1/EP_1^*$, which is nothing more than a version of the real exchange rate index of competitiveness.

The actual computation of this type of indices entail a number of practical difficulties. In particular, in most countries it is not easy to obtain reliable data on the a_{ij} 's, and on the cost of many of the factors of production. As a result, some analysts have postulated that a more practical and useful measure of competitiveness can be obtained by focusing on only some (or maybe only one) elements of the cost of production. Traditionally, the most closely studied element of costs has been the real wage rate. However, in many cases other components of costs, such as the cost of services including transport and energy, are important determinants of a country's degree of competitiveness.

II.3 Real Wages and Competitiveness

A number of studies -- especially those for industrialized nations -- have focused on labor costs when analyzing the evolution of international competitiveness. The reason for this is not only that labor is one of the most important cost components, but also that it is a fundamentally nontradable factor of production.¹³ Consequently, it is expected that labor can easily explain a significant proportion of cost differentials across countries. In fact, most policy and popular discussions on trade policy -- including recent debates on the proposed Mexico-U.S. Free Trade agreement -- have focused on labor cost differentials as broad measures of competitiveness.

More specifically, there are many possible measures of labor costs. Naturally, the most intuitive one is the real product wage in import competing and export sectors: with other things given, higher real wages in these sectors will result in an increase in domestic production costs, and in a decline in "competitiveness".

At a fundamental analytical level there is a direct relationship between real wages and real exchange rates. This can be illustrated with the following simple model:

$$\hat{P}_t = \alpha \hat{P}_{Tt} + (1-\alpha) \hat{P}_{Nt}, \quad (7)$$

$$\hat{P}_{Tt} = \hat{E}_t + \hat{P}_{Tt}^*, \quad (8)$$

$$D^N(P_N/P_T) = S^N(W/P_N, r), \quad (9)$$

$$\hat{w} = \hat{W} - \hat{P}, \quad (10)$$

$$\hat{e} = \hat{P}_T - \hat{P}_N. \quad (11)$$

¹³Of course, migration adds some international mobility to labor.

22

Equation (7) expresses percentage movements in the price level (\hat{P}_t) as a weighted average of changes in the price of tradables in home currency (\hat{P}_{Tt}) and the price of nontradables (\hat{P}_{Nt}). Equation (8) is the law of one price for tradables, where \hat{P}_t^* is the rate of change in the world price of tradables and \hat{E} is nominal devaluation. Equation (9) is the equilibrium condition for the nontradable goods market, where the demand for nontradables, D^N depends negatively on the relative price of nontradables, and the supply is a negative function of the product wage rate (W/P_N) and of a parameter r that captures the extent of technological progress and/or productivity gains.¹⁴ If there are no productivity gains, then $\dot{r} = 0$. Equation (10) defines changes in real wages \hat{w} , whereas equation (11) gives us the evolution through time of the relative price of tradables to nontradables or the real exchange rate. As before, a real depreciation means that $\hat{e} = (\hat{P}_T - \hat{P}_N) > 0$.

Using equations (9) and (10) and assuming no productivity gains, the following expression is obtained:

$$\hat{e}_t = -\left(\frac{\epsilon}{\eta + \epsilon}\right) (W - \hat{P}_T), \quad (12)$$

where ϵ is the elasticity of supply of N with respect to the product wage ($\epsilon < 0$) and η is the elasticity of demand of N with respect to the relative price of N ($\eta < 0$). This equation states that if the real exchange rate appreciates ($\hat{e}_t < 0$), the nominal wage rate is increasing faster than the domestic price of tradables. The opposite will be true if there is a real depreciation: With no productivity improvements, real

¹⁴Notice that other cost elements are absent from this formulation of the supply curve for N . This is related to the assumption that other factors -- and especially capital -- are highly tradable and that their (real) rewards are anchored by the rest of the world.

depreciations necessarily will be related to declines in the real product wage rate for tradables.

If, however, there are gains in productivity, it is possible to have a simultaneous real depreciation and real wage rate increases. Formally, if $\dot{r} > 0$, we have that

$$\dot{\epsilon} = \left[\frac{\epsilon}{\eta + \epsilon} \right] (\dot{P}_T - \dot{W}) - \left[\frac{\sigma}{\eta + \epsilon} \right] \dot{r}, \quad (13)$$

where $\sigma > 0$ is the supply elasticity of nontradables relative to productivity gains.¹⁵ This situation where the real exchange rate depreciates at the same time as real wages increase has been observed in a number of Asian nations. Korea provides possibly the best known case of this type of phenomenon.

Measuring Labor Costs in Practice

There are several ways to measure labor costs in practice. A first decision that has to be made is whether to measure the real wage in domestic or foreign currency:

$$w = \frac{W}{P}; \quad w^f = \frac{W}{EP^*}, \quad (14)$$

where w refers to the domestic currency real wage and w^f to the foreign currency real wage (e.g., the wage rate expressed in real dollars).¹⁶ When

¹⁵An interesting question is how are real exchange rates and the real consumption wages related? Defining the consumption price level as in

equation (7) we have: $\dot{\epsilon} = - \left[\frac{\epsilon}{\eta + \epsilon \alpha} \right] (\dot{W} - \dot{P}) - \left[\frac{\sigma}{\eta + \epsilon \alpha} \right] \dot{r}$

¹⁶Notice that the ratio of these two indices is exactly equal to the Purchasing Power Parity (PPP) definition of the real exchange rate:

$$\frac{w^f}{w} = \frac{EP^*}{P}$$

Consequently, if there are deviations from PPP, as there invariably are when

dealing with international competitiveness, the w^f definition of real wages is particularly appealing: it measures the labor cost of producing in the domestic country a good that will be sold in the foreign country. An interesting feature of w^f , then, is that it clearly shows that if nominal devaluations are accompanied by equiproportional increases in the nominal wage in domestic currency, there will be no improvement in "competitiveness."

An alternative, and particularly informative way of looking at labor costs from an international competitiveness perspective is to compute relative real wage indices. Here the benchmark for comparison are not goods prices, as in equation (14), but wages in foreign countries. Assume that the home country is Nicaragua and that we want to compare its real (dollar denominated) wage rate to Costa Rica's (dollar denominated) real wages. Denoting Nicaragua's and Costa Rica's (average) nominal wages by w^N and w^C , and referring to the nominal exchange rates between Nicaragua and the U.S., and Costa Rica and the U.S., by $E_{N,U}$ and $E_{C,U}$ respectively, we have:

$$\frac{w_C^f}{w_N^f} = \frac{(w^C/P^{US}E_{C,U})}{(w^N/P^{US}E_{N,U})} \quad (15)$$

Recognizing that by triangular arbitrage the Nicaragua-Costa Rican nominal exchange rate (E_{NC}) is equal to E_{NU} divided by E_{CU} , (that is, $E_{NC} = E_{NU}/E_{CU}$) we can rewrite equation (15) as:

$$\frac{w_C^f}{w_N^f} = \frac{E_{NC}w^C}{w^N} \quad (16)$$

there are changes in the relative price of tradables to nontradables, these two real wage indices will behave differently.

25

What is particularly interesting about this expression is that it is exactly equal to the traditional (bilateral) real exchange rate definition, using national wage rates rather than price indices as the relevant deflators.¹⁷ Although a number of authors have argued that this type of indicator is useful, very few policy evaluations on the developing countries have computed these indices. The reason is that in many developing countries the data on wage rates are of very poor quality and have a very limited coverage. However, in spite of these estimations, in Chapter IV below we present a detailed discussion of the recent evolution of real wage measures in Nicaragua. We do this as a way to provide an alternative perspective to RER in the analysis of competitiveness in the country.

II.4 Productivity and Unit Labor Costs as Measures of Competitiveness

One of the problems with real wages as a measure of international competitiveness is that straight wages tend to ignore differentials in productivity across countries. To the extent that labor productivity improvements differ across countries, a more general measurement of competitiveness would take this explicitly into account. This can be done through the computation of unit labor costs.

$$ULC = \left(\frac{W}{P} \right) \rho, \quad (17)$$

where ρ is the inverse of (the average) productivity of labor. This index measures the real labor cost of producing one unit of a particular good. If the data used refer to a broader aggregate, such as the manufacturing sector as a whole, this index will provide a summary measure of the real labor

¹⁷In fact, this type of real exchange rate concept has been proposed by a number of authors as a useful concept. See the discussion in Edwards (1988).

costs of producing one unit of manufacturing value added. The equivalent index in foreign currency is:

$$ULC^c = \left(\frac{W^*}{EP^*} \right) \rho^* \quad (18)$$

The ratio of these two unit labor cost indices provides a relative measure of competitiveness. In the case of our previous example involving Nicaragua and Costa Rica, we have:

$$\frac{UCL^N}{UCL^c} = \frac{E_{nc} W^N \rho^N}{W^c \rho^c} \quad (19)$$

where ρ^N and ρ^c are the (inverse) of labor productivity in Nicaragua and Costa Rica. Of course, the most interesting feature of this index is that it clearly captures the fact that the evolution of competitiveness does not depend only on wages and (nominal) exchange rates, but also on productivity.¹⁸

Although equation (19) provides an intuitive and powerful competitiveness index, it has some limitations and measurement problems.¹⁹ A first shortcoming is that these ULC measures don't specify the sources of productivity gains. For example, it is possible for labor productivity to increase because more or better (and more costly) capital is used in the production process. In this case, the total cost of production has increased due to the improvement in the quality of machinery; however, this higher cost is not reflected at all in our ULC calculation. A second limitation of this type of index is that for the vast majority of developing

¹⁸The relationship between productivity gains and "competitiveness" is also captured by traditional real exchange rate indices. See, for example, Balassa (1964).

¹⁹From a practical perspective, one of the limitations of using wage rate or unit labor cost indices refers to periodicity. In the majority of the developing nations wage rate indices are not available on a monthly basis.

countries, including Nicaragua, data on productivity are either nonexistent or of a rather poor quality. And third, using a particular index of productivity in those countries with segmented labor markets can be misleading, for it will usually capture the formally organized sector alone.

II.5 Summary

The purpose of this chapter has been to discuss analytically a series of alternative indices of a country's international competitiveness. Although all of them have some attractive features, they also have some limitations. It is not possible to know a priori which one (or ones) should be preferred. However, for analysts facing real life policy situations, there is no real need to select a particular one and to neglect the others. In fact, for many of the reasons presented above, it is highly recommendable to construct (and examine) more than one indicator. At a practical level it is advisable that analysts (try to) construct a least a RER index of the type presented in Section II.1 and unit labor cost indices based on equation (17). In microeconomically-oriented studies on cost structures at sectoral levels it is also advisable to obtain cross country comparative data on taxes, energy costs, and other service costs.

In countries such as Nicaragua the availability of basic data dictates which indicators can actually be computed and analyzed. In Chapter III, I present the recent evolution of some of these indicators for Nicaragua. However, in spite of the lack of current data the Nicaraguan authorities should make an effort in the future that would allow the collection and analysis of this group of indices.

III. Competitiveness and External Misalignment: Analytical Issues and Policy Angles

In order to have a useful analysis of the external sector indicators of the type presented above, it is necessary to have a well-defined analytical theoretical framework that tells us how these variables are affected by different disturbances. More specifically, this framework should tell us when movements in the key indicators reflect an equilibrium, and thus justifiable phenomenon, and when they refer to a misalignment or disequilibrium situation. The purpose of this section is to present a summary of an analytical framework for analyzing a country's competitive and external sector position.²⁰ The analytical framework developed in this and the previous chapter are used in our discussion of the Nicaraguan economy presented in Chapters V and VI.

III.1 Real Exchange Rate Misalignment

Real exchange rate misalignment is defined as a situation that occurs when the observed (or actual) RER experiences sustained departures from its long term sustainable equilibrium level. If the actual real exchange rate falls below (that is, it becomes more appreciated) than the equilibrium RER (ERER), we then face a situation of real exchange rate overvaluation or a loss in the degree of international competitiveness. If the actual RER exceeds its long run equilibrium value the country faces a situation of undervaluation.

An important, indeed crucial, implication of this definition of RER misalignment is that there are (at least) two possible ways for the RER to become overvalued with respect to the long run sustainable level. First,

²⁰The basic elements of this framework are developed in a more technical way in Edwards (1988, 1989). The discussion in this paper is more policy-oriented, and is geared at providing the analytical base for the Nicaraguan discussion that follows.

overly expansive and inconsistent macroeconomic (fiscal and credit) policies will generate a rapid domestic inflation, tending to push the actual RER below the ERER. This, macroeconomically induced misalignment has been the most common cause of RER overvaluation in Latin America over the years and was experienced several times by Nicaragua during the 1980s.²¹ Second, a situation of RER disequilibrium can also evolve because the equilibrium RER exchange rate changes, thus departing from a largely unaltered actual RER. This means that even in the absence of fiscal expansions and obvious macroeconomic inconsistencies, a situation of RER overvaluation can develop. This would be the case, for example, if the country in question experiences a severe negative terms of trade shock that results in an increase (that is depreciation) of the equilibrium real exchange rate. To the extent that, due to rigidities or other reasons, the actual RER does not respond (rapidly) to the new terms of trade, a situation of overvaluation will emerge. This type of real exchange rate disequilibrium has been called structural misalignment and tends to be the dominant source of disequilibrium in relatively stable macroeconomic regimes, such as the Asian nations.

III.2 Equilibrium Real Exchange Rates and Structural Misalignment

The long run sustainable equilibrium real exchange rate (ERER) is defined as the relative price of tradable to nontradable goods that, with other relevant variables given, is consistent with the simultaneous attainment external and internal equilibrium.²² In this context, external equilibrium

²¹See Edwards (1988) for a detailed discussion on this type of misalignment.

²²There is a long list of authors that have used this definition for the equilibrium real exchange rates: Frenkel and Mussa (1981), Williamson (1985), Dornbusch (1991). More detailed and more technical discussions on equilibrium and misaligned RER can be found in Edwards (1988, 1989). Interested readers are referred to those works for greater details.

is defined as a situation where the current account satisfies the intertemporal condition that the present value of future current account surpluses is equal to the initial stock of foreign debt. In other words, external equilibrium is defined as a situation where the current account is consistent with sustainable capital flows. An important implication of this is that situations where the current account deficit is financed by persistent losses of international reserves, or by an increasing flow of foreign resources, do not satisfy the requirement for external equilibrium.

Internal equilibrium is defined as occurring when the nontradables or domestic goods sector clears in the current period and is expected to clear in every future period, and where the actual rate of unemployment does not differ from its long run equilibrium level, or natural rate. Notice that given the close relationship between RERs and real wages, the evolution of the RER will influence the unemployment conditions of the country, for an overvalued RER reduces international competitiveness and shrinks the employment base in the tradable sector.

Several implications follow from the definition of the equilibrium real exchange rate. First, the ERER is not an immutable number, determined by some historically normal year observed in the past. On the contrary, the ERER is imminently variable: whenever any of the variables that affect the conditions of external and internal equilibrium experience a change, so will the ERER. These (real) variables are known as the real exchange rate fundamentals. All of this, of course, means that it is not possible to conduct analyses of real exchange rate misalignment using the traditional purchasing power parity technique. That approach has to be modified in important ways in order to

account for changing (actual and expected) conditions in the economy.²³ A second important implication is that policies aimed at maintaining a constant RER will generally be destabilizing. The reason is that in the face of a changing equilibrium real exchange rate, a policy of targeting a constant RER will often imply maintaining a "wrong" (i.e., misaligned) level of the real exchange rate.²⁴

A third implication of our definition of long run equilibrium RER is that it is not enough to equilibrate the external accounts. In addition, unemployment should not be above "normal". This is an important point since under a number of circumstances it is possible to have an equilibrated external sector with massive unemployment. This would be the case, for example, if there are rigid real wages set above labor market equilibrium. In this case, in order to generate external sector equilibrium the economy will have to operate below capacity, with labor and other factors being underemployed.²⁵ As is argued in Chapter V below, this indeed seems to be the case in Nicaragua.

The equilibrium RER fundamentals, or close determinants of the equilibrium real exchange rate, include: (a) international prices (that

²³For a complete discussion of purchasing power parity see Officer (1982). See also Dornbusch (1982).

²⁴In a number of recent writings, especially emanating from the IMF, the policy of maintaining a constant RER has been referred to as the "real targets approach" to exchange rate policy. Other authors, however, define "real targets approach" as a policy aimed at accommodating, via nominal exchange rate adjustments, changes in the equilibrium real exchange rate. These two meanings of "real targets" are, of course, very different and have different merits. While maintaining a constant RER is rarely justified, an accommodative policy can, in principle, greatly aid macroeconomic adjustment.

²⁵This case is discussed in Edwards (1988) where in the presence of rigid wages the economy operates inside the production possibilities frontier.

is, international terms of trade); (b) capital flows, including international transfer and foreign aid flows; (c) world real interest rates; (d) domestic taxes and subsidies; (e) taxes on international transactions, including tariffs and quotas; (f) export subsidies; (g) the composition of government expenditure; and (h) productivity. However, from a historical and empirical point of view the most important fundamentals are international terms of trade, closely followed by trade taxes and international transfers.

Under most conditions it is expected that a worsening in the terms of trade will require an equilibrium RER depreciation.²⁶ The reason for this is intuitively clear: a deterioration in the country's terms of trade will tend to result in a worsening of its current account. Thus, with other things given, a re-establishment of external equilibrium will require a correction in the current account which will be obtained through a real exchange rate depreciation. A typical case of terms-of-trade-induced change in the equilibrium RER is given by temporary deterioration in commodity export prices. This situation, which is currently affecting Nicaragua due to the decline in world prices of coffee and cotton, will require an adjustment (depreciation) of the equilibrium real exchange rate that will generally be smaller than if the change in the terms of trade is permanent. However, in practice, the extent of this required real equilibrium depreciation will depend on the availability of foreign exchange funds to finance the temporary payments difficulties.

Changes in barriers to international trade are another common source of changes in the equilibrium real exchange rate. The intuition is again

²⁶There are some (rather implausible) exceptions to this. See Edwards and van Wijnbergen (1987).

simple. Consider, for example, a trade liberalization reform which makes importables less expensive. As a result, there will be an increase in the demand for importables, and an incipient deterioration in the external position of the country will develop. The re-establishment of external equilibrium, then, will require a real exchange rate depreciation, which will make exportables more competitive internationally and will make importables relatively more expensive. The importance of this effect should not be underestimated. Countries that have gone through drastic changes in their trade regimes -- Chile being, perhaps, one of the most dramatic cases in the last 15 years -- have experienced substantial structural (equilibrium) real exchange rate depreciations. In fact, in those countries where liberalization has failed or has been reversed we invariably find that RERs have not depreciated sufficiently.²⁷ On the other hand, the implementation of export promotion schemes will result in an equilibrium real exchange rate appreciation. The reason is that by encouraging exports, there will be a tendency to improve the current account. In the case of Nicaragua, the implementation of the non-traditional exports law in the near future makes this case relevant.

International transfers -- and especially capital flows, foreign aid, and remittances from abroad -- constitute the third major determinant of equilibrium RERs. Their increase will generate forces towards equilibrium real exchange rate appreciation. This responds to the fact that a larger availability of foreign funds will tend to generate an improvement in the external position of the country. Re-establishing equilibrium will thus require a reduction in the relative price of tradable goods, or equilibrium

²⁷See Michaely et al. (1991).

real exchange rate appreciation.²⁸ On the other hand a decline in foreign aid will require a real exchange rate depreciation. In the case of Nicaragua this is a particularly relevant aspect, since the magnitude of foreign assistance is indeed expected to decline in the future. This strongly suggests that in a not too distant future there will be a need for a real exchange rate depreciation in Nicaragua. The key policy issue is how to achieve this important policy goal.

Higher domestic taxes will also require an equilibrium real exchange rate depreciation. The reason is simple: higher taxes (that is tax hikes with unchanged competitors taxes) will increase domestic costs crowding out some domestic exports. This means, then, that the negative effect on exports generated by higher domestic taxes can be compensated by a higher real exchange rate.

Of course, an implication of this discussion is that to the extent that "fundamentals" are constantly moving -- as terms of trade, in particular, do -- the equilibrium real exchange rate will be permanently changing. This does not mean, however, that moderate divergences between the equilibrium and actual real exchange rates constitute serious situations of misalignment, nor does it follow that small (or even medium size) temporary deviations of the actual from equilibrium RER will result in serious costs to the country in question. In fact, short- and medium-term fluctuations of the real exchange rate that stem from temporary changes in fundamentals are quite common. There are ways to face this type of situation. In a pre-determined, or fixed, nominal exchange rate regime these divergences are tackled through a

²⁸Another way to think about this is that an increase in capital inflows or remittances generates an increase in disposable income. This, in turn, results in a higher demand for all goods, including nontradables, and in a higher relative price for these goods.

combination of reserves decumulation (or accumulation) and "appropriate" macroeconomic policies. Under more active (or administered) nominal exchange rate policies the authorities try to minimize these divergences through accommodating changes in the nominal exchange rate.

III.3 Macroeconomic Policies and Real Exchange Rate Misalignment

Changes in fundamentals -- with a (roughly) constant actual RER -- are not the only source of RER misalignment. As pointed out above, inconsistent macroeconomic policies, and in particular expansive fiscal policies, are an additional cause of RER misalignment.

If domestic credit increases at a rate that exceeds the demand for domestic money, the result will be an excess demand for goods and financial assets.²⁹ As a consequence, international reserves will fall, the price of nontradable goods will rise, and the RER will appreciate. As reserves become dangerously low, the government will usually try to deal with the situation by imposing a whole battery of trade, capital and exchange controls. The parallel market for foreign exchange will become more active, and the premium in that market becomes increasingly large. Naturally, the imposition of trade, capital and exchange controls are not a long term solution for macroeconomic disequilibrium. All they achieve is a delay in the day of reckoning when the government will have to come to grips with the situation of an external crisis, and will have to engineer a sweeping, profound and credible adjustment program.³⁰

²⁹This situation can still occur under crawling peg regimes if the rate of adjustment of the nominal exchange rate consistently falls short of the inflation. Naturally, this statement assumes that there are no changes in fundamentals that justify slowing down the rate of the crawl.

³⁰The economic history of developing countries is replete with situations that resemble the above description. An early account of this type of exchange rate crisis can be found in Cooper (1971). See also

Situations of macroeconomically-induced RER overvaluation were common in Nicaragua in the 1980s. At the present time, however, this is not an eminently urgent problem. Moreover, to the extent that fiscal and credit control are maintained in the near future the country will be able to avoid falling into this type of disequilibrium. I deal with this subject in Chapter V.

III.4 Restoring Real Exchange Rate and Macroeconomic Equilibrium: The Analytics of Devaluations

The fundamental first step in dealing with macroeconomically induced real exchange rate misalignment is the restoration of consistency between macro (and especially fiscal) policies and the exchange rate system. Given the goal of regaining price stability and external sector sustainability, rapid action on fiscal front should be taken by the authorities. In fact, without corrective macroeconomic policies there is no hope of putting an end to inflation and overvaluation.

The re-establishment of external equilibrium implies that the relative price of tradables to nontradables will have to move back to its long run sustainable level. This increase in the relative price of tradable goods can be achieved basically through two mechanisms. The first option is to follow a disinflationary policy, where a contraction in aggregate demand forces a reduction in nominal prices of nontradable goods.³¹ The reduction in P_N will then generate a move in (P_T/P_N) (= RER) towards equilibrium. This option, however, has two fundamental drawbacks: it is too slow, and if nominal prices (or wages) are inflexible downwards the transition will be

Harberger and Edwards (1982), and Edwards (1989).

³¹More precisely, an adjustment could still take place if prices of nontradables grow at a slower pace than international goods.

characterized by unemployment and reduced output. The second way of re-establishing real exchange rate equilibrium is by engineering an increase in the domestic price of tradable goods through a nominal devaluation. In this case, of course, all the nominal devaluation is attempting to do is help speed-up the adjustment.³²

Naturally, for the nominal devaluation to be effective, in the sense of truly helping re-establish macroeconomic equilibrium in a smoother fashion, three conditions have to be met. First, the devaluation has to be taken from a starting disequilibrium situation of RER overvaluation; second, the devaluation has to be accompanied by consistent macroeconomic and especially, fiscal policies. If these conditions are not met, the devaluation will have no lasting effect, and the external crisis will not be solved. There is substantive empirical evidence suggesting that nominal devaluations undertaken as part of comprehensive adjustment packages, and that have been accompanied by restrictive monetary and fiscal policies, have been able to help greatly the transition towards a new equilibrium.³³ Third, in order for a nominal devaluation to be effective, and to generate a real devaluation, it is necessary that domestic prices (and especially domestic wages) are not indexed. If nominal wages are linked to the exchange rate a nominal devaluation will not re-establish competitiveness and will be ineffective.

The above discussion clearly suggests that in order for devaluations to "work" there is no need, as is often suggested, for economic agents to have "money illusion". Indeed, within this scenario devaluations will facilitate the adjustment even when there are ultra-rational forward-looking economic

³²Even when realignment is accomplished, the nominal devaluation is not the ultimate cause of the observed real exchange rate change; it is merely the vehicle through which the adjustment is attained.

³³Edwards (1989).

agents. In fact, in a forward-looking world, devaluations undertaken within the context described here will tend to be particularly effective. The reason for this is that highly informed rational individuals will clearly understand that the devaluation is facilitating relative price changes and, thus, is inducing the required expenditure switching away from tradable goods. Consequently, economic agents will not react to this exchange rate change in a perverse way. However, if the devaluation is not accompanied by consistent macroeconomic policies, the informed public will anticipate a devaluation-inflation spiral, making the situation highly volatile.

It is important to note that the argument presented here in favor of an active use of devaluations under conditions of severe initial real exchange rate overvaluation is not limited to situations of macroeconomically-induced misalignment. Real exchange rate misalignment of the structural type, generated by major real shocks, such as a significant deterioration in the country's terms of trade, can also be dealt with effectively through the use of an active exchange rate policy. Naturally, the precondition of maintaining a consistent macroeconomic package throughout the adjustment still applies.

III.5 Monitoring Real Exchange Rate and Competitiveness Misalignment

The discussion presented in the previous section has dealt with some of the most important analytical aspects of real exchange rate misalignment and competitiveness losses. More technical and formal discussions can be found in Dornbusch and Helmers (1988) and Edwards (1989). The purpose of this subsection is to provide a guide on how to evaluate the appropriateness of a specific real exchange rate situation. An important objective of this discussion is to determine a series of variables (or indicators) that the analyst should examine in the process of verifying the presence of misalignment.

A first step in the analysis is to construct a set of competitiveness indicators, including real exchange rate indices and real wage indicators, and to decide on a benchmark date, with respect to which the actual value of these different indices will be compared.

The next step in the analysis consists on determining whether the selected benchmark date represents a plausible situation of historical equilibrium of the external and internal sectors of the economy. Admittedly, in some countries, and especially in those affected by severe macro or structural shocks, it will be difficult to determine these "equilibrium" benchmarks. The analysis then should be based more heavily on the evolution of other external sector indicators, including the parallel market premium, the level of international reserves and the current account, than on an adjusted historical comparison. This is the case in Nicaragua where the hyperinflationary experience has reduced the usefulness of historical statistics and comparisons.

The analyst should then investigate what has happened to the RER fundamentals during the period elapsed between the benchmark historical equilibrium date and the present. In doing this, an effort should be made to determine whether the observed changes in fundamentals such as terms of trade, the degree of protection, world interest rates, international transfers, and so on, are permanent or transitory. Additionally, the analyst should try to determine -- with the help of expert forecasts provided by the World Bank or similar institutions -- what is the expected path for

³⁴In this step it is also important to analyze the way in which labor productivity has evolved in the country in question. To the extent possible this should be compared with productivity changes in other countries.

Once the information on the behavior of fundamentals behavior is at hand, the analyst should proceed to correct, or at least qualify, the benchmark base of the real exchange rate and other measures of competitiveness. At the end of this step the analyst will have an estimate -- or at least a rough idea -- of the equilibrium path of the RER. Needless to say, this path will play a key role in the overall evaluation of the macroeconomic condition of the economy. Since the methods available for actually estimating how changes in fundamentals will affect the equilibrium RER are rather imprecise, the analyst may decide at this point to work with two, or at most three, possible scenarios that gives him/her alternative paths for the equilibrium real exchange rate.

At this point it must be investigated the way in which macroeconomic forces have affected the actual real exchange rate. The most important question here is to evaluate the way in which possible disequilibria in the fiscal accounts and/or in credit policies have impacted the real exchange rate. The key issue at this point is to determine whether the current macroeconomic policies are sustainable, or whether, on the contrary, they are forcing the external sector onto a nonsustainable path. This analysis should be supplemented with an investigation of the behavior of a series of indicators of the external sector accounts. Special attention should be paid to the evolution of: (a) the trade account; (b) the current account; (c) international reserves; (d) the black or parallel market premium.

This analysis provides additional information that will complement the competitiveness indices analysis, and will help him/her assess whether the external situation of the country is sustainable. The evaluation of the different indicators should rely both on historical and international comparisons. For instance, the analysts should inquire whether the parallel

market premium has experienced important jumps in the immediate past -- this would be a sign of a situation perceived as increasingly unsustainable -- and whether it has reached levels that in other countries have been associated with imminent crises.

At this point of the analysis the expert should look in some detail at other markets, including very especially the labor markets. Rigidities and distortions should be noted and evaluated, with an effort to determine the extent to which the labor market structure is rendering the external sector adjustment process more difficult.

By combining information from the previous steps it is possible to determine whether real exchange rate (and real wages) is indeed out of equilibrium, and if so what is the approximate magnitude of the required realignments. Naturally, there is no way to determine this required adjustment in a precise, engineering-style fashion; unavoidably, the numbers at which the analyst will arrive at this point will be somewhat imprecise. In fact, it is more appropriate to think that he/she will determine an interval or range for the required adjustment than a precise number.

Notice that what is estimated in this step is the (approximate) magnitude of the RER misalignment; nothing has yet been determined on the magnitude (or desirability for that matter) of nominal devaluation. That is the subject of the next step.

If it is found that the RER is indeed out of line, it is necessary to determine the best procedure for re-establishing international competitiveness and real exchange rate equilibrium. A number of options should be considered, including macroeconomic adjustment, devaluation, incomes policies, commercial policy changes, or some combination of these policies.

An important element in deciding the type of adjustment to be undertaken is the magnitude of the (perceived) misalignment. If the extent of RER overvaluation is rather small it will be usually possible to use a combination of financing and macroeconomic corrections to re-establish equilibrium. If, however, there is a major overvaluation, an adjustment package that includes a nominal exchange rate devaluation will usually be needed.

If a devaluation option is selected, a further decision on the nature of the exchange rate adjustment has to be made. The key decision is whether a discrete, once-and-for-all, devaluation should be implemented, or whether the devaluation should be followed by successive (small) exchange adjustments. Several elements should be considered at this point. Chief among them is the country's ability to re-establish quickly fiscal discipline. If the reduction of the fiscal deficit to levels compatible with price stability cannot be achieved rapidly, a crawling peg type of regime will be required, at least, on temporary bases. This, of course, does not mean that the authorities should forsake fiscal adjustments -- it should be sought with enthusiasm.

Perhaps the two most important aspects of this step are the following:

- (1) under every possible package, consistent macroeconomic policies will be required for a long term re-establishment of external sector equilibrium and macro stability. There is no way around this; the only differences across strategies is the intensity of these macropolicies at particular moments in time.
- (2) Nominal devaluations will only be effective if nominal wages are not indexed to inflation or the exchange rates. If devaluations are accompanied by (equiproportional) wage increases they will be ineffective; having no impact on the RER.

PART TWO
REAL EXCHANGE RATES AND
INTERNATIONAL COMPETITIVENESS IN NICARAGUA

IV. The Recent Evolution of Nicaraguan Competitiveness Indices: 1988-1992

IV.1 Introduction

In this chapter we turn to the empirical discussion of actual competitiveness indicators for the Nicaraguan economy. This is done via the construction and evaluation of both real exchange rate and labor cost indices. Although these measures, as explained in Chapter II, should yield similar assessments of the history and present condition of Nicaraguan competitiveness, real exchange rates and labor costs point to distinct policy areas that should reinforce each other in the path towards regained competitiveness. These areas are exchange rate policy and labor market reform, both critical items in the strategy for strengthening the Nicaraguan external sector.

As argued in great detail in Chapter V, the economic stabilization and restructuring progress made up to date in Nicaragua will remain a provisional achievement while the enormous external imbalance presently facing the Nicaraguan economy remains unaltered. This stands as a great and most immediate danger to the successful conclusion of the government's economic program.

In this chapter, I estimate and assess bilateral and multilateral real exchange rate indices as well as real wage indices. These estimates are first computed in Sections IV.2-IV.4 on a monthly basis for the 1988-92 period. In Section IV.5, I present a brief discussion on the effects of inefficiencies on the costs of doing business and on the degree of competitiveness in Nicaragua. In Section IV.6 the recent evolution of the Nicaraguan bilateral real exchange rate is compared with that of four Central American countries and Mexico. In Chapter V a long term perspective is taken, and multilateral RER indices for 1973-91 are presented. detailed explanation on how the various indices were constructed is

presented in Appendix I of this report.

IV.2 Recent Evolution of Bilateral Real Exchange Rates

In the most general terms, and as discussed in Chapter III, bilateral real exchange rates (BRER) indicate the evolution of an economy's competitiveness by quantifying the changes in opportunity costs of export and import competing industries. The BRER index has three components that together allow the computation of this relative price: 1) an index of the exchange rate with the currency of the most important trade partner -- the U.S. dollar; 2) an index of tradable goods prices; and, 3) an index of the home country's nontradable goods prices. The general formula is then,

$$\text{BRER} = \frac{E \cdot \text{PT}}{\text{PN}}$$

where E = cordobas per U.S. dollar exchange rate index,

PT = tradables price index,

PN = nontradables price index.

Usually, as pointed out before, it is not possible to find direct measures of tradable and nontradable prices, while most often the data on exchange rates are readily available. In the case of Nicaragua the situation is to some extent reversed. This is because, on the one hand, the choice of exchange rate to be used in the BRER calculation is not a trivial matter in circumstances where multiple rates co-exist, as it has occurred in Nicaragua. On the other hand, contrary to the norm, the Central Bank of Nicaragua (BCN) does compute series on tradable and nontradable prices.³⁵ In what follows I discuss how the variables in the BRER equation were obtained for the Nicaraguan case.

³⁵However, it is not clear how reliable these tradables and nontradables indices are. For reasons explained above, it is extremely difficult to actually separate the price index into tradable and nontradable components.

Between 1979 and 1988 Nicaragua had multiple official exchange rates and a very active black market for foreign exchange. With the currency reform of February 15, 1988, the multiplicity of official rates was eliminated, abolishing the numerous export and import exchange categories and the special loan repayment and invisible rates that existed at the time. However, a parallel rate administered by state exchange houses and a black market rate continued in place. Today, private exchange houses have inaugurated a second parallel market with slightly higher rates than those paid by government owned houses.

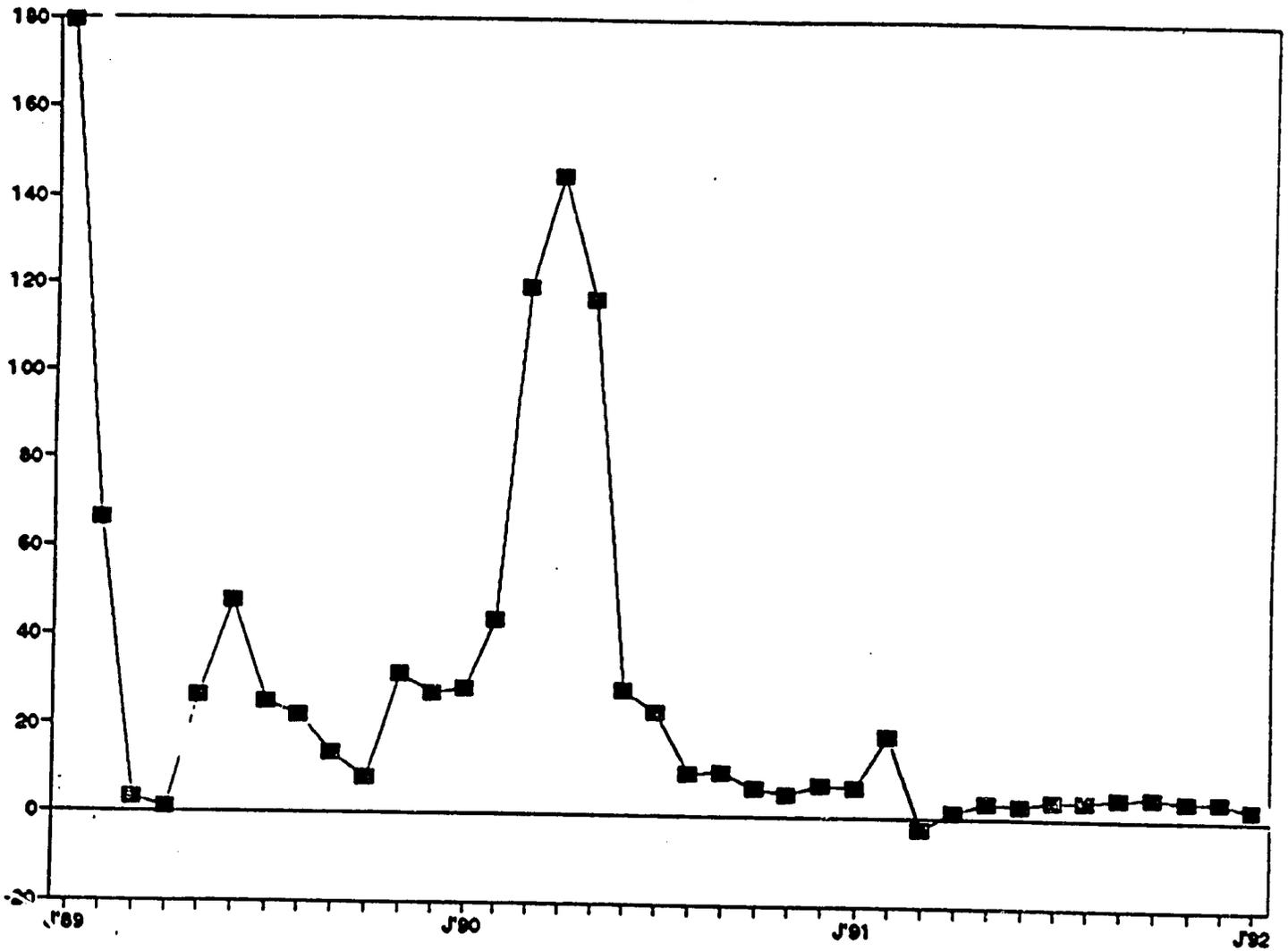
The ideal exchange rate index for BRER calculation purposes is that which reflects the proportions in which importers and exporters are converting their proceeds from foreign trade. This implies the computation of a weighted average among all "relevant" exchange rates -- or those which are in fact used by importers and exporters for foreign trade purposes. The computation of this weighted average for the period 1979-88, when multiple official rates were in place in Nicaragua, is carried out and explained in detail in Appendix I of this report. For the purpose of this section, which studies the evolution of the real exchange rate since January 1988 onwards, multiple official exchange rates are a concern for January and February of 1988 only.³⁶

A problem remains on how to handle the parallel and black market exchange rates after February 1988 in the computation of the bilateral nominal exchange rate in index E. That is, it must be decided whether the black market parity should be incorporated in the average exchange rate and, if so, which weight should be attached to it. A problem with any attempt to

³⁶The quarterly series on the average official import and export exchange rate is shown in Table A.6 of the Appendix. The rate for the months of January and February 1988 was C436.72 and C5,218.36.

Figure 1

**Black Market Premium
Percentages**



Source: Banco Central de Nicaragua; Currency Yearbook.

TABLE 2

Black Market Premium

New Cordobas

<u>Year</u>	<u>Month</u>	<u>Black Market R Period Average</u>	<u>Official Rate Period Average</u>	<u>Percentage Difference</u>
1988	January	48.00	0.48	9969.23
	February	82.76	5.22	1486.05
	March	130.00	10.00	1200.00
	April	138.00	10.43	1223.11
	May	174.19	11.48	1417.33
	June	253.33	41.47	510.88
	July	385.48	80.00	381.85
	September	400.00	83.23	380.62
	August	443.83	180.00	146.57
	October	810.81	320.00	153.38
	November	2363.33	628.67	275.93
	December	4880.64	920.00	430.50
1989	January	5483.87	1963.23	179.33
	February	5000.00	3007.14	66.27
	March	5106.45	4945.16	3.26
	April	6473.33	6413.33	0.94
	May	9241.93	7325.81	8.96
	June	23566.67	15950.00	47.75
	July	25000.00	20000.00	25.00
	September	25000.00	20490.32	22.01
	August	25000.00	22023.33	13.52
	October	25632.26	23741.94	7.96
	November	36680.00	27920.00	31.38
	December	43300.00	34075.16	27.07
1990	January	54822.58	42779.35	28.15
	February	66571.43	46380.00	43.53
	March	101750.00	46380.00	119.38
	April	130333.33	53289.33	144.58
	May	248064.51	114516.13	116.62
	June	307166.67	239500.00	28.25
	July	515483.86	418387.08	23.21
	September	788870.95	720645.16	9.47
	August	1177666.60	1070333.33	10.03
	October	1464838.70	1377419.35	6.35
	November	1835333.33	1745000.00	5.18
	December	2571935.47	2404838.71	6.95

Table 2 (cont.)

<u>Year</u>	<u>Month</u>	<u>Parallel Rate Period Average</u>	<u>Official Rate Period Average</u>	<u>Percentage Difference</u>
1991	January	3681612.91	3453548.39	6.60
	February	5557142.86	4694642.85	18.37
	March	24350000.00	25000000.00	-2.60
	April	25350000.00	25000000.00	1.40
	May	25850000.00	25000000.00	3.40
	June	25750000.00	25000000.00	3.00
	July	25950000.00	25000000.00	3.80
	August	26000000.00	25000000.00	4.00
	September	26200000.00	25000000.00	4.80
	October	26250000.00	25000000.00	5.00
	November	26050000.00	25000000.00	4.20
	December	26050000.00	25000000.00	4.20
1992	January	25650000.00	25000000.00	2.60

Source: BCN

(*)Buying rate at government owned exchange houses.

do this is that the amount of foreign currency being converted in the parallel and black markets between 1988 and the present for international trade purposes is not known with any precision. The general impression of Nicaraguan government officials is that this amount has been relatively small throughout and decreasing since the stabilization program of March 1991 was put into effect. So, despite the fact that the difference between the parallel and official rates was at times very large prior to August of 1990, as shown in Table 2 and Figure 1, the comparatively minor importance of the parallel market in financing foreign trade means that the official rate (AEROF) is a fairly close approximation of the weighted average of all relevant exchange rates. Thus, the monthly BRER index from March 1988 to January 1992 was constructed with the official exchange rate as published by the BCN. For the first two months of 1988 a weighted average of the official import and export exchange rates, as calculated in Appendix I, was used in the computation of the BRER.

Regarding the choice of indices to represent the evolution of tradable and nontradable prices, the standard practice is to use the domestic consumer price index (CPI) as a proxy for PN and the wholesale price index (WPI) of the U.S. as an approximation to PT. This approach is justified because in most empirical studies it is not possible to separate tradables from nontradables within the domestic economy.

Generally speaking, the CPI is a fair representation of PN since, on the one hand, a good number of the products included in the basket it measures are in fact nontradables and, on the other, the prices it surveys are at the retail level and thus incorporate a large content of value added of domestic

TABLE 3

Bilateral Real Exchange Rates

1989.IV - 100

<u>Year</u>	<u>Month</u>	<u>BRERNTPI</u>	<u>BRERCPI</u>
1988	January	6.31	4.83
	February	29.81	30.11
	March	35.48	31.78
	April	32.14	25.88
	May	30.22	24.10
	June	69.40	53.08
	July	72.52	55.97
	August	56.83	48.41
	September	85.19	70.74
	October	92.64	78.24
	November	100.90	72.61
	December	68.18	47.19
1989	January	57.53	53.10
	February	52.91	56.05
	March	68.01	77.31
	April	79.06	89.74
	May	90.93	89.31
	June	122.10	119.53
	July	125.38	112.56
	August	118.72	107.38
	September	107.36	103.42
	October	96.93	97.47
	November	98.29	98.92
	December	104.04	103.04
1990	January	102.73	102.30
	February	99.63	96.72
	March	89.34	83.94
	April	79.64	70.66
	May	75.50	70.48
	June	61.84	73.34
	July	56.53	68.73
	August	51.91	66.09
	September	48.48	62.80
	October	49.17	63.22
	November	45.48	59.84
	December	41.14	55.24

Table 3 (cont.)

Year	Month	BRENTPI	BRERCPI
1991	January	38.49	52.26
	February	35.86	49.30
	March	56.52	72.05
	April	45.17	59.84
	May	50.53	64.16
	June	57.58	68.91
	July	57.29	68.19
	August	57.04	69.50
	September	56.07	68.53
	October	51.22	64.72
	November	51.42	64.11
	December	51.22	64.17
1992	January	NA	63.40

Source: BCN, IMF.

services, which are also nontradable.³⁷ Conversely, since the U.S. WPI excludes the value added of nontradable services within the U.S. economy, it is a good proxy for "the" foreign price of tradable goods. So, in practice, the formula for the bilateral real exchange rate becomes:

$$BRER = \frac{E \cdot WPI_{US}}{CPI_{nic}} \quad (20)$$

The bilateral real exchange rate calculated following this standard practice, denoted as $BRER_{cpi}$, is shown in Figure 2. An alternative index was computed using the BCN index for nontradable prices in the denominator. This BRER, denoted as $BRER_{ntpi}$, is also shown and contrasted with the $BRER_{cpi}$ in Figure 2. The actual time series for these two bilateral RER indices are presented in Table 3.

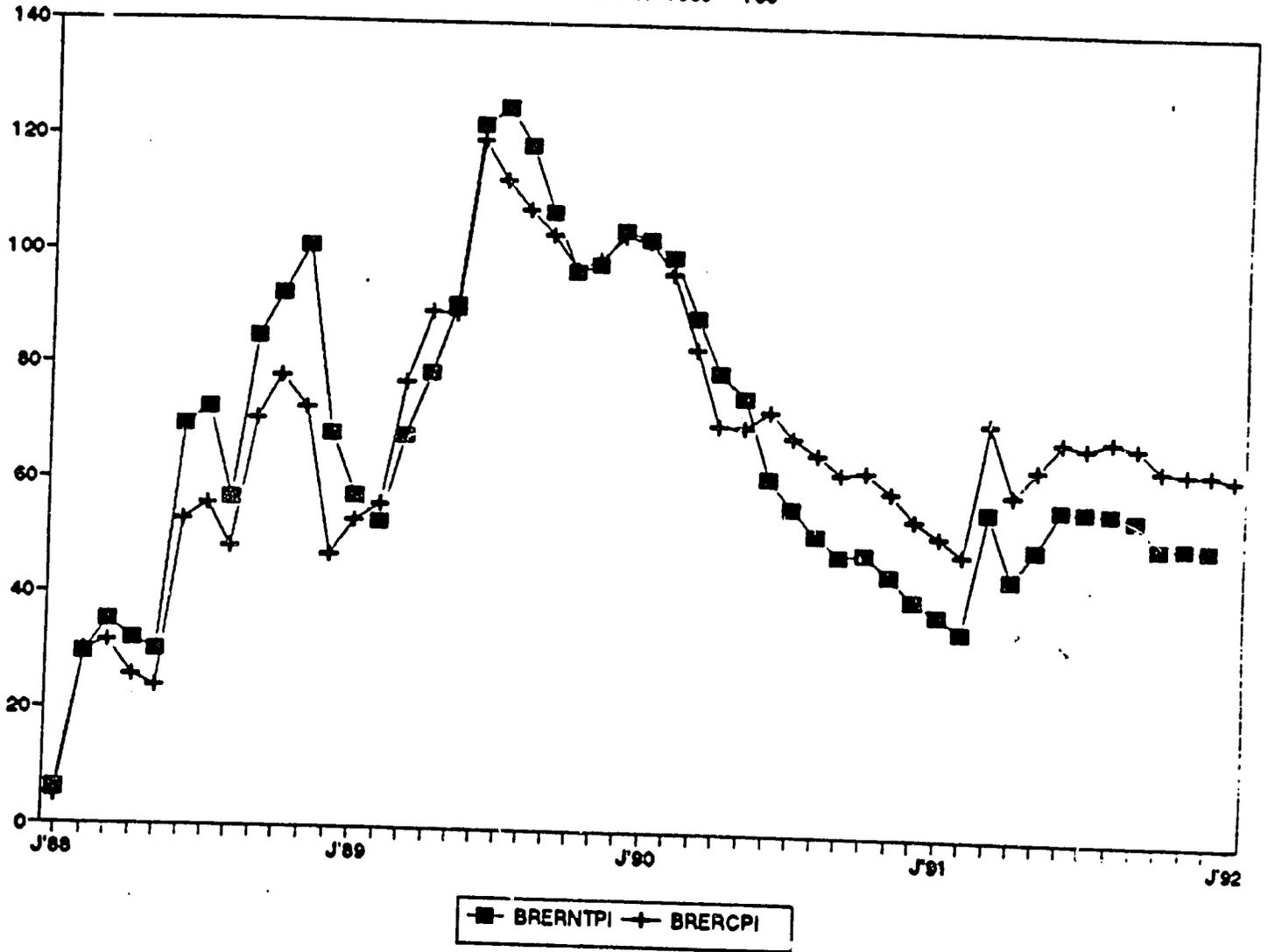
The base date for these monthly BRER indices was set as the fourth quarter of 1988 = 100. It must be noted that no particular interpretation should be attached to this specific point in time. The base date can be changed for expositional purposes with no consequence on the analysis. In fact, as was explained in Chapter III, in order to discuss the appropriateness of the real exchange rate at any moment in time it is necessary to analyze in detail the behavior of the so-called real exchange "fundamentals". We do this in Chapter VI.

The two BRER indices shown in Figure 2 behave with remarkable similarity, describing the same trend and basically the same levels of real appreciation and depreciation of Nicaragua's real exchange rate in recent years. This implies that in the particular case of Nicaragua for the period 1988-92 it makes little difference which proxy for nontradable prices we use

³⁷It should be noted, however, that for the period prior to 1989 there are severe problems with the CPI. This is discussed in some detail below.

Figure 2

Bilateral Real Exchange Rates
Fourth Quarter 1989 = 100



Source: see text.

55

in order to assess the general evolution of its competitive standing.³⁸ These two BRER indices tell an almost identical overall story regarding the recent progress of Nicaraguan competitiveness.

From the BRER indices we can clearly distinguish that Nicaraguan competitiveness has gone through three very distinct periods between 1988 and 1992. Each one of these periods has been initiated by drastic changes in Nicaraguan economic policy, and these policies have had a very different impact on the country's competitiveness. The three periods in question can be demarked and briefly described as follows:

- 1) Beginning with the devaluation and adjustment program of February 1988, the BRER goes through a period of considerable depreciation till mid-1989, as a policy of aggressive nominal devaluations was pursued. During this period the rate of exchange rate devaluations outpaced the rate of inflation by a considerable margin (see Table 4), generating a real depreciation, as shown by the increase in both BRER indices at that time. However, since the exchange rate adjustment policy was not accompanied by a consistent set of fiscal and credit measures, the economy entered into a serious devaluation-inflation spiral, which resulted in an accumulated rate of inflation for 1989 of 13,649%.
- 2) From mid-1989 through the first year of the present administration, February 1991, the BRER's prior trend is clearly reversed as it appreciates continually to levels similar to those prevalent in mid-1988. Most of the competitive edge gained in terms of relative prices since February 1988 had been lost by February 1991. During this one and half years inflation outran the devaluation of the Cordoba,

³⁸As is discussed below this is not the case for the 1973-88 period. Depending on the price deflator used the behavior of the RER indices will be very different.

TABLE 4

NICARAGUA: Inflation and Official Exchange Rate
 Monthly Percentage Changes

<u>Year</u>	<u>Month</u>	<u>Official Devaluation</u>	<u>Rate of Inflation</u>
1988	January	0.00	50.08
	February	1094.05	91.27
	March	91.64	82.13
	April	4.30	29.22
	May	10.07	19.02
	June	261.24	65.83
	July	92.91	83.55
	August	4.03	20.44
	September	116.28	48.23
	October	77.78	60.90
	November	96.46	111.88
	December	46.34	126.66
1989	January	113.39	91.80
	February	53.17	45.80
	March	64.45	20.00
	April	29.69	12.56
	May	14.23	15.51
	June	117.72	62.24
	July	25.39	32.30
	August	2.45	7.69
	September	7.48	11.90
	October	7.80	14.39
	November	17.60	16.19
	December	22.05	19.20
1990	January	25.54	25.88
	February	8.42	14.68
	March	0.00	15.01
	April	14.90	36.24
	May	114.90	116.43
	June	109.14	100.63
	July	74.69	86.41
	August	72.24	82.51
	September	48.52	58.80
	October	28.69	30.52
	November	26.69	33.03
	December	37.81	47.50

Table 4 (cont.)

<u>Year</u> <u>Month</u>	<u>Official</u> <u>Devaluation</u> %	<u>Rate of</u> <u>Inflation</u> %
1991 January	43.61	52.19
February	35.94	-41.98
March	432.52	261.15
April	0.00	20.29
May	0.00	-6.39
June	0.00	-7.06
July	0.00	0.88
August	0.00	-1.72
September	0.00	1.24
October	0.00	5.90
November	0.00	0.95
December	0.00	-0.10
1992 January	0.00	1.18

Source: BCN.

resulting in the abrupt fall of the BRER indices. It should be noted that this fall is equally drastic irrespective of the domestic price index used to calculate the BRER.

- 3) The third period starts with the devaluation and stabilization plan introduced in March of 1991, which manages to stop the rapid appreciation of the BRER. Since then the real exchange rate has stabilized itself at a level slightly lower from that achieved immediately after the latest devaluation of the Cordoba. However, the BRER currently stands below the peak it reached in mid-1989. It is interesting to note that, contrary to previous historical experiences in Nicaragua, effect of the March 1991 nominal devaluation on the real exchange rate has not been fully eroded by inflation, as some analysts have suggested. To be precise, according to our $BRER_{cpi}$ index the real exchange rate stood in January of 1992 28.6% higher than in February of 1991.

However, the fact that the RER has been subject to some correction is not enough to assess the degree of success of the devaluation episode. The percentage of the nominal devaluation which is passed on to the real exchange rate gives us a measurable and comparative appraisal. This is done by computing an effectiveness index, defined as the ratio of the accumulated RER adjustment to the nominal devaluation. For the March 1991 episode this index is equal to only .07, indicating that it was rather "costly" to generate the observed RER improvement. This low value of the effectiveness index is the product of the entire policy package implemented in March 1991, and in particular of the decision to grant a massive wage adjustment. It must be noted, however, that the fact that the real devaluation has not been fully eroded this time, as was the case of all other Nicaraguan devaluations since 1979, is a

consequence of the success in controlling further price increases.

Another positive result of the successful control of domestic inflation since March of 1991 is that the real exchange rate has stabilized.

IV.3 Recent Evolution of the Multilateral Real Exchange Rate

The Multilateral Real Exchange Rate (MRER) takes into account a basket of currencies corresponding to the most important trading partners of Nicaragua, weighted by their relative importance in Nicaraguan foreign trade. More formally, as explained in the preceding chapter, the algebraic expression for the MRER is:

$$\text{MRER} = \frac{\text{MNER} \cdot \text{PT}}{\text{PN}} \quad (21)$$

where MNER = multilateral nominal exchange rate;

PT = tradables price index;

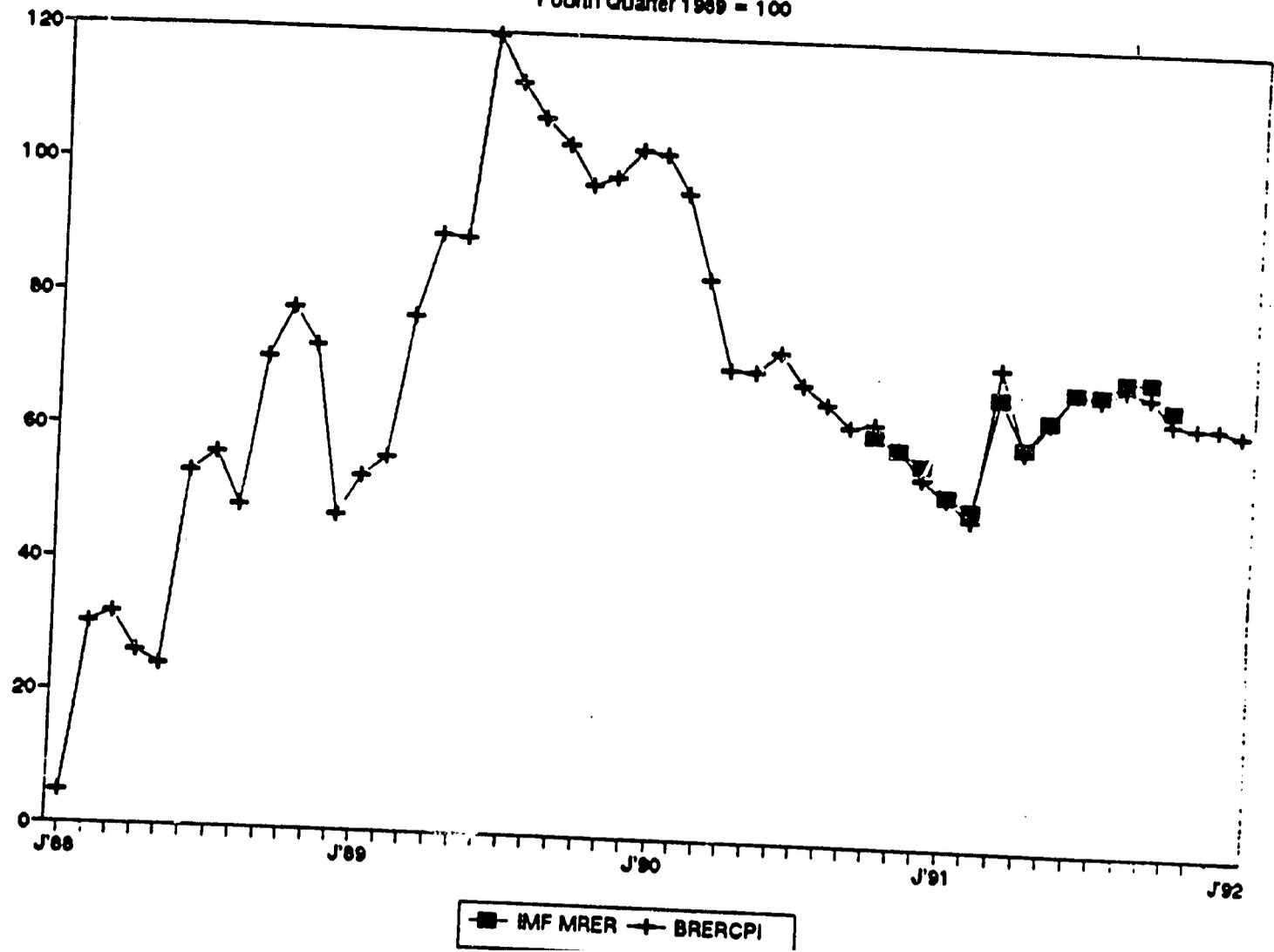
PN = nontradables price index.

In many ways, the MRER is a more comprehensive and precise measure of competitiveness than the BRER. This is because it includes the relative standing of the home country with respect to all its major trading partners. A significant difference may emerge between these measures when a country's foreign trade is well diversified among nations whose currencies float freely. For example, a country might have a depreciating BRER with respect to the U.S. dollar, but if the dollar is revaluing itself against, say, European currencies, and the country trades heavily with Europe, the MRER may well show an appreciating trend.

In Appendix I, I calculate alternative long-term quarterly measures of the MRER for Nicaragua; here I will briefly look at the monthly MRER that the IMF has elaborated for Nicaragua. It must be noted that the IMF's procedure uses the inverse of equation (21) with PN as the numerator. So, an increase

Figure 3

Real Exchange Rates: IMF vs BRERCPI
Fourth Quarter 1999 = 100



Source: own calculations; IMF.

in the IMF's index represents an appreciation, and a fall implies a depreciation. However, to make the IMF's MRER estimate compatible with our format, it needs simply to be inverted. This is exactly what we do.

The monthly MRER for Nicaragua calculated by the IMF covers the period October 1990 to October 1991, which has been inverted and then reproduced in Figure 3, together with the BRER shown previously in Figure 2.³⁹ In order to make these indices comparable, the base for the IMF index was also set to be the last quarter of 1989 = 100.⁴⁰

Again it can be seen that both rates describe a very similar behavior of Nicaraguan competitiveness for the months in question. The IMF calculation, by itself insufficient to draw any conclusions due to its limited time coverage, does confirm, however, the principal insight suggested by the BRERs for this period: after March 1991 the Nicaraguan real exchange rate continues to be at a level substantially below that prevailing in the second half of 1989. The indices differ slightly in that the IMF MRER shows that the real depreciation achieved in March of 1991 was still holding by October of that year, while our BRER shows a slightly larger degree of erosion.

In both cases the inflationary bout that followed immediately after the March, 1991 devaluation erodes away some of its real impact on the exchange rate, but the indices rise again during the next three months. In

³⁹The monthly IMF index used here is the Real Effective Exchange Rate in the IMF document "Nicaragua - First Review Under Stand-by Arrangement," January, 1992. It should be noted that this index is not consistent with the earlier IMF estimate of the monthly Real Effective Exchange Rate in IMF, "Nicaragua - Staff Report for the 1991 Article IV Consultation," May 28, 1991.

⁴⁰In the January 1992 document, op cit., the IMF does not provide monthly figures for its Real Effective Exchange Rate prior to October 1990. However, it does provide quarterly figures from the first quarter of 1989. So, the number in this series corresponding to the fourth quarter of 1989 was used to recalculate the base date. The IMF's quarterly index is reproduced in full in Section IV.6.

62

our BRER estimate, however, it never reaches the peak of March of 1991 as it does in the IMF estimate. In any case, the trends depicted by these indices clearly coincide throughout this period, for both reflect the same changes in appreciation and point towards a real exchange rate that is today between 35% and 40% below January 1990.

IV.4 Real Wage Indices as Measures of Competitiveness

As pointed out in Chapter II, the evolution of real wages and unit labor costs provide another window into a country's competitive situation. At a given level of productivity differential between two economies, comparatively lower increases in real wages denotes a relative fall in production costs and thus a gain in competitive edge. Equivalently, any surge in real wages which outpaces improvements in labor productivity will have a negative impact in a country's ability to compete internationally.

Although it is difficult to assess the recent evolution of labor productivity in Nicaragua, a positive trend in this regard during the last decade can be safely dismissed. For instance, yields in key export crops show for the most part a stagnant or a declining productivity trend since the late 1970s.⁴¹

The estimation of real wage indices is a particularly difficult task in any developing country. Data on wages are known to be largely inaccurate in LDCs, and Nicaragua is no exception in this respect. To provide a robust discussion on the subject, several indicators of nominal wages were considered and different indices on real wages were constructed for the recent

⁴¹Comparing the average yields obtained during the three agricultural cycles 1976/77 to 1978/1979 with those for the most recent period 1988/89 to 1990/91, the yield per "manzana" has decreased, to mention just a few examples, for coffee: -22.3%, sugar: -12.9%, ajonjolí: -49.1%, bananas: -26.7%. BCN, Dirección General de Producción.

(1988-92) period. Despite the variety of sources, much caution is advised in the reading of the data. Thus, before analyzing the trends in Nicaraguan real wages, a few words on the sources and quality of data are warranted.

IV.4.1 The Data

In our analysis we used three sources for Nicaraguan wages: the Nicaraguan Social Security Institute (INSSBI); the Ministry of Labor (MTRAB); and, Mayorga Associates.

The INSSBI records by economic activity the average earnings of workers enrolled in the Social Security Institute. The most evident problem with this source is that the INSSBI covers a relatively small proportion of the total employed population. In fact, as shown in Table 5, the number of employees enrolled in INSSBI between 1989 and 1991 amounted to about 35% of the national total of fully employed persons.

The data suffers from another set of problems, however. On the one hand, it reports total earnings perceived by workers, not wages, so that it includes overtime payments and cash benefits. On the other, it does not include payments in kind, which during much of the Sandinista rule were an important and integral part of Nicaraguan workers' regular compensation package. This omission is particularly problematic when using these data to estimate the real purchasing power of wages, for that part of wages that was paid in kind evidently did not depreciate with inflation.

Also, payments of Social Security quotas are not done with perfect regularity: many firms delay their payments for months, and then pay their arrears all at once. This means that the monthly wage figures are not strictly comparable; quarterly or semi-annual estimates would be more accurate.

The Ministry of Labor has estimates on average national wages beginning December 1988. These are disaggregated in only two large

TABLE 5

Total Employment and Social Security Enrollment

<u>Year</u>	(1) <u>Total Employment</u>	(2) <u>INSBBI Enrollment</u>	(3) <u> </u>
1987	835.7	312.6	37.4
1988	826.8	na	na
1989	773.5	261.9	33.9
1990	737.3	261.4	35.5
1991	611.6	228.9	35.5
1987-91			35.6

Source: MTRAB, INSBBI.

(1) in thousands; MTRAB employment data.

(2) in thousands.

(3) (2)/(1)

Figure 4

Wages in Real Cordoba
Fourth Quarter 1989 = 100

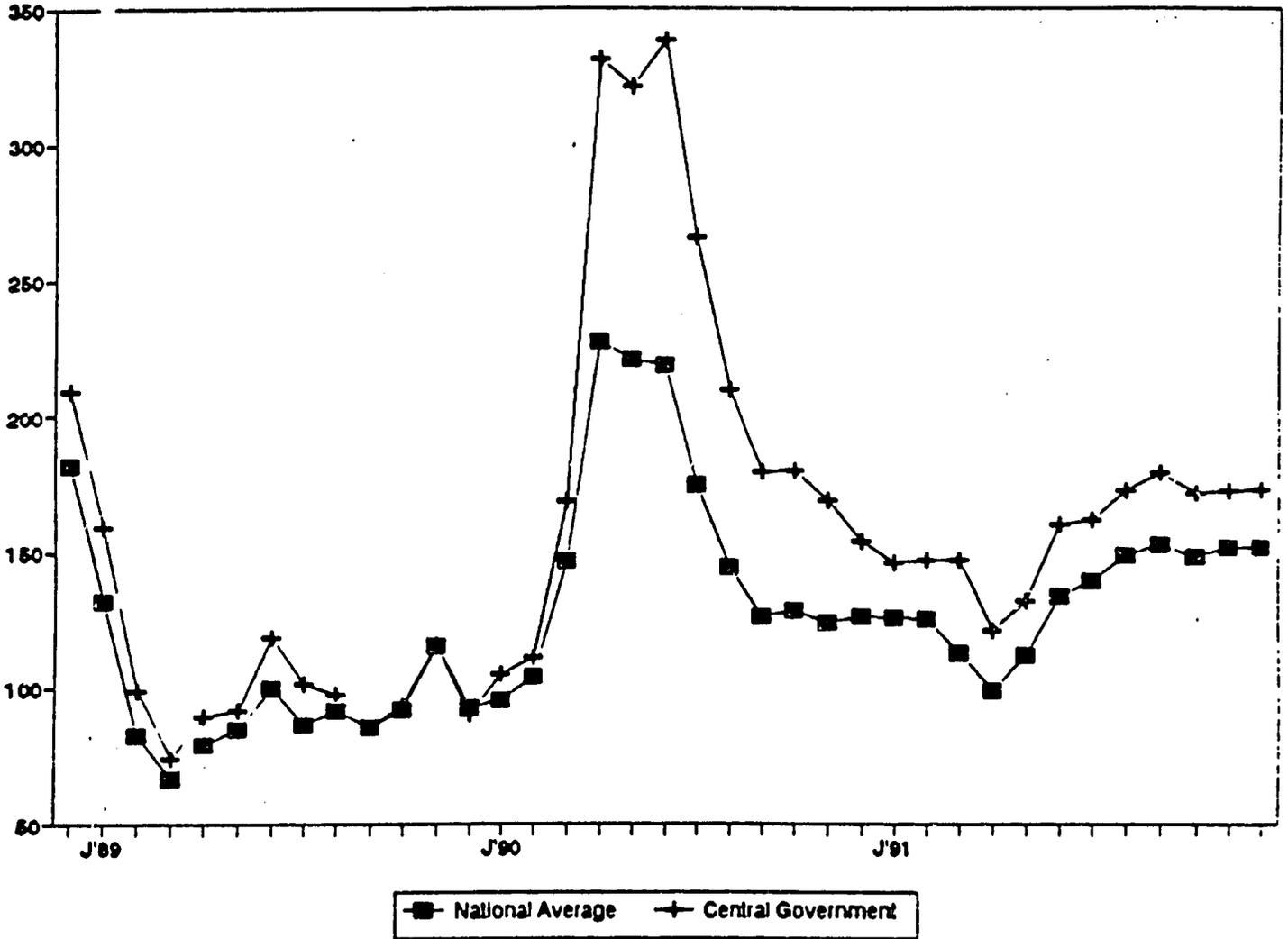
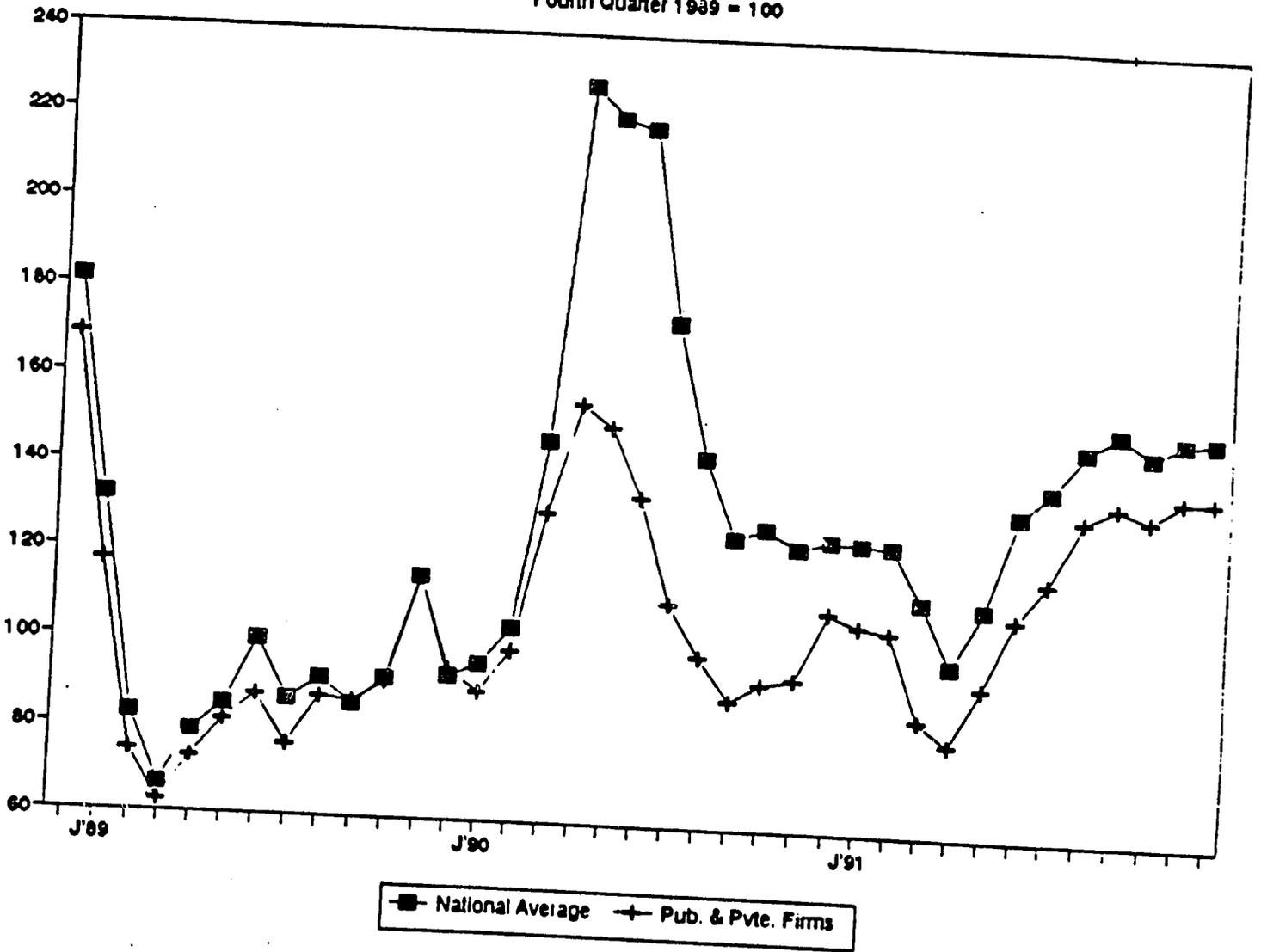


Figure 5

Wages in Real Cordoba
Fourth Quarter 1989 = 100



categories: "Central Government" and "Enterprises and Decentralized Entities". This last category corresponds to private and public firms in various areas of economic activity (e.g., manufacturing, banking), plus municipalities and public schools. The MTRAB gathers the data via monthly surveys of 60,000 central government employees and 204 entities covering approximately another 80,000 employees outside the central government.

Although the MTRAB data are obtained from a sample totalling 140,000 employees, that is about half of those registered with the INSSBI, the sample is more representative of the wages paid in the economy as a whole. Also, the MTRAB wage figures include the market value of payments in kind and excludes overtime payments. However, a significant problem remains with the estimate of Central Government average wages. Since the "Occupational Conversion Program" was initiated in 1990, about 20,000 employees have left their government positions,⁴² and the large majority of these were in the lower wage categories. This means that the average wage will show increases despite the fact that no actual wage raises have been authorized. Clearly, this average will tend to be upward biased. The other limitation of this statistical series is that it does not permit a long run analysis, for it only begins at the end of 1988 and it is not quite compatible with the INSSBI wage series.

Mayorga Associates has been surveying Nicaraguan wages by occupation since November 1989. During 1989 and 1990 this survey covered 17 firms in the Managua area, and in 1991 this sample was increased to 29 firms, all of them in Managua. The data are made available in current U.S. dollars and cordobas for five specific occupations: general accountant, secretary, driver, average blue-collar worker, and plant supervisor. Although the Mayorga

⁴²To September 30, 1991, 17,009 employees had left their government positions through the Occupational Conversion Program. BCN, Boletín Trimestral, Vol. III, 1991.

data cannot be taken by itself as a definite indicator of the evolution of wages in the Nicaraguan economy as a whole, it is extremely useful to investigate the behavior of labor costs in the formal manufacturing sector.

Despite the limitations that each individual data source has, all the sources together allow some fairly robust inference about the recent evolution of real wages in Nicaragua.

IV.4.2 Wages in Real Cordobas: December 1988-January 1992

According to the data on wages which the MTRAB began to collect in December of 1988, real wages in Nicaragua have demonstrated a definite upward trend since February of 1989. Figures 4 and 5 show respectively indices of real wages constructed with MTRAB information for the central government and the sample of public and private enterprises, compared in each case with the index of national average real wages. The data are presented in Table 6, where the nominal wages reported by the MTRAB have been deflated by the Nicaraguan CPI and converted into constant cordobas and then reformulated into an index with the fourth quarter of 1989 as the base date.

It can be seen in these figures that all three real wage indices have reached and stayed during the second half of 1991 at a level twice as high as that prevailing in March of 1989. The very large jump above the rising real wage trend in the second quarter of 1990 corresponds to the massive nominal wage increases obtained by labor union after a successful stand-off with the entering government authorities.⁴³

With the rapid subsequent inflation, these increases were quickly eroded in real terms, especially after the new government managed to implement stricter wage raise guidelines. However, following the March 1991

⁴³BCN, Informe Anual, Managua, 1990.

TABLE 7

Index of Average Real Wages in U.S. Dollars

Fourth Quarter 1989 = 100

<u>Year</u>	<u>Month</u>	<u>Central Government</u>	<u>Public & Private Enterprises</u>	<u>National Average</u>
1988	December	118.38	95.62	102.89
1989	January	157.50	115.99	130.88
	February	149.39	112.06	125.28
	March	111.04	94.64	100.04
	April	116.06	94.40	102.30
	May	112.96	100.81	104.84
	June	89.96	66.24	75.81
	July	86.68	65.10	73.80
	August	89.61	80.32	83.86
	September	87.75	88.57	87.99
	October	106.78	103.78	104.93
	November	108.88	108.36	108.61
	December	84.33	87.86	86.47
1990	January	103.14	87.69	93.98
	February	113.05	100.25	105.56
	March	192.06	149.19	167.34
	April	411.22	193.74	283.51
	May	343.40	161.50	236.76
	June	504.35	201.60	327.03
	July	464.27	193.80	305.77
	August	381.28	179.92	262.82
	September	343.96	171.18	242.02
	October	342.32	177.48	244.55
	November	339.33	190.13	250.13
	December	335.20	239.12	275.47
1991	January	336.19	246.74	289.28
	February	358.96	259.27	305.96
	March	245.08	144.43	188.65
	April	242.92	163.96	198.82
	May	247.40	176.60	209.86
	June	279.71	192.01	233.16
	July	284.77	209.18	245.49
	August	298.51	230.18	257.58
	September	314.02	239.67	268.76
	October	318.65	249.40	275.90
	November	324.22	260.25	284.97
	December	324.22	260.25	284.97
1992	January	NA	NA	NA

Source: MTRAB, BCN, IMF:IFS.

economy, as represented by MTRAB's "Public and Private Enterprises" category, have risen cumulatively at rates very close to the national average, so that the surge in the latter index cannot be imputed exclusively to the increase in central government wages.

This rising trend shown by MTRAB data is confirmed by the surveys carried out by Mayorga Associates. On average, real wages in dollars for the five occupations shown in Tables 8 and 9 have risen about 200% between the last two months of 1989 and January 1992. This is similar to the percentage increase reflected by the MTRAB data. At the lowest end are plant supervisors, whose real dollar wages increased 1.9 times, and at the high end are blue-collar workers, whose real dollar wages surged 2.3 times between those dates.

From the INSBBI data on real wages in dollars, summarized in Table 10, we have that the national average in current dollars increased from an annual mean of U.S. \$57.21 in 1989 to U.S. \$159.07 for 1991. In real dollars of 1989, this represents an increase of over two and half times in real wages. The INSBBI series yields, therefore, an even higher jump in real dollar wages in the last two years. However, the difference with other sources might be explained, not only due to the inherent bias of the INSBBI sample, but also because INSBBI does not register payments in kind. As mentioned before, prior to 1991 an important part of wages was paid in kind, but it has been since replaced by cash payments. In other words, a portion of the increase in wages registered by INSBBI statistics may well reflect the full monetization of wages, especially to central government employees.

In any case, the review of the different sources on wages indicate that these have risen in real U.S. dollars somewhere around 200% in the last two years. Interestingly enough, wages in real U.S. dollars have increased even

TABLE 8

Real Wages in Selected Occupations

U.S. Dollars

<u>Year</u>	<u>Month</u>	<u>Blue Collar Worker</u>	<u>Plant Supervisor</u>
1989	11	66.13	296.05
1989	12	76.00	327.00
1990	1	73.33	333.50
1990	2	84.38	311.40
1990	3	70.44	301.90
1990	4	60.49	265.14
1990	5	80.29	364.31
1990	6	107.58	512.76
1990	7	105.57	527.84
1990	8	116.43	436.13
1990	9	129.17	449.58
1990	10	116.06	410.02
1990	11	126.33	423.01
1990	12	NA	NA
1991	1	175.84	638.64
1991	2	184.36	669.77
1991	3	146.42	563.93
1991	4	134.67	520.86
1991	5	138.14	583.15
1991	6	142.34	512.02
1991	7	155.46	536.70
1991	8	160.13	546.62
1991	9	160.42	549.57
1991	10	161.39	547.54
1991	11	162.38	573.29
1991	12	162.38	584.18
1992	1	162.43	587.33

Source: Mayorga Associates.

TABLE 9

Real Wages in Selected Occupations

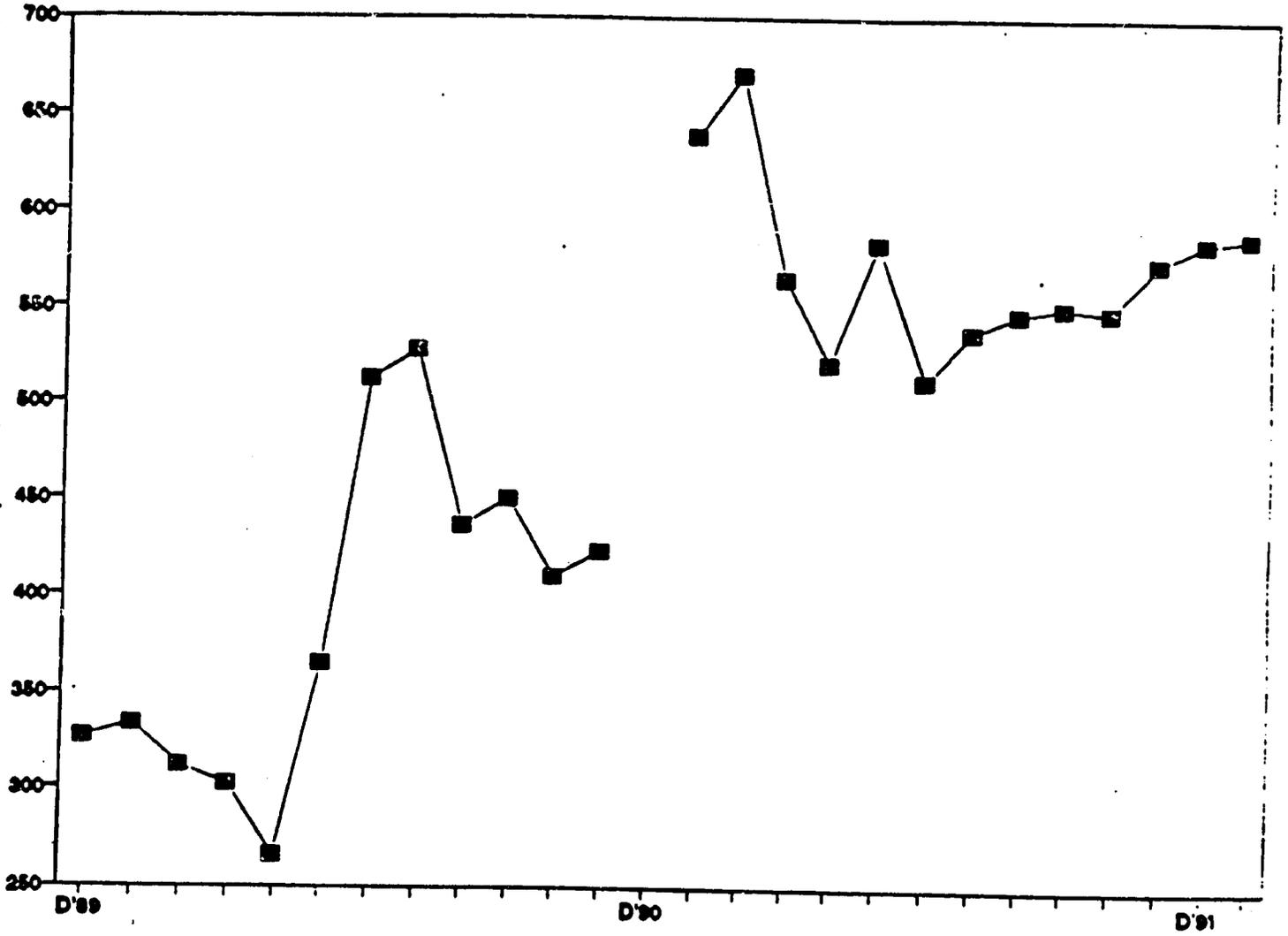
U.S. Dollars

<u>Year Month</u>	<u>Accountant</u>	<u>Secretary</u>	<u>Driver</u>
1989 November	316.40	146.50	76.30
1990 December	359.00	155.00	79.00
January	346.56	147.66	77.35
February	403.81	190.86	112.50
March	276.74	136.86	80.51
April	268.17	108.88	63.51
May	389.40	159.57	121.44
June	545.94	221.19	125.68
July	525.83	210.13	120.65
August	587.09	225.96	135.18
September	556.51	254.46	141.80
October	494.69	231.17	129.38
November	546.47	249.79	139.73
December	NA	NA	NA
1991 January	720.77	291.78	174.88
February	749.20	312.82	177.49
March	576.79	257.23	135.54
April	531.75	236.66	124.77
May	519.01	243.72	132.22
June	533.77	257.39	138.39
July	566.41	283.20	153.48
August	589.13	285.67	156.18
September	592.15	290.14	158.44
October	603.98	299.02	160.40
November	636.66	300.01	165.35
December	629.73	300.01	165.35
1992 January	633.88	304.06	165.40

Source: Mayorga Associates.

Figure 6

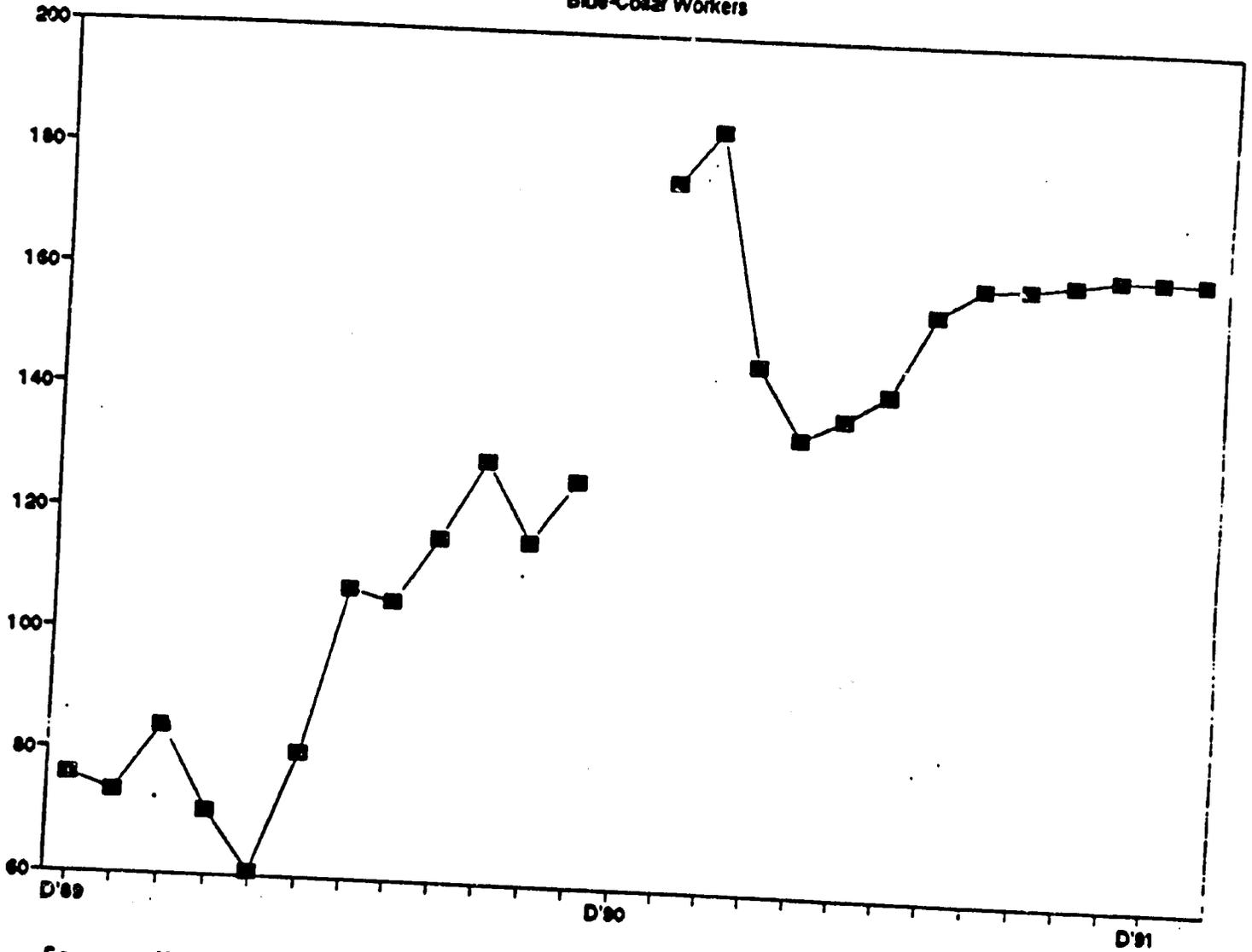
Wages in Real Dollars
Supervisors



Source: Mayorga and Associates.

Figure 7

Wages in Real Dollars
Blue-Collar Workers



Source: Mayorga and Associates.

TABLE 10

Annual Average Wages in U.S. Dollars

Year	(1) Wages in <u>Current Dollars</u>	(2) Wages in <u>1989 Dollars</u>	(3) Real % <u>Increase</u>
1989	57.21	57.21	--
1991	159.07	151.17	164.24

Source: INSBBI, IMF, BCN.

- (1) Converted in US dollars according to the annual average official exchange rate.
- (2) Deflated by the US wholesale price index.
- (3) Accumulated change between 1989 and 1991.

Figure 8

Real Wage Indexes
Fourth Quarter 1989 = 100

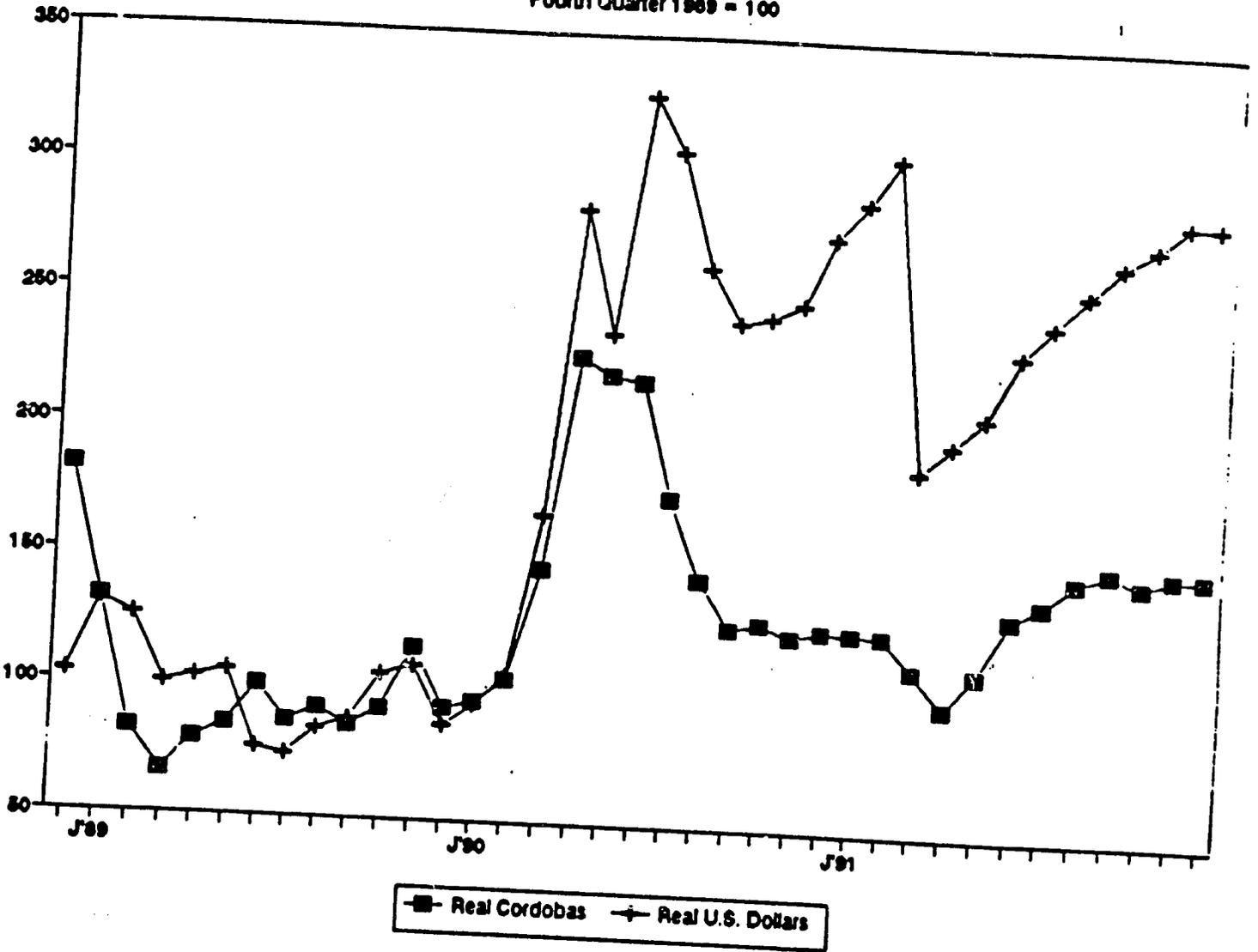


Figure 9

BRER and Wages in Real Dollars
Fourth Quarter 1989 = 100

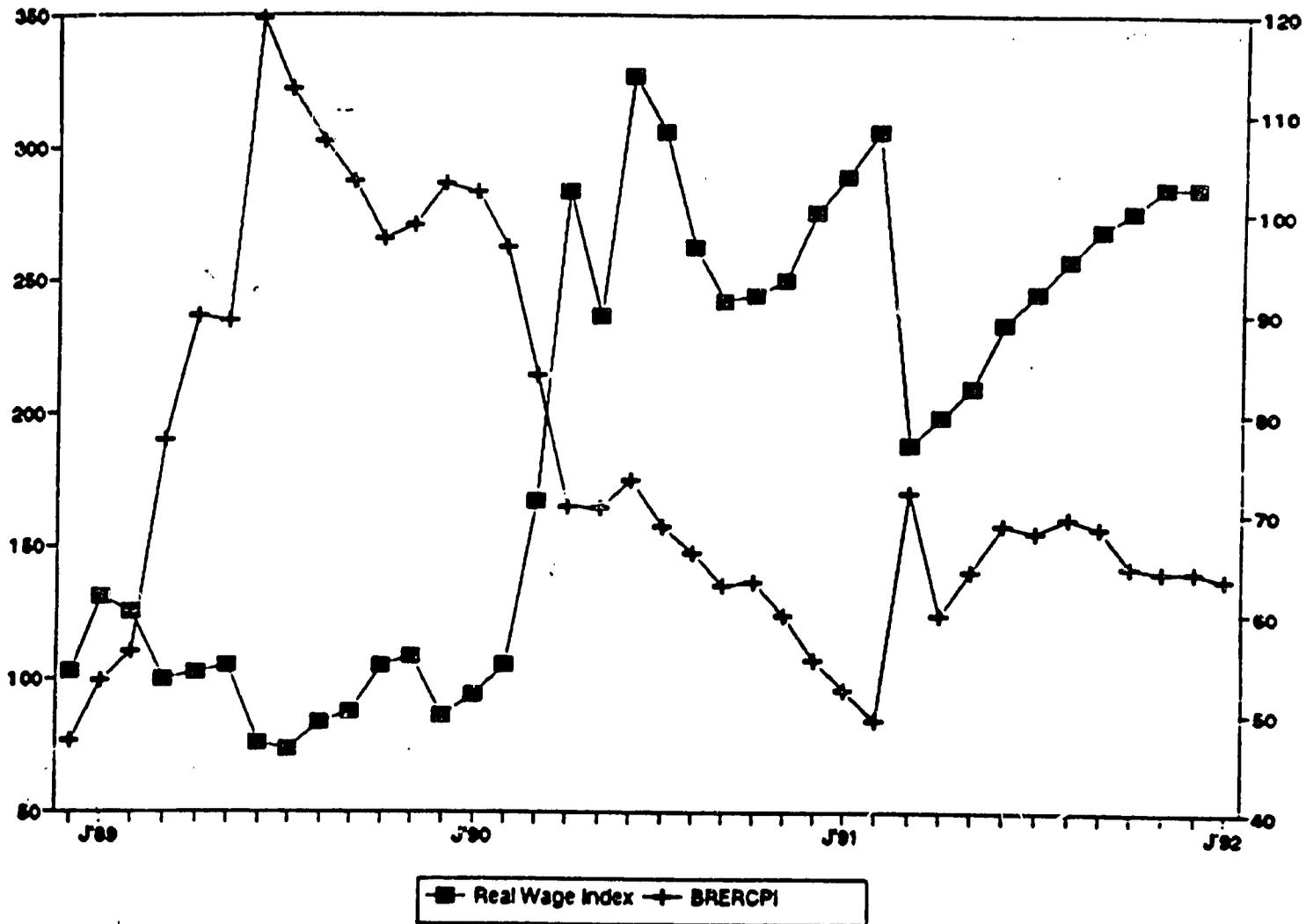


Figure 10

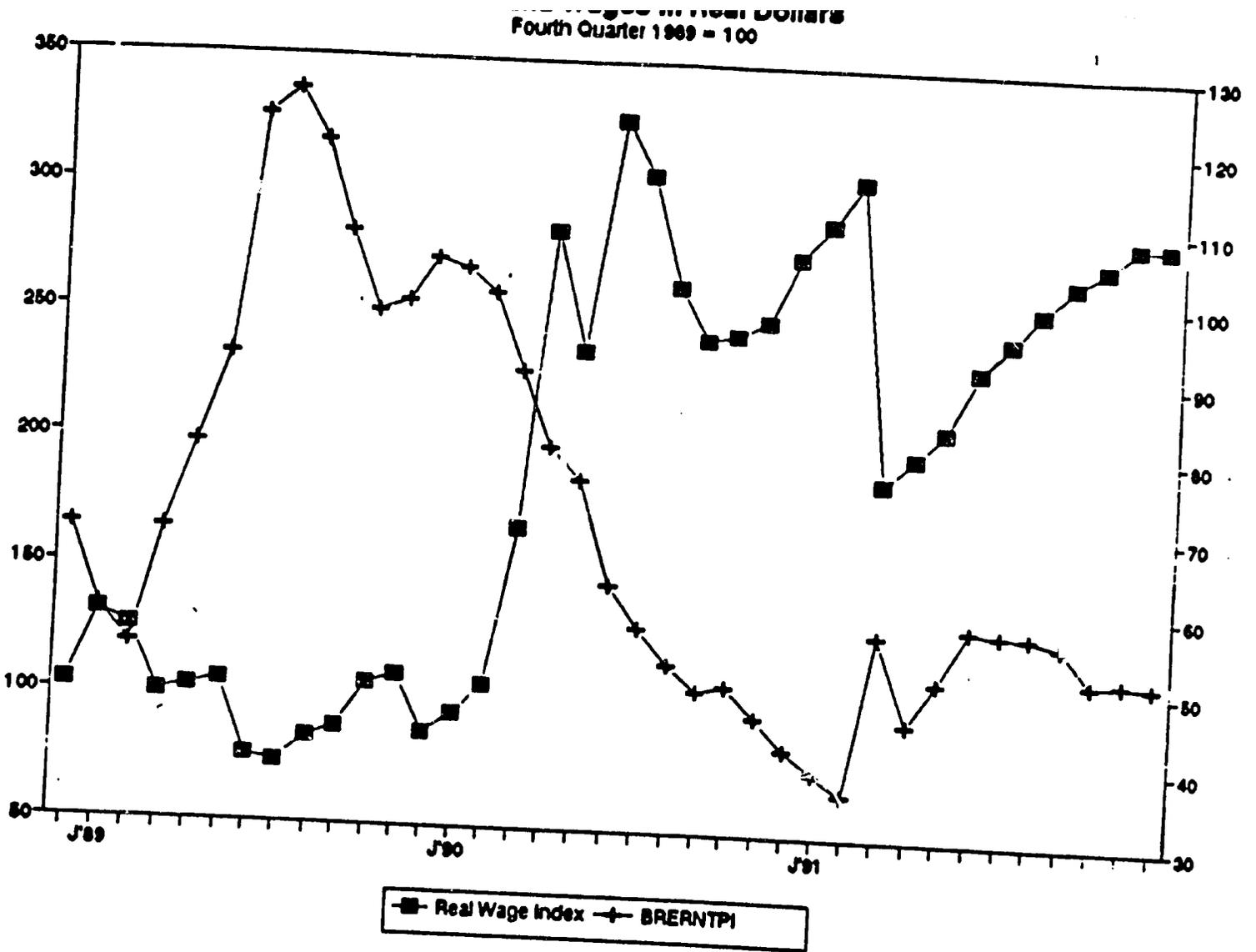


TABLE 11

Average National Real Wages

% change

<u>Year</u>	<u>Month</u>	<u>U.S. Dollars</u>	<u>Cordobas</u>
1989	January	27.20	-27.21
	February	-4.28	-37.59
	March	-20.14	-19.52
	April	2.25	18.52
	May	2.49	7.78
	June	-27.69	17.72
	July	-2.65	-13.54
	August	13.63	5.81
	September	4.93	-5.98
	October	19.26	6.88
	November	3.55	25.55
	December	-20.39	-19.51
1990	January	8.69	3.01
	February	12.32	8.65
	March	58.52	41.26
	April	69.42	55.22
	May	-16.49	-3.02
	June	38.13	-0.96
	July	-6.50	-20.11
	August	-14.05	-17.34
	September	-7.92	-12.50
	October	1.05	1.72
	November	2.28	-3.18
	December	10.13	1.66
1991	January	5.01	-0.65
	February	5.75	-0.23
	March	-38.34	-9.88
	April	5.39	-12.46
	May	5.55	13.16
	June	11.10	19.33
	July	5.29	4.19
	August	4.92	6.95
	September	4.34	2.88
	October	2.65	-3.06
	November	3.29	2.32
	December	0.00	0.10
1992	January	NA	NA
1989-1992 AVERAGE		4.69	1.00

Source: MTRAB, BCN, IMF.

TABLE 12

Estimated Correlation Matrix of Variables

	<u>BRERCPI</u>	<u>IRWD</u>	<u>IRWC</u>
BRERCPI	1.0000	-.6973	-.4488
IRWD	-.6973	1.0000	.6787
IRWC	-.4488	.6787	1.0000

Source: MTRAB, BCN, IMF.

- BRERCPI - Bilateral real exchange rate constructed with CPI;
- IRWD - Index of national average wages in real U.S. dollars;
- IRWC - Index of national average wages in real cordobas.

further than their measure in real cordobas, as shown in Figure 8 and Table 11.

As was pointed out in Chapter II of this paper, we would expect that there should be a strong inverse relationship between the real exchange rate and the behavior of the real wage. This is in fact the case in Nicaragua, as can be seen in Figures 9 and 10, where the BRER and real wage indices are compared. In general, these figures show that when the Nicaraguan BRER increases (depreciates), real wages in the country are declining and vice versa.

The correlation matrix in Table 12 indicates this relationship with more precision. The correlation coefficients are indeed negative, and quite high in the case of the real U.S. dollar wage index and the BRER. It is clear, therefore, that in Nicaragua both real exchange rate and labor cost measures of competitiveness have moved in a consistent way, pointing to a lesser competitive situation for country.

To summarize, all of this clearly suggests that if, as it is with all likelihood the case, there haven't been productivity gains, the increase in dollar denominated wages during this period is capturing a steady decline in the country's degree of international competitiveness, with respect to late 1989. This result, that emerges from the wage data, is consistent with the broad picture on the evolution of competitiveness since 1989 obtained from our analysis of RER indices.

IV.5 The Recent Evolution of Nicaraguan Competitiveness in a Central American Context

It is interesting to compare the recent trends in Nicaraguan competitiveness to the experience of other Central American countries. These nations are, in fact, the more relevant since in many respects they are the direct competitors of Nicaraguan exporters. Monthly BREFs were calculated for Guatemala, Honduras, El Salvador, Costa Rica and Mexico, which are shown

respectively in Figures 11 to 15. Official exchange rates and the U.S. wholesale price index were used in the numerator of the BRER formula, while consumer price indices were used as denominators in all cases.⁴⁵

Confronting the Nicaraguan BRER with that of the five countries listed above for the 1988-92 period, it stands out that in the last 40 months none of them has suffered an appreciation of the real exchange rate of the magnitude observed in Nicaragua. In fact, in all cases the Nicaraguan BRER index has moved below that of the other countries since December 1989, the base date common to all of these series.

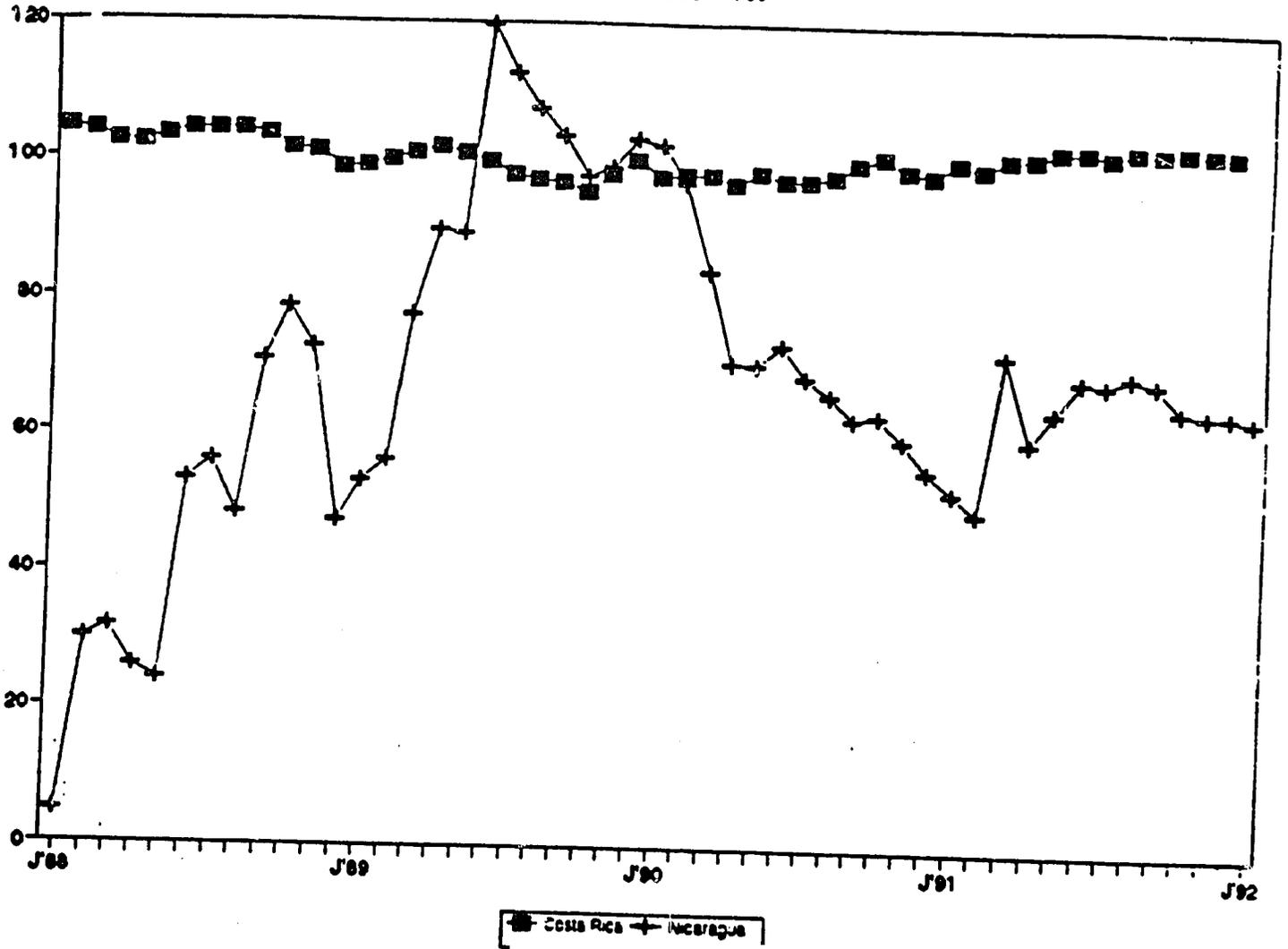
These countries do not experience either the variability that the Nicaraguan real exchange rate does. On the contrary, they have managed to maintain a great deal of stability in the evolution of their BRERs. This is a particularly important feature of RER behavior, since a highly volatile RER will result in widespread uncertainty about relative prices, disrupting efficient allocation of resources, specially in the tradable sector. Nicaragua's competitive disadvantage consequently has accumulated in both accounts: an appreciating and most unstable real exchange rate.

Mexico, the only country that has allowed a steady appreciating trend in the last four years, has managed to keep the BRER within a very stable and predictable path, falling slightly more than 20% from its 1988 average. Costa Rica's BRER presents even greater stability, with no appreciating trend at all. While the standard deviation of its 1988-91 BRER series is 2.33, Nicaragua's is 22.93, that is 10 times larger. The standard deviations for all BRERs series are presented in Table 13.

⁴⁵The data on monthly price indexes for the Central American countries and Mexico were obtained from the Consejo Monetario Centroamericano (C/MC).

Figure 11

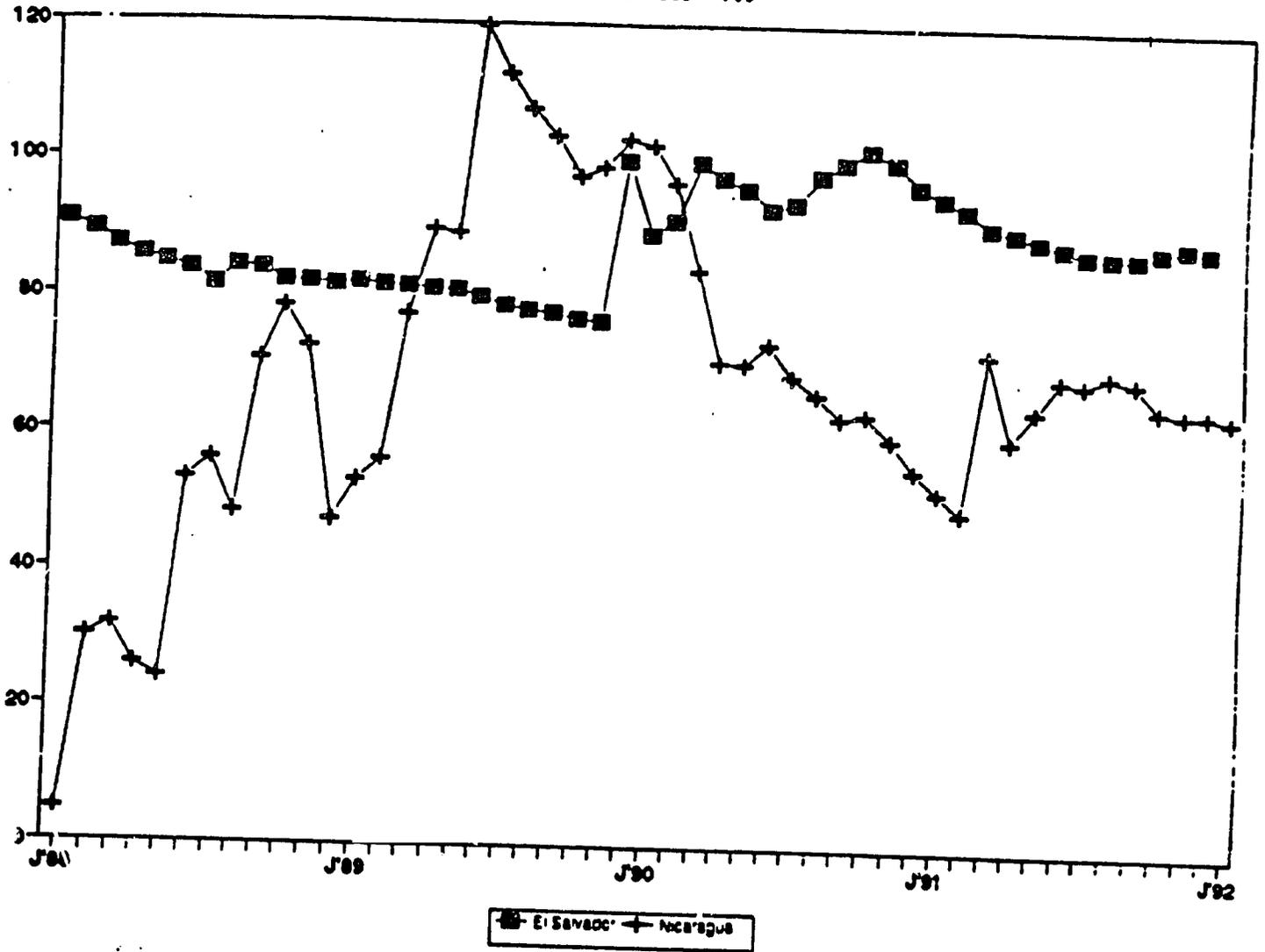
BRER: Costa Rica
December 1989 = 100



Source: own calculations, CEMLA.

Figure 12

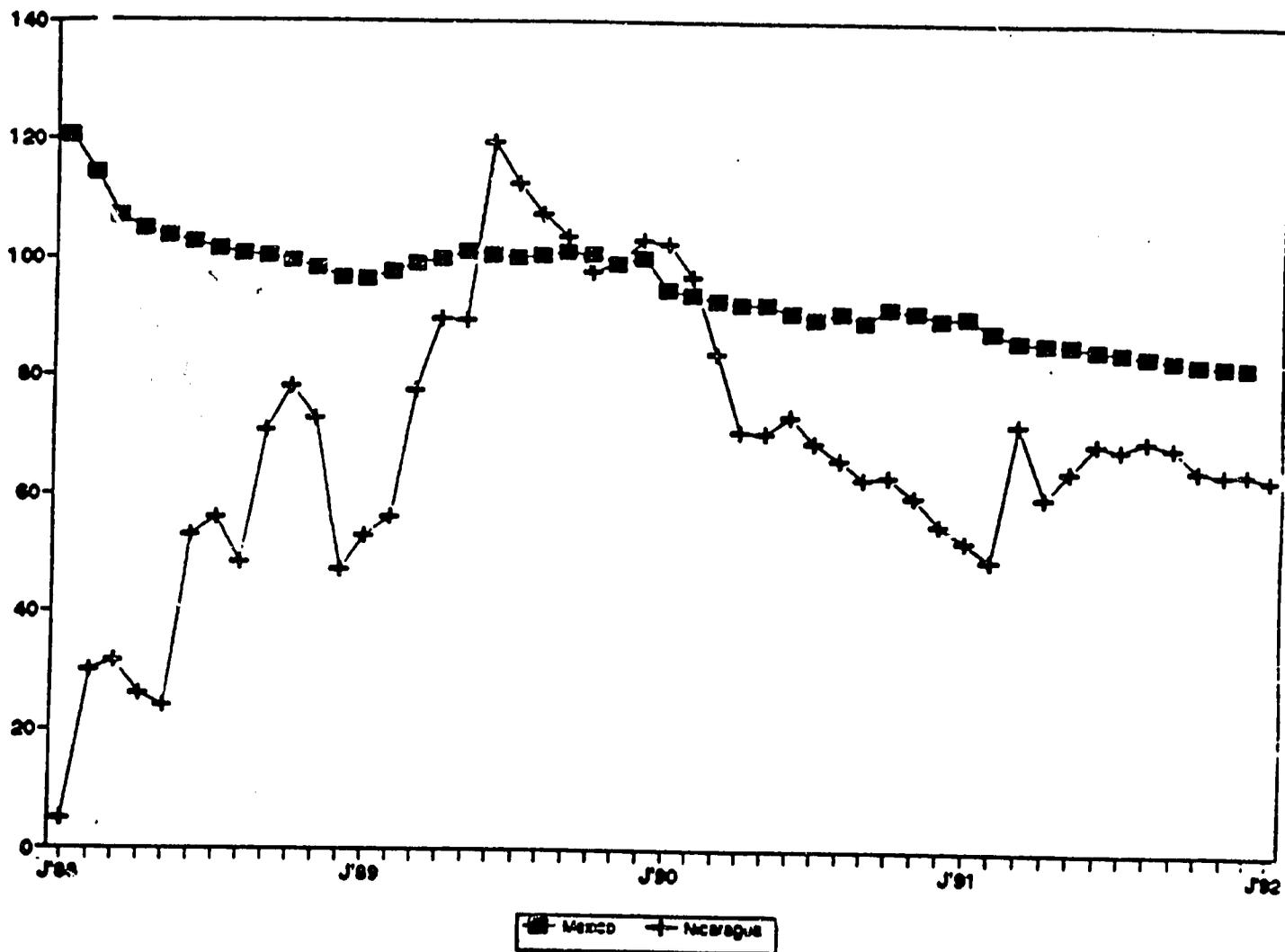
BRER: El Salvador
December 1989 = 100



Source: own calculations, CEMLA.

Figure 13

BRER: Mexico
December 1989 = 100

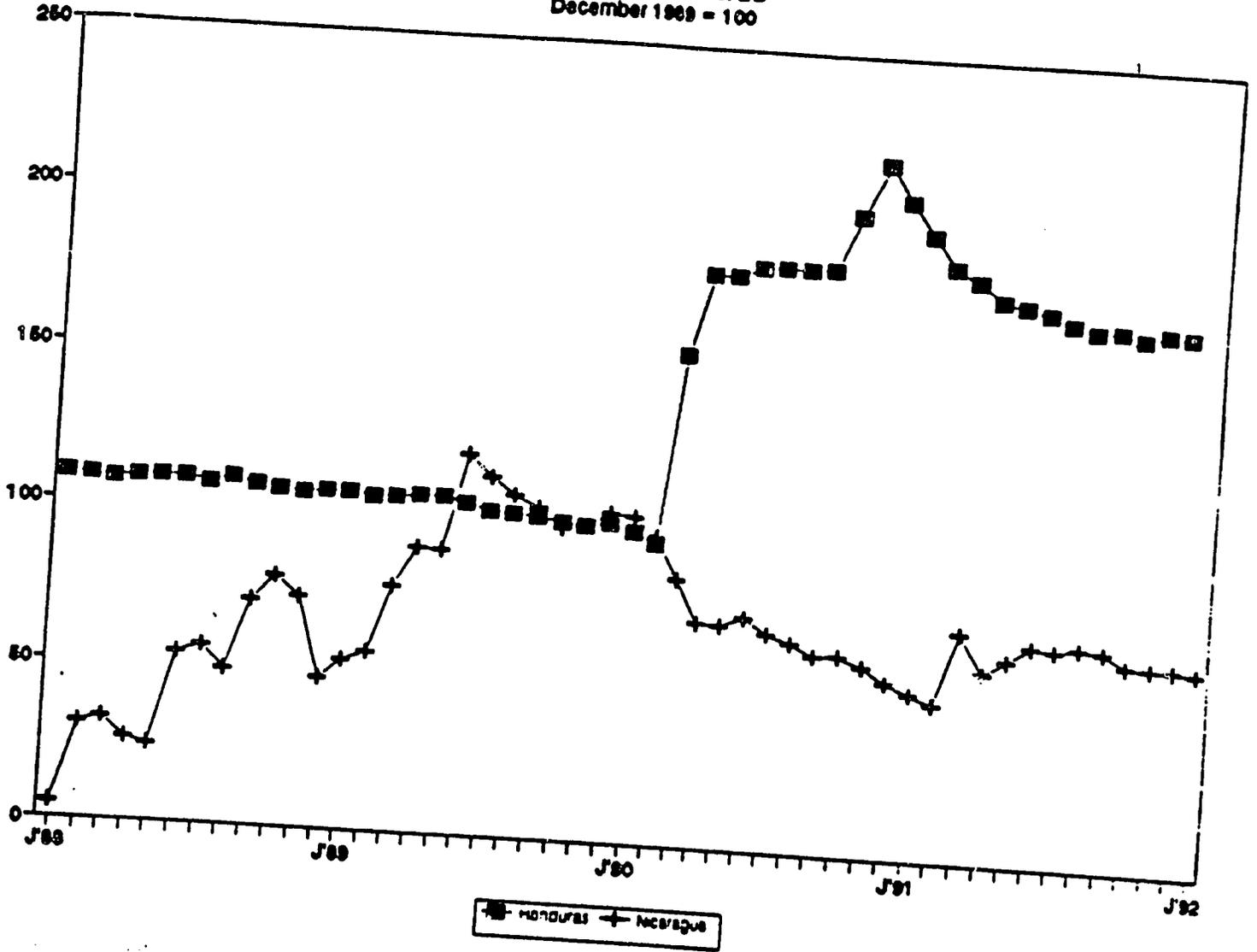


Source: own calculations, CEMLA.

8/6

Figure 14

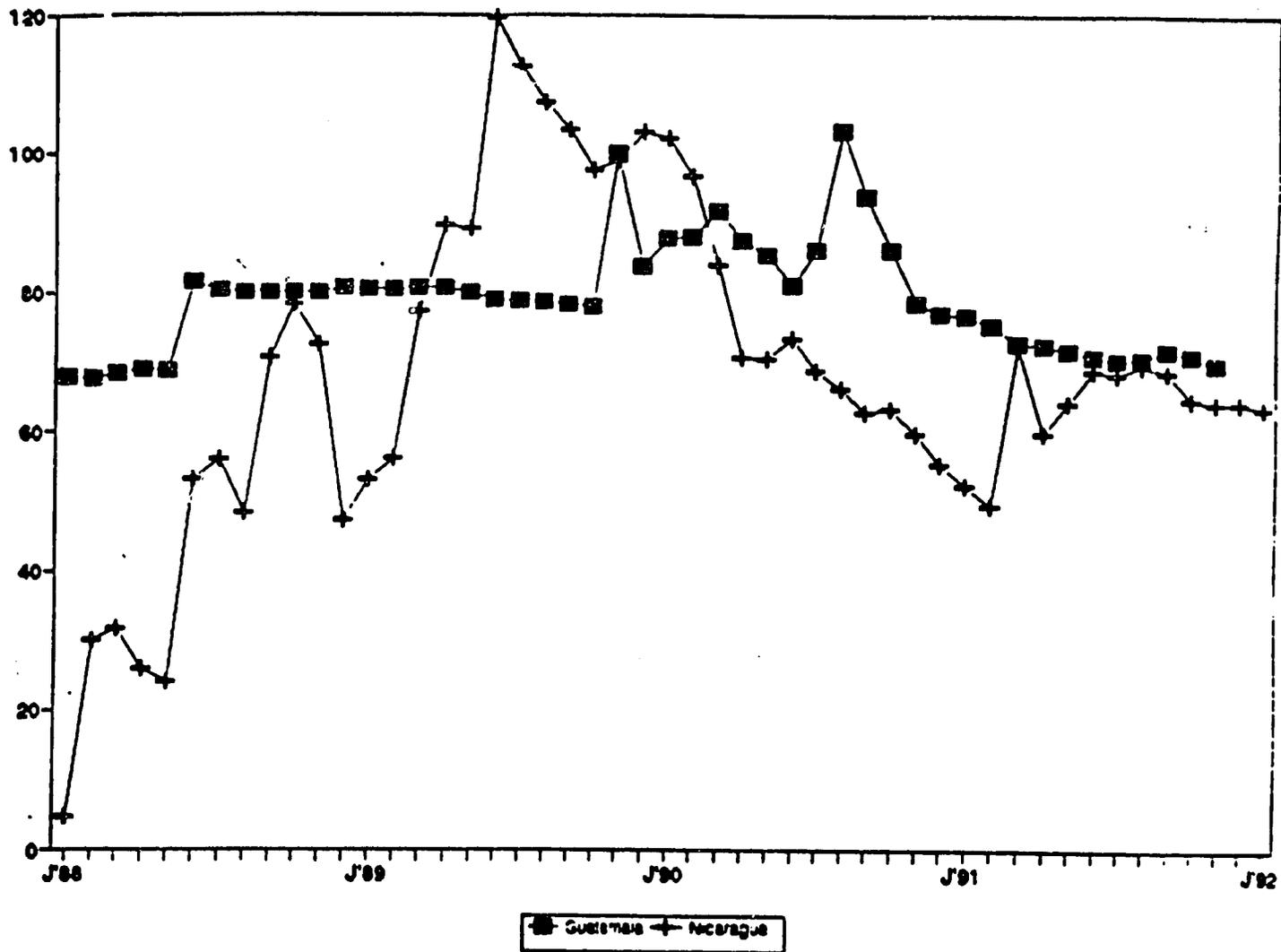
BRER: Honduras
December 1989 = 100



Source: own calculations, CEMLA.

Figure 15

BRER: Guatemala
December 1989 = 100



Source: own calculations, CEMLA.

TABLE 13
BRER Variability
1988-1991

<u>Country</u>	<u>Standard Deviation</u>
Costa Rica	2.33
El Salvador	6.99
Guatemala	8.04
Mexico	8.22
Nicaragua	22.93
Honduras	38.98

Source: IMF, CMC.

The cases of El Salvador and Honduras are particularly instructive because they clearly show that nominal exchange rate policy can engineer a sustained real depreciation, as it was pointed out in Chapter III of this paper. The Honduran BRER jumped about 80% in the first months of 1990, and after a slight erosion, a significant gain in competitiveness has been maintained throughout 1991. The Salvadorian BRER was depreciated by over 25% at the end of 1989 and since then it has been kept well above its previous levels.

These data indicate that in comparison with the end of 1989 the Nicaraguan competitive position relative to that of Costa Rica, El Salvador, Guatemala, Honduras and Mexico, has experienced a significant deterioration. To the extent that in 1989 the Nicaraguan economy was already experiencing a substantial external disequilibrium -- the trade deficit amounted to 34.1% of GDP that year -- these data clearly suggest that at the current time there is a substantial overvaluation of the Cordoba.

IV.6 Competitiveness and Other Costs of Doing Business: A Partial and Preliminary Analysis

In the analytical discussion presented in Chapter II of this paper we argued that relative production costs across countries constituted a very useful and comprehensive measure of international competitiveness. Although labor costs are, without any doubt, a critical component of the costs of production, they are not the only one and, in many cases, not even the most important one.⁴⁶ A number of Nicaraguan analysts, including private exporters, have argued that the high costs of doing business in Nicaragua, including the high costs of intermediate imports and high taxes, represent a

⁴⁶However, as pointed out in Chapter II, to the extent that labor is largely immobile internationally, it becomes a big component in serious analyses on competitiveness.

serious impediment for the rapid development of exports in the country. Although a detailed analysis of the microeconomic cost structures in Nicaragua and the rest of Central America is well beyond the scope of this paper, in this section I present some preliminary findings on the subject.

Table 14 includes data collected by IICA in dollar prices for six important agriculture inputs in Central America during February of 1992. As can be seen, in four out of the six inputs Nicaragua has the highest prices¹ in the region, while in the other two (sulfate and 15-15-15) it has the lowest. Table 15, on the other hand, contains dollar denominated prices for eight important inputs used in coffee production in Nicaragua and Guatemala in the first quarter of 1992. Interestingly enough, in this case the price differentials show a slight cost advantage for Nicaragua. Table 16, finally, includes dollar denominated prices from six construction materials in Nicaragua and Guatemala. These data show that, with the exception of PCV tubes, construction costs are significantly higher in Nicaragua. A number of local observers have also argued that the inefficiency of the distribution system in Nicaragua is at the heart of the observed higher prices in the country. We deal with this issue in Chapter V below.

Although the (admittedly limited) comparisons of input prices in these tables detect a number of instances of higher Nicaraguan cost, the trend is in no way generalized: in a number of items Nicaraguan costs appear indeed to be below those in competing countries. There is preliminary evidence, however, that for a number of services, and in particular for port charges, Nicaraguan costs largely exceed those of neighboring countries.⁴⁷ This situation is the result of a number of factors, including a very low level

⁴⁷COSEP has commissioned a study whose preliminary results strongly support this view.

TABLE 14

Producer Prices Selected Inputs in Central America:

February 1992

(U.S. Dollars)

		<u>Costa Rica</u>	<u>El Salvador</u>	<u>Guatemala</u>	<u>Honduras</u>	<u>Nicaragua</u>
Fertilizer (urea)	Ton	258.67	266.08	289.13	269.70	
Fertilizer (Sulfate)	Ton	199.56	116.28	121.96	195.75	97.57
Fertilizer (15 15 15)	Ton	237.00	238.68	307.61	264.84	205.96
Diesel	Gallon	1.06	.86	1.13		
Leaded Gas	Gallon	1.36	1.31	1.73	1.32	
Airplane Fuel	Gallon	1.51	-	-	1.35	

Source: IICA.

92

TABLE 15

Price Comparison of Chemical Inputs Used In
Coffee Production: Nicaragua and Guatemala

Insumos	Prices Nicaragua ^a (U.S. \$)	Prices Guatemala ^a (U.S. \$)
Compto (qq) 18-6-12-4-2	9.0	11.8
Nitrogenado (qq) Urea 46%	14.6	11.6
Roundup (Lts.)	14.0	12.8
Granoxone 200 (Lts.)	5.5	6.0
Simazina (Lts.)	4.0	8.3
Lorsban (Lts.)	11.4	11.6
Malathion (Lts.)	4.00	4.7
Captafol (lbs.)	4.00	5.7

^aExchange rates are 5 cordobas per dollar and 5 quetzales per dollar.

Source: Nicaragua: Sample taken during first week of March 1992. Prices include IGV. Guatemala prices taken from survey contracted by INCAE. They include sales tax. Survey taken in late January.

TABLE 16

Price Comparisons for Construction Materials:
 Nicaragua and Guatemala (First Quarter, 1992)
 (U.S. \$)

<u>Material</u>	<u>Nicaragua</u>	<u>Guatemala</u>
Cement (qq)		3.1
Cement block		0.2
Steel (qf)		21.4
Plywood sheet		7.7
PCV Tube (20'x4")	1.4	1.7
Oil Paint (gallon)		9.5

Source: Nicaraguan prices sampled in Managua among wholesale distribution during the first week of March 1992. Guatemalan prices obtained from survey contracted by INCAE. All prices include sales tax.

of investment in infrastructure and a tragically low level of productivity.

There is little doubt that the cost-reducing measures announced in the March 1992 package will help improve the competitive position of the country. However, it is highly unlikely that these measures will, on their own, result in the improvements in competitiveness required for self-sustained development in the medium and long runs. In order to gain further insights into this important question it is recommended that detailed comparative analyses at the Central American level of the costs of doing business are undertaken in the future.

IV.7 Summary

In this chapter we have presented the recent (1988-1992) evaluation of a number of competitiveness indicators in Nicaragua. This analysis clearly shows that independently of the index used -- bilateral RER, multilateral RER or alternative wage indicators -- the degree of international competitiveness in early 1992 stands significantly below the level it achieved in late 1989 when the Sandinista government implemented its final (and failed) attempt to introduce corrective measures in the functioning of the economy. The analysis undertaken here also shows that the March 1991 devaluation did manage to increase somewhat the real exchange rate. The effectiveness index of that devaluation, however, was a meager 0.07, capturing the fact that the large wage rate adjustments granted at the time largely eroded the real exchange rate effects of the adjustment.

The comparative analysis of RER behavior in Central America is particularly illustrative since it indicates that, in relation to late 1989, Nicaragua is currently facing a significantly deteriorated external sector position. This means that the country will have serious difficulties in competing for foreign markets with its neighbors. In Chapter VII, I discuss

15

some of the policy options opened for Nicaragua in the months to come.

V. A Longer Term Perspective on Nicaraguan Competitiveness

V.1 Introduction

The analysis presented in the preceding sections has concentrated on the recent (since 1988) evolution of Nicaragua's competitive position. However, in order to understand the behavior of competitiveness from a broader perspective it is useful to construct longer term series on real exchange rates. As pointed out in Chapter III, an important element in the evaluation of the external position of a country is determining a benchmark year for historical comparisons. This benchmark should be a "normal" year, hardly a description fitting the 1988-92 period in Nicaragua. For this reason, a number of alternative indices were constructed, covering the period 1973-91. A very detailed explanation on how these indices were computed is offered in Appendix I of this report. In this section, therefore, I will not present an extended discussion on the technicalities and data sources involved in the calculation of MRER indices. For a more in depth understanding of these issues I will refer to the Appendix.

V.2 Historical Behavior of Nicaragua's Price Levels: A Statistical Mystery

There is a very difficult and crucially important problem that arises in the long-run analysis of Nicaraguan competitiveness which deserves full attention at this point: the accuracy of the statistical series on the Nicaraguan price indices prior to 1989 are suspect.⁴⁸ An indication of the weakness of this series is the significant divergence between the CPI and the GDP deflator recorded for Nicaragua before that year.⁴⁹ Table 17

⁴⁸Much of the official statistics on Nicaragua prior to 1988 are now being revised by the BCN.

⁴⁹It is not unusual that in high inflationary situations the CPI loses accuracy.

compares both variables and shows the difference between them.

It can be appreciated in Table 17 that the consumer price index and the GDP deflator are highly inconsistent, as they show very different yearly rates of increase, with the CPI showing cumulatively increases many times more than the GDP deflator. These indices begin to diverge notoriously in 1982 and by 1986 and 1987 the CPI is growing at percentages more than twice as large as that of the GDP deflator.⁵⁰ This divergence is particularly high in 1988 when the CPI shows a rate of inflation that is one thousand percentage points higher than that captured by the GDP deflator. At this point, and without a detailed analysis of historical series, it is not possible to know precisely what are the sources of this divergence. However, a possible explanation would recognize that the CPI placed a relatively heavy weight on goods sold in the informal market, where prices were much higher than in the official market.⁵¹ From 1989 onwards, however, the two price series begin to converge again.

Such inconsistency across price indexes is not entirely surprising, for recording price changes with precision in hyperinflationary conditions is a very difficult task indeed. However, excuses aside, these divergences introduce serious difficulties since the choice between the CPI and the GDP deflator as the appropriate proxy for nontradable prices will produce very different estimates of the evolution of the real exchange rate and other competitiveness indexes. Given the characteristics of the two alternative price indicators, the use of the CPI in the calculation of long term series

⁵⁰Prior to 1978 these two price indicators also diverged for some years, but the cumulative indices up to 1978 remain quite close to each other.

⁵¹See IMF, Nicaragua - First Review under Stand-by Arrangement, January, 1992.

TABLE 17
CPI and GDP Deflator

Year	Consumer Prices		GDP Deflator	
	Index	%	Index	%
1973	100.0	---	100.0	---
1974	114.9	14.9	124.2	24.2
1975	126.1	9.7	127.4	2.6
1976	130.0	3.1	140.3	10.1
1977	145.0	11.5	150.0	6.9
1978	152.3	5.1	158.1	5.4
1979	225.8	48.3	219.4	38.8
1980	305.3	35.2	300.0	36.8
1981	378.1	23.9	335.5	11.8
1982	471.6	24.7	391.9	16.8
1983	617.9	31.0	433.9	10.7
1984	836.3	35.4	603.2	39.0
1985	2672.0	219.5	1612.9	167.4
1986	20879.1	681.4	6153.2	281.5
1987	211285.3	912.0	38335.5	523.0
1988	30407519.4	14291.7	5113564.5	13239.0
1989	1484254128.3	4781.2	262734945.0	5038.0
1990	111686460207.1	7424.8	19923190880.0	7483.0
1991	2712163040614.6	2328.4	563427838100.0	2728.0*

*Preliminary.

Source: BCN, IMF.

for the multilateral RER will result in an historical scenario where Nicaragua's competitiveness has suffered staggering decline. On the other hand, using the GDP deflator shows a higher RER in 1991 than in the mid 1970s. The strategy followed in this section of the report is to make both calculations: one using the CPI and the other using the GDP deflator, and then discuss each resulting scenario regarding the long-run evolution of Nicaragua's competitiveness.

V.3 The Long Run Evolution of the Multilateral Real Exchange Rate

As explained in Chapter II, the MRER takes into account a basket of currencies corresponding to the most important trading partners of Nicaragua, weighted by their relative importance in foreign trade. The varying features between the different MRERs measures introduced here are the combination of trading partners taken into account, and the weights assigned to each of them. The following combinations were considered in the computation of four alternative MRER indices, denoted as follows:

- 1) MRER_s, which includes the five nations that make up the SDR currency basket: the United States, Japan, Germany, France and the United Kingdom. The weights used here are those of their respective currencies in the SDR basket (see Appendix I);
- 2) MRER_{cm}, which includes the nine most important countries in Nicaraguan total foreign trade (imports + exports): the U.S., Costa Rica, Guatemala, Germany, Japan, Mexico, Italy, Netherlands and Spain;
- 3) MRER_x, which includes the ten most important countries as destination of Nicaraguan exports: the U.S., Germany, Japan, Costa Rica, Guatemala, Netherlands, Belgium, Italy, Canada and Spain;
- 4) MRER_m, which includes the nine most important countries as origin of Nicaraguan imports: the U.S., Venezuela, Costa Rica, Guatemala, Japan,

100

Germany, Spain, Mexico, and the United Kingdom.

Due to the lack of complete information on prices for Honduras and El Salvador, though important trade partners of Nicaragua, these countries were not included in our MRER calculations. For the same reason, Eastern European nations and Cuba, which made up as a whole a sizeable proportion of Nicaragua's foreign trade during the second half of the 1980s, were not considered either (see Appendix I for a detailed discussion on the subject).

The sets of countries listed above -- with the exception of those in SDR based index -- were selected because they constituted the most important trading partners of Nicaragua between 1978 and 1982. This time period was deemed appropriate for such selection because Nicaragua has gone through very large shifts in the direction of its trade since the mid-1980s and is still adjusting presently as the country comes out of the U.S. embargo. Thus, today's geographic composition of Nicaraguan trade cannot be taken as definite yet. However, the most recent trend, including the U.S. quick repositioning as Nicaragua's principal trading partner, points to a pattern of trade in the near future which will closely resemble that prevalent during 1978-82. The issue whether the U.S. trade embargo affected the historical evolution of Nicaragua's real exchange rate is investigated in Section II.7 of Appendix I.

The weights assigned to these countries in the calculation of the different MRER indices are defined according to their relative importance in Nicaraguan trade during the same 1978-82 period. A detailed explanation on how these weights were calculated and the weights themselves are presented in Section II.1 of Appendix I. Section II of the Appendix presents also a full discussion on the estimation of all the variables necessary for the computation of the MRER -- the nominal exchange rates and the price indices

101

for tradable and nontradable goods -- which in the case of Nicaragua it involves a less than trivial procedure to arrive at appropriate exchange rate measure. So, here I will present and compare without further introduction two sets of MRER indices: one calculated with the CPI as a proxy for nontradable prices, and a second where the GDP deflator was used instead.

Figures 16, 17, 18 and 19, and Tables 18 and 19 show annual MRER indices constructed with the two alternative domestic price measures (CPI or GDP deflator).⁵² It can be seen in these Figures that using the GDP deflator as a proxy for nontradable prices results in a milder real exchange rate appreciation between 1981 and 1987, and a much steeper depreciation as a result of the series of devaluations that took place starting in 1988.

In fact, according to the CPI based measures the Nicaraguan RER in 1987 was at most 10% of its 1973 level, while the GDP deflator based RER indices

⁵²It is interesting to note in this last respect that for most of the 1970s the Nicaraguan real exchange rate appreciated more according to the trade weighted MRER measures than it did according to the SDR based index. In fact, between 1977 and 1979 the MRERs shows a depreciating trend. This is because during those years the U.S. dollar suffered a significant devaluation against the Japanese and European currencies, and since the cordoba was pegged to the dollar, it automatically depreciated against those currencies, which have a much larger weight in the SDR measure of the Nicaraguan real exchange rate. The (relatively small) divergence between the trade weighted MRER indices is explained mostly because the weights attached to the countries that have suffered large devaluations and inflation rates -- Mexico, Guatemala, Costa Rica and Venezuela -- differ from one index to another. In fact, these four countries have a collective weight of about 40% in the import based real exchange rate measure (MRER_m), but in the total trade and the export based indices -- MRER_{xm} and MRER_x -- that percentage is only 26% and 16% respectively (see Tables A.1, A.2 and A.3 in Appendix I). Consequently, as shown in Table 15 by mid-1991 the lowest measure of appreciation of the Nicaraguan real exchange rate is given by the MRER_m index, while the highest is represented by the MRER_x index shown in Table 19. This is not a minor issue since it implies that the appreciation of the real exchange rate has impacted Nicaragua's export sector the most. In the estimation of the MRER_m index Venezuela appears as one of the most prominent partners of Nicaragua on the import side of her trade. Today Venezuela no longer holds an important share of Nicaragua's trade. A real exchange rate index was calculated in the Appendix were the most recent trade pattern is taken into account.

108

TABLE 18
 CPI Based Annual Multilateral Real Exchange Rate Indices
 1973 - 100

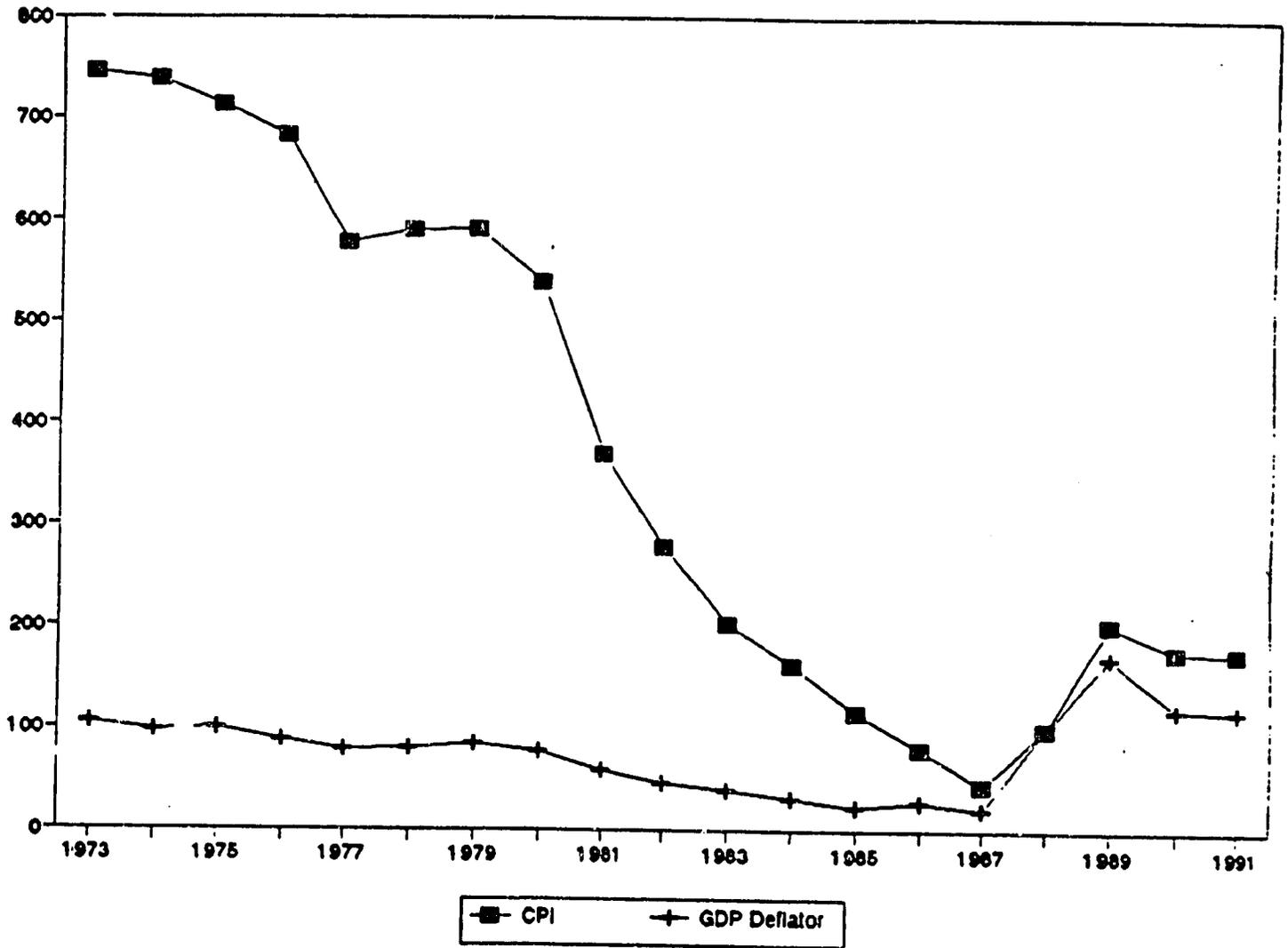
<u>Year</u>	<u>MRERs</u>	<u>MRERxm</u>	<u>MRERm</u>	<u>MRERx</u>
1973	100.00	100.00	100.00	100.00
1974	102.50	99.22	99.10	97.16
1975	101.59	95.76	96.20	93.10
1976	97.90	91.67	94.99	92.82
1977	94.31	77.60	86.18	89.19
1978	102.78	79.26	88.32	92.90
1979	105.68	79.44	88.68	93.51
1980	96.83	72.33	81.62	83.99
1981	75.49	49.88	57.93	56.38
1982	67.75	37.52	48.49	49.13
1983	52.40	27.29	37.62	38.93
1984	41.30	21.79	28.24	30.92
1985	28.97	15.69	20.54	21.96
1986	20.26	10.74	13.84	15.06
1987	10.15	5.81	6.79	7.50
1988	18.45	13.43	14.32	13.64
1989	34.99	27.24	32.35	26.60
1990	28.68	23.73	27.87	22.35
1991	25.79	23.55	27.78	21.02

*First and second quarter of 1991.

Source: BCN, IMF.

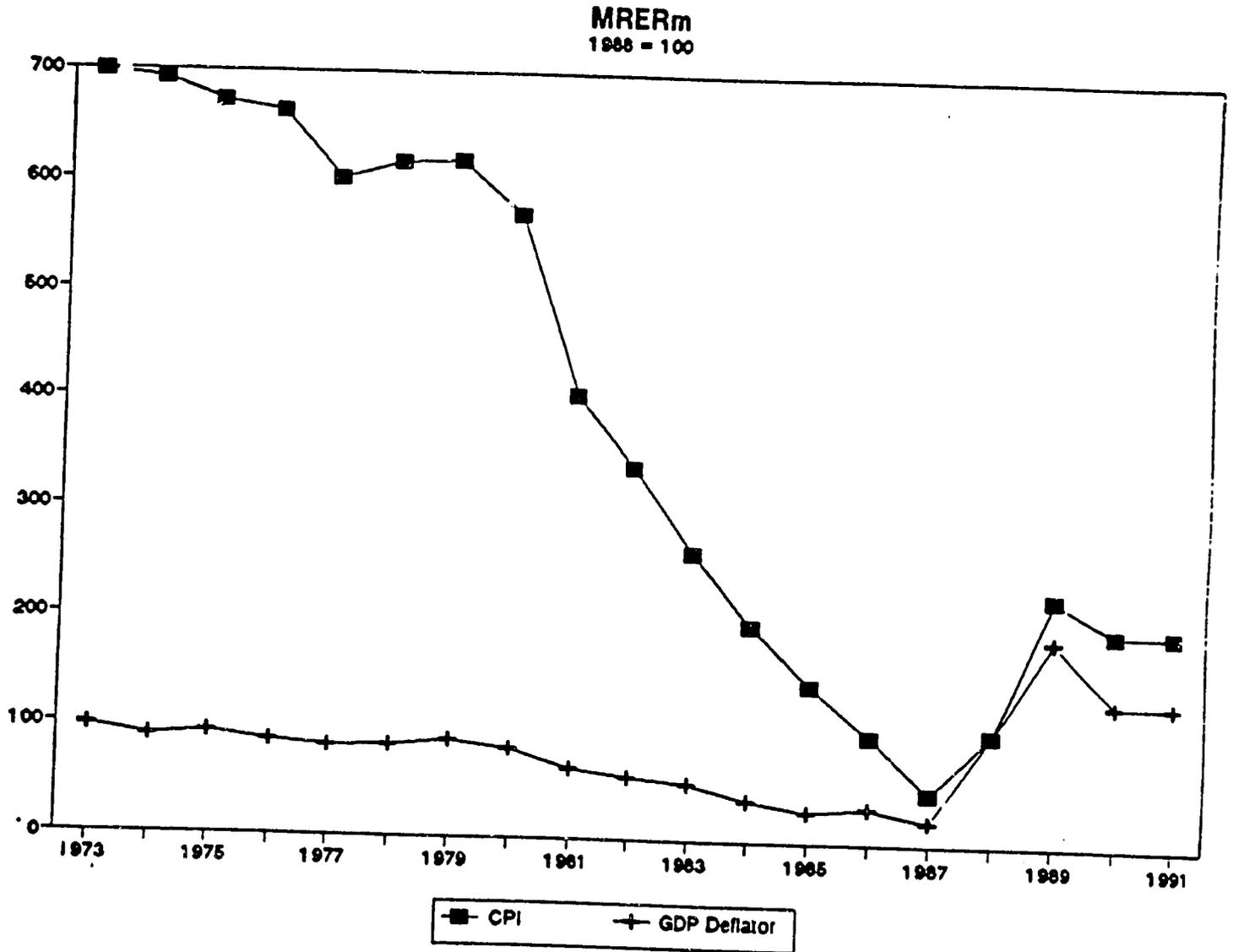
Figure 16

MRERxm
1988 = 100



Source: own calculations.

Figure 17

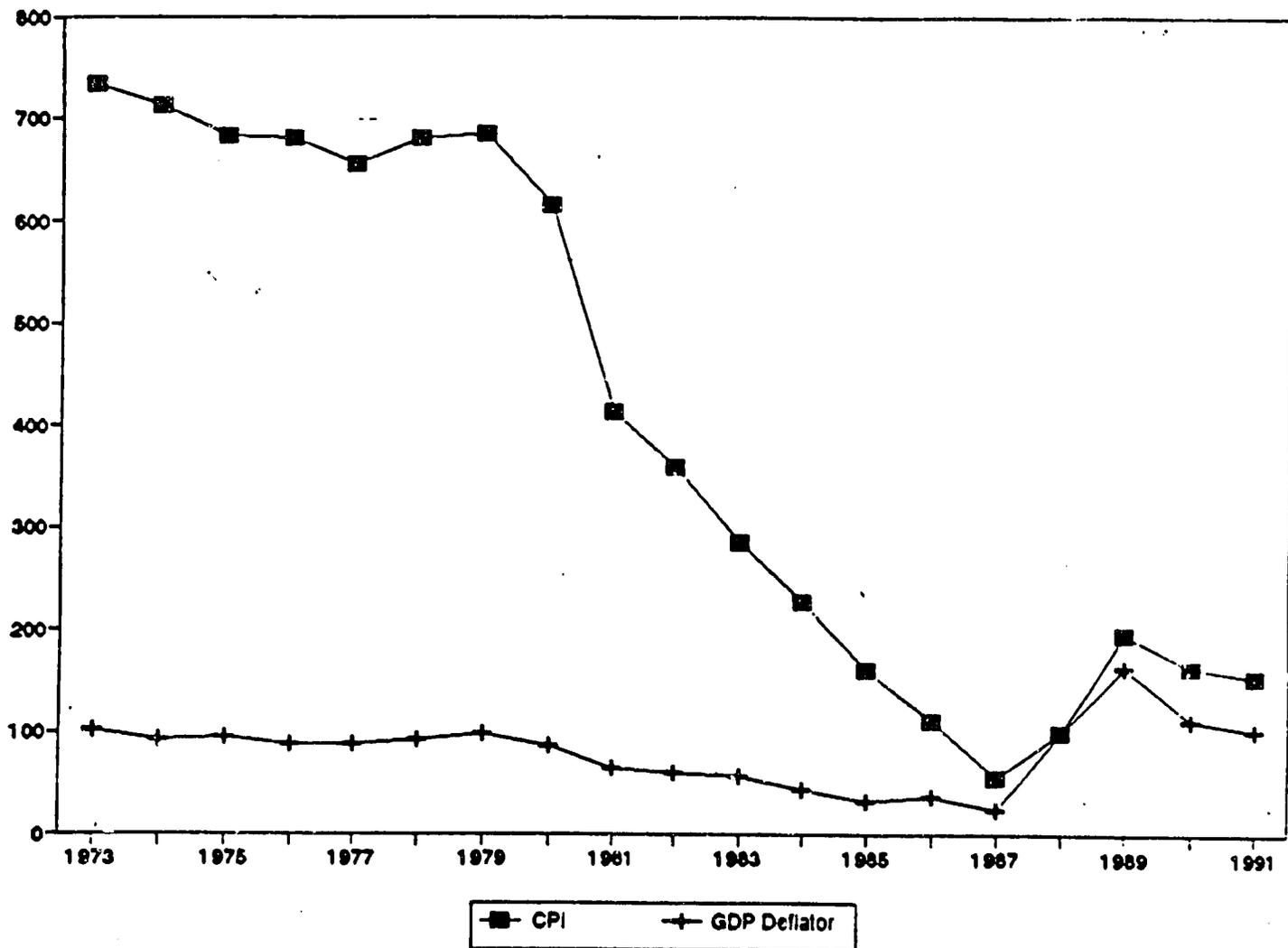


Source: own calculations.

105

Figure 18

MRERx
1988 = 100



Source: own calculations.

106

TABLE 19
GDP Deflator Based Multilateral Real Exchange Rate Indices

1973 = 100

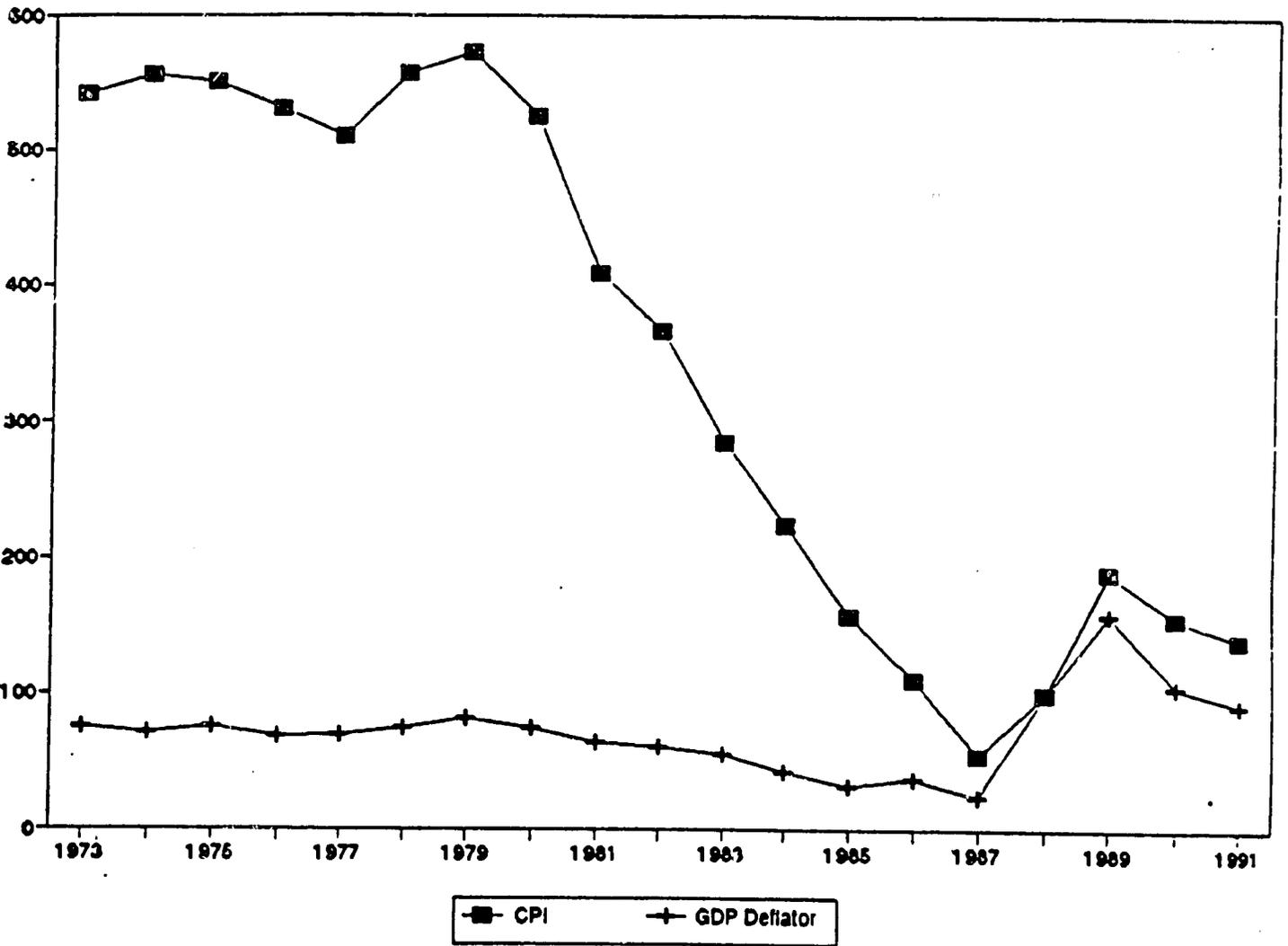
<u>Year</u>	<u>MRERs</u>	<u>MRERxm</u>	<u>MRERm</u>	<u>MRERx</u>
1973	100.00	100.00	100.00	100.00
1974	91.91	91.82	89.98	94.87
1975	94.79	95.22	92.17	100.56
1976	84.96	88.05	86.03	90.72
1977	75.01	83.31	86.21	91.15
1978	76.41	85.15	89.56	99.07
1979	81.11	90.56	95.48	107.94
1980	73.46	82.91	85.28	98.37
1981	55.97	65.01	63.24	84.68
1982	45.05	58.27	59.08	81.39
1983	38.41	53.01	54.78	73.74
1984	29.73	38.52	42.17	56.26
1985	22.45	29.42	31.51	41.80
1986	26.02	33.15	36.41	49.15
1987	18.80	21.78	23.40	31.85
1988	95.65	102.13	97.40	132.21
1989	162.66	190.62	159.31	209.22
1990	113.35	132.66	107.20	139.25
1991	111.97	132.31	99.72	122.05

*First and second quarter of 1991.

Source: BCN, IMF.

Figure 19

MRERs
1988 = 100



Source: own calculations.

show a less drastic scenario: by 1987 the different MRER measures stand between 20% and 30% of their 1973 levels. Although both sets of indicators point undoubtedly to a very pronounced appreciation of Nicaragua's RER after 1979, the GDP deflator based indices place the RER in 1987 at values three times higher than the CPI based indices do.

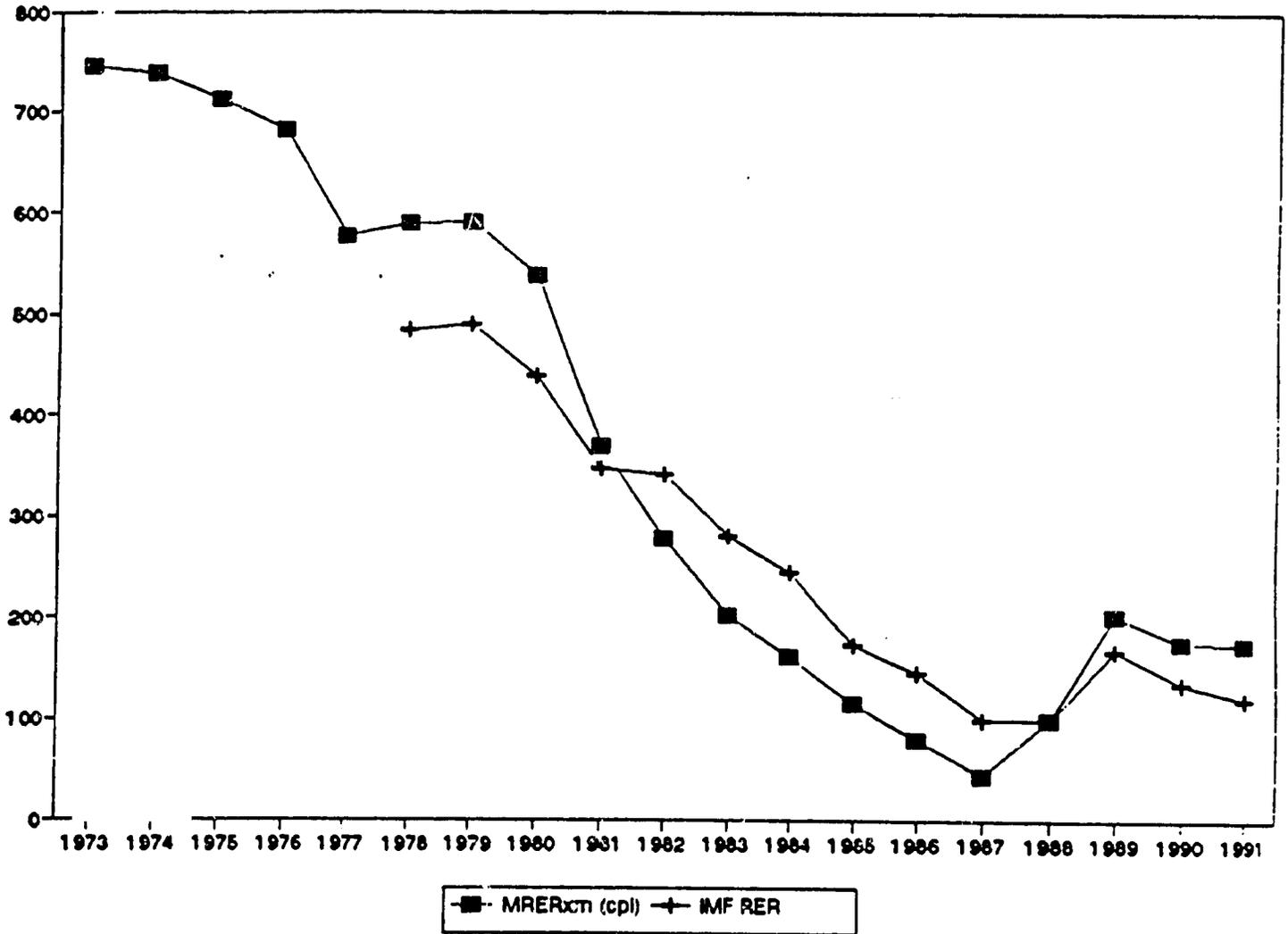
From 1988 on both sets of indices diverge much more widely, describing quite different scenarios. According to the CPI based measures the successive devaluations of the Cordoba beginning in February of 1988 managed to reverse the appreciation of the real exchange rate, but the RER remains nonetheless at very low historical levels, somewhere between 20% and 30% of those prevailing in 1973. Instead, the GDP deflator based indices place the RER from 1988 on at levels higher than in any year since 1973. More specifically, these MRER indices indicate that today, depending on which specific measure we look at, the RER is between 15% and 30% higher than what it was in 1973. A close analysis of these data reflect that the more serious divergence appears in 1988. According to the CPI based indices in that year the RER approximately doubled, while according to the GDP based indices in that year the RER increased by a multiple of five! Of course, as pointed out above, at the root of this is the very large difference in CPI and GDP inflation in that year -- more than 1,000 percentage points.

Interestingly enough, most studies on the external sector in Nicaragua have ignored this dramatic divergence in log term RER calculations.⁵³ For example, the IMF's estimate of the Real Effective Exchange Rate presented in

⁵³See Government of Nicaragua, Situación de la Economía Nicaraguense, 1991; J.L. Medal Una Evaluación Preliminar del Tipo de Cambio Real en Nicaragua, Managua, February 1992; IMF, May 1991 and January 1992, op cit. An exception to this general approach of computing a CPI based RER is J.A. Ocampo, Collapse and (Incomplete) Stabilization of the Nicaraguan Economy, in R. Dornbusch and S. Edwards (eds.) The Macroeconomics of Populism in Latin America, Chicago, London: University of Chicago Press, 1991.

Figure 20

IMFRER & MRERxm
1988 = 100



Source: own calculations; IMF.

its January 1992 document on Nicaragua implies that the RER in 1991 stood at less than a third of its 1980 level. The IMF estimate regularly published under the rec series in the IFS volumes closely resembles our CPI based computation of the multilateral real exchange rate $MREER_{xm}$. Figure 20 compares both indices on a quarterly basis for the period 1985-91.

The problems in measuring the long run evolution of the RERs in Nicaragua means, quite simply, that in defining policy options it is not possible to rely on a historical benchmark. As is often the case in countries that have suffered from hyperinflation the design of a policy path will have to rely on other pieces of information, including the short run behavior of several indicators. I do this in Chapter VII of this study.

V.4 Long Run Evolution of Real Wages

Table 20 presents three series on real wages for the period 1979-91. The first series has been calculated by the World Bank and the second by the Government of Nicaragua; both of them have been deflated with Nicaragua's CPI and the base date is 1980=100. The third series is our own estimation based on available data on average nominal wages from the INSBBI and MTRAB,⁵⁴ which has been converted into real wages using the GDP deflator shown in Table 17.⁵⁵

⁵⁴As reproduced by the BCN, for 1987 the INSBBI has only a preliminary figure on average wages which is not reliable, and it does not report any data for 1988. The figure that the Institute reports as the annual nominal wage for 1990 corresponds to the average for December of that year only, which is much higher than the annual average. So, for 1987, 1988 and 1989 the real wage was estimated based on its percentage change reported by J.A. Ocampo, 1991. For 1990 MTRAB data on average national wages was used. Since INSBBI wages are somewhat higher than those reported by MTRAB, the 1990 real wage is probably underestimated with respect to the rest of the series we computed.

⁵⁵Ocampo (1991) also presents real wage data based on the GDP deflator.

TABLE 20

Average Real Wage Indices

<u>Year</u>	<u>World Bank(1) Estimate</u>	<u>GON(2) Estimate</u>	<u>GDP Deflator Estimate</u>
1979	123	na	na
1980	100	100	100
1981	91	92	101
1982	96	81	95
1983	83	70	105
1984	79	67	93
1985	55	48	79
1986	20	20	67
1987	14	8	58
1988	5	5	40
1989	9	8	27
1990	15	12	38
1991	na	na	48

Source: INSBBI, MTRAB, IMF, BCN, GON, WB, J.A.Ocampo 1991.

(1) A. Cox, Wage Trends in Latin America, A View from LATHR No.18, Human Resources Department, The World Bank, Washington, D.C.: September 1991.

(2) Gobierno de Nicaragua, Situación de la Economía Nicaragüense 1991, Managua: November 1991.

As expected, the behavior of real wages changes significantly depending on which price index is used to deflate them. The two CPI based series are fairly close to each other, as they both describe a sustained fall in real wages beginning in 1980, reaching in 1988 only 5% of their original level. By 1990, however, real wages had tripled their low 1988 level, but stood only at 12% to 15% of their 1980 level.

However, according to the GDP deflated real wage index in column 3 of Table 20 real wages in Nicaragua do not fall as dramatically as the previous two measures indicate. The lowest point is reached according to the latter index in 1989, when real wages have lost slightly over 70% of their 1980 value, but by 1991 they had rebounded to about 50% of their original level. In fact, from 1985 onwards our estimate places real wages around three times higher than the World Bank and GON calculations.

Although at this point there is no direct evidence in favor of either the CPI or GDP deflator as a preferred price index, it is still possible to use indirect information to shed light on the plausibility of the alternative real wage rate series in Table 20. One such piece of indirect evidence refers to the behavior of income per capita in the last few years. As a preliminary, and very broad approximation, one would expect that the decline in real wages would be of roughly the same order of magnitude of the decline in income per capita. Given that Nicaragua's real GDP per capita fell by approximately 46% between 1980 and 1991,⁵⁶ a decrease in real wages by 88%, as suggested by the CPI-based real wages series, seems rather implausible. For the same reason, the GDP deflator based estimate of real wages, which shows a fall of about 50%

⁵⁶This percentage was computed by deflating the GDP per capita in current U.S. dollars reported in GON (1991) by the U.S. CPI. The GON series was updated to 1991 with data from IMF (January, 1992), and population growth was estimated for that year at 3.4%, the same percentage applied to previous years by the IMF.

between those same years, seems the more credible and consistent measure of the evolution of real wages in Nicaragua.

V.5 Summary

To summarize, the analysis of longer term RER series shows, in all its magnitude, the difficulties involved in RER evaluation in hyperinflation economies. While indices based on a particular deflator (CPI) point to a RER today approximately 25% of what it was in 1973, those based on an alternative deflator indicate that today's RER is above the 1973 level. These significant discrepancies introduce major difficulties in the final analysis of the current competitive situation of Nicaragua. In Chapter VII an effort is made to quantify the magnitude of the disequilibrium characterizing Nicaragua's competitive position; unfortunately, and largely due to the statistical discrepancies reported in this chapter, these computations rely only marginally on long range historical comparisons.

P A R T T H R E E
COMPETITIVENESS AND MACROECONOMIC MANAGEMENT
IN NICARAGUA

115

VI. Real Exchange Rates and Competitiveness in Nicaragua: Current Situation

Is the real exchange rate overvalued in Nicaragua? To a large extent this is an academic question. Indeed, it would be difficult to find observers that seriously argue that the current exchange rate level is consistent with long term external equilibrium, where the current account is financed by sustainable capital inflows. At the present time foreign aid is an essential element in the financing of the Nicaraguan balance of payments, with foreign donations amounting in 1991 to U.S. \$528 million, a figure that represents a staggering 34% of GDP. For 1992, the International Monetary Fund expects that donations will reach U.S. \$402.5 million or 22% of GDP. Of course, this type of aid-dependent situation is not sustainable in the longer run, and a move to a healthier balance of payments will require at some point a series of structural changes in the economy, including a real exchange rate depreciation that will improve the country's ability to compete internationally. Additionally, the current situation in the internal sector, including the very large level of unemployment and underemployment, are clear indicators that the current configuration of relative prices is not sustainable in the medium term.

All of this means, then, that the key question is not whether the real exchange rate is overvalued; a set of more relevant questions include: (1) approximately by how much is the córdoba overvalued; (2) which are the most appropriate policies to help correct this overvaluation; and (3) what is the most appropriate timing for undertaking these corrective policies.

The purpose of this and the next chapter is to address these issues in some detail. In Section VI.1, I discuss some indicators of the recent evolution external sector in Nicaragua. In Section VI.2, I deal with the behavior of real exchange rate fundamentals, and I show that their recent, and expected behavior, calls for an equilibrium real depreciation. In

Section VI.3, I analyze for how long the GON will be able to defend the current parity. Section VI.4 is devoted to a discussion of the labor market. Here I argue that the segmentation and rigidities in this market are a primary stumbling block in any effort to generate improvements in the competitive position of the country. Policy options are tackled in substantial detail in Chapter VII.

VI.1 The Evolution of Some Basic Indicators of the External Sector

In this section I briefly discuss the evolution of a set of external sector indicators: the current account balance and the trade account balance. In Section VI.3, I deal with the black market premium and international reserves. As was pointed out in Chapter III.5 the behavior of these indicators provide important information, which jointly with the evolution of RER indices, will be useful to the analyst to evaluate the external position of the country. In the case of Nicaragua, this study is particularly important, since the lack of reliable long term series on RER imply that the analysis will have to rely more heavily on current statistics.

Table 21 deals with the current account deficit. Two sets of figures are presented: The first one places foreign donations "below-the-line" while the second column places them above the line. The data show that independently of the concept used, the deficit is exorbitantly high and, clearly, not sustainable in the medium and long run. Table 22 contains data on the trade account, showing that its deficit currently stands at an extremely high level.

In both Tables 21 and 22 some historical data for the second half of the 1970s are included. They provide a staggering contrast with the current data: the current account deficit averaged only 2.5% of GDP and the trade account deficit was almost zero during the earlier period.

Table 23 shows that in recent years donations to Nicaragua have been extremely high, allowing the trade and current accounts the deficits depicted in Tables 21 and 22. Although this level of foreign aid may possibly continue for a few more years, it clearly cannot be considered as a permanent feature of the Nicaraguan economy. Policymakers in Nicaragua should contemplate the scenario where, given the new global geopolitical realities in Eastern Europe -- including the disappearance of global threat of communism, and the need of large sums of resources in that area -- it is likely that the flow of aid resources will decline even faster than originally anticipated.

An important question in evaluating the required magnitude of the adjustment in the medium run refers to the sustainable level of the current account deficit. This will depend on a series of factors including the future level of donations, and the country's ability to obtain substantial relief from its foreign debt, which at the current point stands above 600% of GDP.⁵⁷ Even without having reliable data on future creditor's decisions regarding Nicaraguan foreign debt, we can argue that a reduction of the trade account deficit to a level of approximately 15% of GDP in the next two to three years would constitute a serious first step towards the achievement of a progressive reestablishment of external sector viability. Over the medium run -- 5 years, say -- a trade deficit between 5% and 3% of GDP constitutes a target that would move the country towards longer run sustainability.⁵⁸ Naturally, "the" actual sustainable level of the trade deficit in the future will depend on the evolution of donations. Instead of

⁵⁷The more than U.S. \$3 billion owed to the countries of the former Soviet Orbit are prime candidates for a first step in a "creative" solution of the foreign debt problem.

⁵⁸Notice that given the incredibly high level of foreign debt, a 3% trade deficit will still imply a high current account deficit. This is likely to be the case even if there is a major foreign debt restructuring.

TABLE 23

Donations: 1988-1992

U.S. \$ Millions

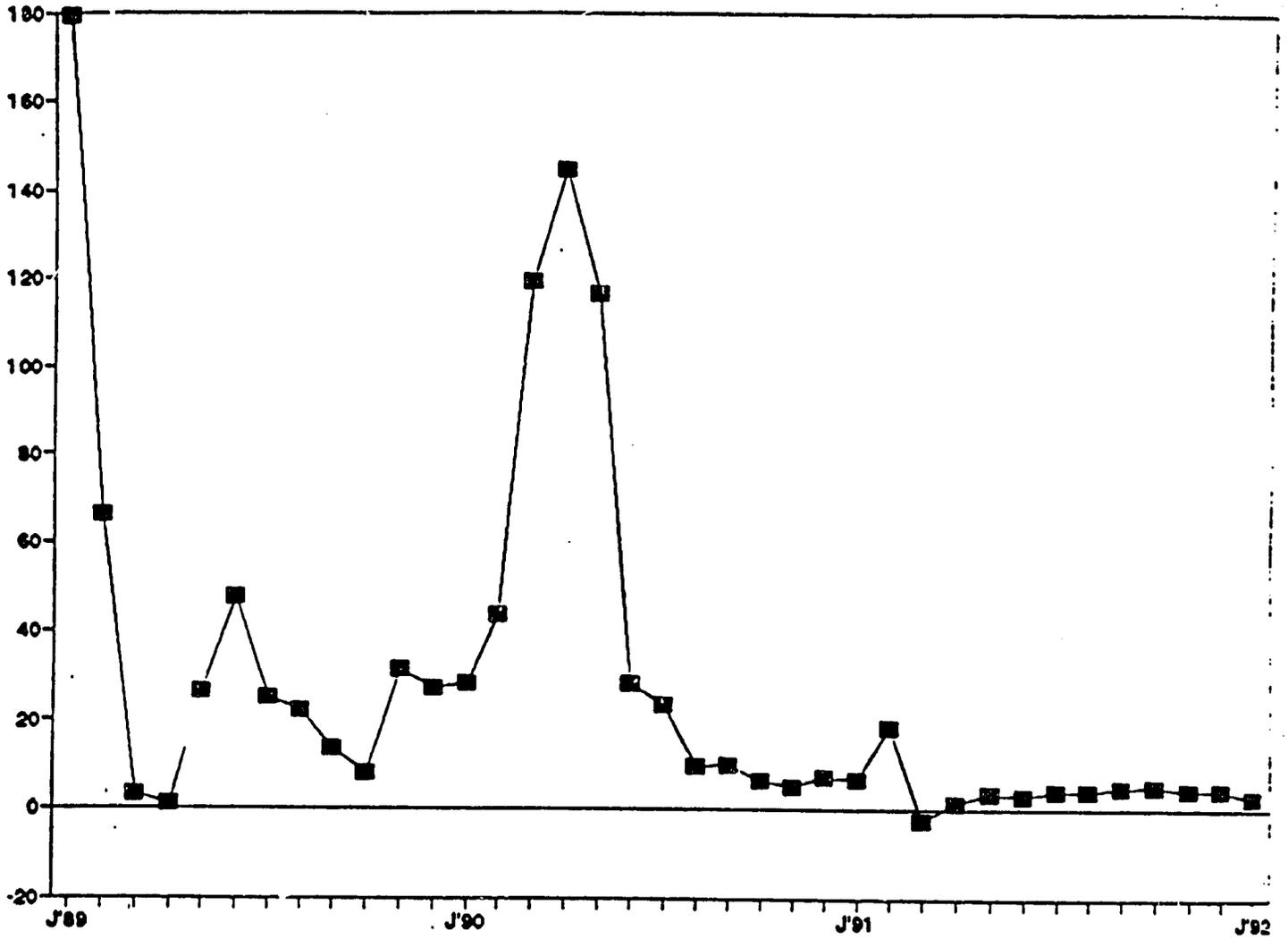
	<u>Donations</u>
1988	189.1
1989	168.9
1990	201.6
1991	528.1
1992 ^a	403.0

^aEstimated.

Source: BON and IMF.

Figure 21

**Black Market Premium
Percentages**



Source: Banco Central de Nicaragua.

forecasting the future evolution of donations, in our discussion below we look at alternative future levels of trade deficit.

VI.2 Fundamentals Behavior

As was pointed out in Chapter III, an important element in the evaluation of the competitive position of a country refers to the behavior of the fundamental determinants of the real exchange rate. In this section we look at three of the most important fundamentals: terms of trade, imports protection and capital inflows. By analyzing the actual and expected future behavior of these variables, we can obtain a broad idea on the direction in which the equilibrium real exchange rate will be moving.⁵⁹ It should be noted that in order to undertake this analysis, it is not necessary to know in a precise fashion what the actual level of the equilibrium real exchange rate is at the current time. What the analysis of fundamentals tendencies will be able to tell us is whether there will be forces towards equilibrium appreciation or depreciation, independently of whether the current situation is one of equilibrium or not.

Table 24 presents yearly data on terms of trade for 1990-1991, and shows that by 1991 Nicaragua was facing the lowest terms of trade of its recent history.⁶⁰ This trend in the terms of trade on and by itself indicates that, quite independently of the base chosen, the equilibrium real exchange rate should be at the current time more depreciated than what it was in the past.

⁵⁹Obtaining estimates of the required magnitude of these equilibrium RER movements is considerably more complicated and requires information not available in Nicaragua.

⁶⁰It should be noticed that these data don't incorporate the fact that during the 1985-90 period Nicaragua received large implicit subsidies from the Soviet-Orbit countries. There is little doubt that if this fact is incorporated into the analysis the worsening of the terms of trade would be even larger.

The recent dip in the terms of trade is, to a large extent, rooted in deep declines in export prices of Nicaragua's main commodity exports, especially coffee and cotton. It has been argued that we can expect at least a partial future reversal of these prices, as these commodities price cycles works their way through. Available evidence, however, indicates that, at least with regard to coffee, the prospects for a quick price recovery are not bright. In fact, the inability of the International Coffee Organization even to meet to discuss pricing strategies has recently sent coffee prices further down (see Table 25 for the recent evolution of world prices of coffee and cotton).⁶¹

Capital flows, and especially foreign aid, represent another important real exchange rate determinant. As was pointed out above, donations are playing a fundamental role in the financing of the external sector. It is expected, however, that in the years to come these will experience a steady decline when measured in real terms or as a percentage of GDP (see Table 26). This projected trend will generate additional pressures for an equilibrium real exchange rate depreciation. In fact, the recent (June 1992) suspension of U.S. aid has clearly highlighted the vulnerability of the Nicaraguan economy to changes in foreign donations. The announcement that U.S. aid was being withheld, immediately generated a jump in the foreign exchange parallel market premium.

The final fundamental determinant of the RER that we will analyze here is the level of import protection. As it was argued in Chapter III of this paper, reductions in the degree of protection in the economy will require an equilibrium RER depreciation, while increased in trade impediment will require an equilibrium RER appreciation. An fundamental component of the

⁶¹See the Financial Times, April 14, 1992, p. 28.

TABLE 25
Coffee and Cotton: Price Indices
(1985 = 100)

	<u>Coffee^a</u>	<u>Cotton^b</u>
1987	77.1	124.8
1988	92.8	106.0
1989	73.5	126.7
1990	61.2	137.8
1991	58.4	128.3
1990 IV	60.9	137.8
1991 I	61.7	140.6
II	60.8	139.9
III	57.7	125.1
IV	53.5	107.8
1991 Sept.	60.1	117.4
Oct.	54.9	113.4
Nov.	53.9	107.0
Dec.	51.6	103.1
1992 Jan.	50.1	99.5

^aLine 386 IFS: Other Milds (New York).

^bLine 111 IFS: Liverpool Index.

recovery plan is a drastic opening up of the external sector through substantial reductions in import tariffs and the complete elimination of quantitative restrictions. Table 27 gives data on the recent and expected evolution of import tariffs liberalization in Nicaragua. Clearly, this imports reform will also work in the direction of requiring an equilibrium real exchange rate depreciation. (Recall the discussion in Chapter III of this report.)

To summarize, then, the available evidence on the most important RER fundamentals suggest that the equilibrium RER should be today -- and for that matter in the years to come -- more depreciated than in the recent years. Indeed, the terms of trade have worsened and import protection has been greatly reduced in the past few years. On the other hand, although official transfers (donations) were in 1991 higher than in any preceding year, the expected trend documented in Table 22 also calls for an equilibrium real depreciation in the next few years. In terms of the analytical framework of Chapter III the recent, and expected, movement in fundamentals generated forces towards the generation of a situation of structural misalignment. In Chapter VII, I present some broad calculations on the estimated magnitude of real exchange rate overvaluation.

VI.3 For How Long Can the Current Parity be Sustained?

As was pointed out above, it is only thanks to the massive levels of foreign assistance that Nicaragua has been able to avoid, in the last few months, a major balance of payments crisis. However, a key question is whether, given the ongoing levels of external sector activity, the current (and expected) levels of donations are sufficiently large as to allow the government to continue successfully to defend the parity. Table 28 contains data on the evolution of the Central Bank international reserves during the

TABLE 26

Donations: 1988-1997

<u>Year</u>	<u>(Millions U.S. \$)</u>	<u>% of GDP</u>
1988	189.1	16.3
1989	168.9	18.0
1990	201.6	20.4
1991	528.1	25.9
1992 ^a	402.5	21.5
1993 ^a	414.2	20.5
1994 ^a	427.4	19.5
1995 ^a	441.5	18.5
1996 ^a	456.1	17.6
1997 ^a	471.2	16.7

^aProjected. Refers to official transfers.

Source: BCN and IMF.

last few months. As can be seen, the data on gross and net international reserves show a somewhat different behavior. While between May and December of 1991 there was an improvement in the net reserves position -- that is, they became less negative -- gross reserves experienced a steady decline between May of 1991 and February 1992. While many formal policy targets are defined in terms of net reserves, from an immediate cash flow perspective gross reserves are particularly relevant, since they capture the actual level of liquidity available to the government to face foreign exchange payments. Between February and April both gross and net reserves experienced an improvement, largely as a result of foreign aid and disbursements. On the other hand, during May they showed a small decline.

Three things make the rather low level of gross reserves particularly serious. First, given the seasonality of Nicaraguan exports, there are very grim prospects for a rebound in international liquidity accumulation through this channel during the second half of this year. Notice however, that when compared with a year earlier, the May 1992 level of gross reserves is lower by \$32 million. Second, during the first quarter of this year exports have performed significantly below what government officials and the staff of the multilateral agents had expected. This below-expectation behavior has been a combination of lower export prices and of very low quantities exported.⁶² Third, the withholding of U.S. \$100 million of foreign aid in June has generated a sense of vulnerability that may well be translated into speculation against the BCN.

⁶²According to the May "Indicadores de Actividad Economica" from the BCN in the first quarter of 1992 export volume has been below that of the first quarter of 1991 in the following goods: cotton, coffee, sugar, bananas, beef, shrimp, lobster and fish. In some cases exporters are delaying sales while expecting higher prices. This, however, is clearly not the case for most commodities.

During the past few months the BCN has used fairly large amounts of foreign exchange to feed the free segment of the foreign exchange market. Although this tactic has succeeded in maintaining a (very) low parallel market premium (Figure 21), it has also played a non trivial role in the erosion of international reserves in the last few months.

In late May the level of (gross) international reserves stood at U.S. \$198 million, an amount approximately equal to three and a half months worth of imports. Although this is a rather comfortable level for the short run, it would not be surprising if in the months to come international liquidity falls significantly. There are no strict mechanical rules regarding the minimum desirable level of reserves, but it is my judgment that the BCN should consider a level equivalent to 35-45 days worth of imports as the minimum amount of international liquidity to be held. If the economy approaches this threshold serious considerations should be given to adopting more drastic policies. In particular, it is highly advisable that the government prepares a contingency strategy to handle this situation. In that regard, it is crucial to point out that the authorities should strongly resist any temptation of facing (even temporarily) this problem by imposing trade restrictions, exchange controls, or foreign exchange rationing. History is extremely clear in this regard: attempts to face external crises through controls not only fail, but at the end of the road end up being tremendously costly for the country as a whole.

As was argued in some detail in Chapter III of this paper, in most historical cases of external sector crises the decline of international reserves is the direct consequence of inconsistent and overly expansive fiscal policies. This, however, is not the case of Nicaragua at the current time. In spite of some recent, and somewhat serious, difficulties with

credit recuperation from the private sector, monetary policy as a whole continues to be within the broad lines of what the program agreed with the IMF. Also, the performance of the fiscal side until May was within the parameters established by the IMF agreement. However, in spite of the adequate management overall of fiscal and credit policies, there are some areas of concern regarding macropolicy in the months to come. On the one hand, the program of credit recuperation for 1991-92 turned out to be even weaker than what was originally anticipated. This means that if the authorities want to achieve the overall credit targets, there will be a further need to contract credit to the public sector. For all practical purposes, this is likely to be translated in reductions in investment outlays. This is particularly serious in the current circumstances, where an increase in infrastructure investment -- especially in ports and roads -- and in social programs, appears to be an especially important step in the effort to increase the overall degree of competitiveness of the country, and of sheltering the poorer segments of society from (some of) the costs of the adjustment.

A second area of some preoccupation (or, at least, uncertainty) refers to the fiscal impact of the recent (February 28) economic package. Although there is little doubt that the reduction in the private sector's tax burden will provide some encouragement to productive firms, it is also true that these measures will have a negative impact on the budget. Although it is now too early to know in an accurate way the magnitude of this effect, the government should be ready to implement corrective measures if the fiscal finances start to get out of hand. Given the importance of investment in infrastructure, it would be highly advisable that any adjustments on the expenditure side are concentrated on current expenses. In that regard an

area that appears to be economically ripe for reform is military allocations. Of course, I am aware that this is easier said than done. The government will indeed determine if this is a politically feasible line of action.

If in the next months reserves decline rapidly, approaching the minimum acceptable floor, the GON faces three alternative options. First, it can further tighten credit and fiscal policy, in an effort to generate an inflow of foreign currency. Given the currently depressed levels of activity and the already tight credit conditions, this alternative carries significant risks. A second possible route is to obtain additional amounts of foreign assistance that would help stabilize the cordoba for some additional time. Alternatively, the authorities could try to persuade donors for additional and earlier releases of assistance that has already been negotiated. However, the recent withholding of U.S. aid has shown that this may not actually be a feasible solution. The third option is, of course, generating a real exchange rate realignment through a nominal devaluation. It is clear, however, that to the extent that the labor market continues to be closely linked to the exchange rate a nominal devaluation would not be fully effective. I return to this point in greater detail in Chapter VII of the paper.

VI.4 Labor Market Distortions and International Competitiveness

As was pointed out in Chapter II, labor costs provide a useful, and alternative, way of looking at international competitiveness. As argued in that chapter, unit labor costs indices measure in a more direct way the ability of a country to compete internationally. Unit labor costs have two components: the degree of productivity of labor, and its (dollar) cost. Increases in productivity will result in reductions of ULC and in an

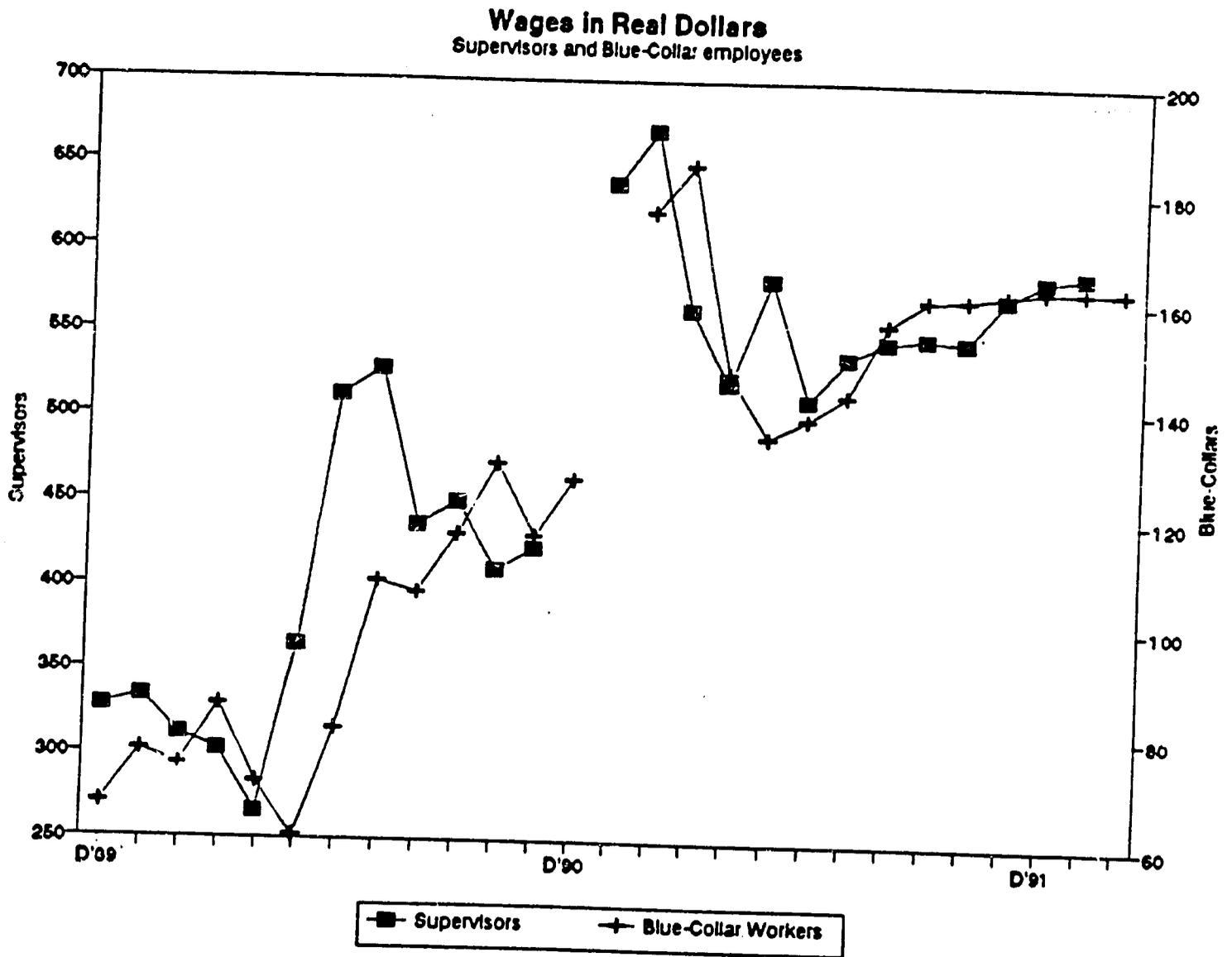
increased ability to compete internationally. On the other hand, increases in dollar denominated wages that are not accompanied by increases in productivity will tend to price countries out of international competition.

Although there are no data on labor productivity in Nicaragua, casual and anecdotal evidence suggests that it is presently significantly below that of its Central American neighbors, and substantially below its past levels. Figure 22 presents time series on real dollar wages for supervisors and blue collar workers, obtained from the Mayorga and Assoc. survey.⁶³

It is, perhaps, in the area of labor market distortions where we can find the most serious problems currently faced by the Nicaraguan economy. A major constraint is that in March 1991, when the stabilization program was launched, wage rates were fixed at a disequilibrium level. This has created a situation of labor market duality (or segmentation), with its concomitant vast level of unemployment. Indeed, only a handful of firms in the so-called formal sector can pay salaries as high as those fixed in March 1991. Other activities plainly cannot develop, or are forced to operate through the hiring of informal workers (the sometimes called under-employed) who get significantly lower salaries and no other type of benefits. Moreover, to the extent that a large number of service industries are in this formal protected sector, the indirect cost of many export industries has increased

⁶³These data, as those presented in Chapter IV, clearly capture the jump in real wages that took place in early 1990, immediately before the current administration took office. Although since that time the real dollar wage has exhibited some variations, this figure shows that at the current time it stands at a significantly higher level than in 1989. The fact that these indexes measure wages denominated in real dollars is particularly relevant for a discussion on international competitiveness. As argued in Chapters III and IV, it is indeed the wage rate expressed in real foreign currency that matters to investors when deciding whether to locate their production in a particular country. It should be noted, however, that given the way the data were constructed -- by surveying large firms -- they should be interpreted as referring to the formal sector of the economy, where relatively large institutions operate.

Figure 22



Source: Mayorga and Associates.

131

information on "canastas" actually computed by CEPAL for some Central American countries.

It is extremely important to note that the CEPAL poverty studies are fundamentally descriptive -- geared at obtaining a picture of how many people live below a certain standard -- and are not done with a direct and immediate wage policy purpose in mind. In particular, these type of studies do not pretend to suggest that minimum salaries should be set at levels that would place every household above the poverty line.⁶⁵ In fact, there is generalized consensus among experts that any labor legislation (or political agreement) that fixes the minimum wage at such a level would generate massive unemployment in poor countries, which would ultimately hurt rather than help the poor. This is of course an unfortunate reality, but one that has to be recognized in policy making; trying to reduce (or eliminate) poverty through unrealistic and rigid minimum wage legislation is not only bad economics, but also bad politics. In poor nations a non trivial amount of the population will not be able to buy a broadly defined basket of goods. Imposing (real) wages above what is consistent with productivity will not solve this problem, but will rather make it more serious. At unsustainable high levels of real wages the country will be unable to compete internationally, driving people out of work and into even more serious poverty, as is currently the case in Nicaragua.

The use of the "canasta" as a benchmark for measuring real wages has introduced additional problems in Nicaragua, since the authorities have been willing to implement distortions to the international trade system as a way to maintain a low "cost of living". The prohibition to export beans and

⁶⁵Some countries use these studies as a guide for targeting social programs to the poor.

to levels that exceed those in many of the Central American competitors.

What makes this situation particularly serious is that for all practical purposes the formal sector wage has been fixed in real terms, through its indexation to the 53 products "canasta básica". In fact, at the present time all negotiations and discussion regarding wages and remunerations are carried on in terms of this "canasta", with an understanding that real wages cannot fall below (a certain percentage of) it. This principle was formally adopted in October of 1990, as an important component of the process of economic and social concentration. Point 4.1 of the Concertación document establishes:

El Gobierno se compromete a fijar un salario mínimo en base a un porcentaje de la canasta básica de 53 productos, así como diseñar un mecanismo para revisar el salario en relación a las variaciones de la misma.

Although the agreement does not establish the exact percentage of the canasta that the minimum salary should cover, it is clear that de facto wages are fixed (and fully indexed) in real terms. This means, then, that currently Nicaragua has two labor market-related problems. First, the level of real wages is too high in relation to labor productivity, and second, the implicit indexation instituted in the concertación has introduced serious rigidities to real wage changes.

The idea of defining a "canasta" of basic products has its roots in studies on "poverty lines". The U.N. Economic Commission for Latin America (ECLA/CEPAL) has conducted a large number of poverty line studies in Latin America and has found that a significant proportion of these countries population live in poverty.⁶⁴ In Appendix II, I present a description of the methodology used in the construction of poverty lines, as well as some

⁶⁴To my knowledge, however, CEPAL has not conducted a poverty line study for Nicaragua.

TABLE 21

Current Account Deficit^a

	<u>Excluding Donations</u>		<u>Including Donations</u>	
	Millions		Millions	
	<u>U.S. \$</u>	<u>% GDP</u>	<u>U.S. \$</u>	<u>% GDP</u>
1975-79	-	2.5	-	-
1988	770.4	66.5	581.3	50.3
1989	530.5	56.7	361.6	38.6
1990	570.8	57.7	369.2	37.3
1991	885.6	57.1	357.5	23.0
1992 ^a	885.0	47.4	482.0	25.8

^aIncludes interest payments on an accrual basis.

^aIMF projections.

Source: BON, IMF.

TABLE 22
Trade Deficit*

	<u>Millions U.S. \$</u>	<u>As % of GDP</u>
1975-79		0.2%
1988	532	45.9%
1989	319	34.1%
1990	327	33.0%
1991	434	28.0%
1992*	527	28.2%

*Net exports of goods and non-factor services.

*Projections.

Source: World Bank and IMF.

TABLE 27

Tariff And Import Tax Schedule

	<u>1989</u>	<u>1990</u>	<u>Mar. 1991</u>	<u>Sept. 1991</u>	<u>Mar. 1992</u>	<u>Dec. 1993</u>
A. <u>Tariff and Import Tax Ranges</u>						
DAI	110% ^a	72.5% ^a	10%-20% ^{b*} 5%-20% ^c	10%-20%	10%-20%	10%-20%
ICS	150% ^a	95.8% ^a	6%-150% ^b	ns	ns	0% ^{a,b}
ITF	3%	3%	3%	3%	3%	0%
B. <u>Nominal Import Protection (NIP) Ranges^d</u>						
NIP	na	4%-253% ^b	ns	10%-60% ^b	10%-40% ^b	10%-20% ^b

^aMFIN, Asesoria Economica. Refers to maximum tariff only.

^bWorld Bank, Nicaragua, Background Paper on Prospects for Economic Recovery May, 1991.

^cWorld Bank, Nicaragua, Sector Lending Summary, July 1991.

^dRefers to combined effect of all taxes levied on imports, including indirect taxes on domestic products. World Bank, July 1991, p. 9.

DAI - Derecho Arancelario a las Importaciones

ICS - Impuesto Selectivo de Consumo

ITF - Impuesto Tibre Fiscal

ns - not specified

* - personal motor vehicles subject to a DAI of 30%-100%².

TABLE 28
 International Reserves in Nicaragua:
 1990-1992
 (Millions of U.S. \$)

	<u>Gross Reserves</u>	<u>Net Reserves</u>
December 1990	74.6	(1,120.0)
January 1991	83.3	(1,124.2)
February	106.2	(1,110.7)
March	122.6	(1,099.8)
April	188.3	(1,063.2)
May	230.3	(1,021.8)
June	217.0	(1,042.9)
July	215.7	(1,059.4)
August	184.4	(1,101.0)
September	190.5	(1,014.0)
October	177.4	(980.9)
November	151.0	(927.4)
December	172.4	(650.4)
January 1992	160.6	(671.8)
February	140.2	(688.0)
March	176.0	(645.6)
April	205.4	(616.4)
May	198.8	(627.4)

Source: BCN.

137

livestock are the most important reflection of this policy. Needless to say, the eliminations of these regulations should be high in the short run policy priority list.

Table 29 contains comparative data for some basic foodstuff for Nicaragua and its Central America neighbors during February of 1992. This table shows two things: first, Nicaragua has the lowest prices in those products that have export restrictions: red beans and meat, capturing the fact that the restrictive policies have indeed subsidized urban dwellers at the cost of reduced profitability for rural producers. Second, this table also shows that Nicaragua is at the top, or near the top, of the list for rice, corn and milk.

Table 30 contains comparative data for Nicaragua and Guatemala on a broader spectrum of food items in the Nicaraguan "canasta", for January 1992.⁶⁶ As can be seen, in nine of the 15 products the retail price is lower in Nicaragua than in Guatemala. Additionally, in a recently finished study (and as yet unpublished) by INCAE, it was found that the cost of the basket in Nicaragua was between February-April 1992, significantly below the average basket cost in Central America (U.S. \$114 against U.S. \$121). In a way, these data provide some evidence that contradicts the popular notion in Nicaragua that retail prices are "too high" because distribution margins are abnormally high. In fact, the data on three basic goods presented in Table 31, show that within the Central American context Nicaraguan margins are neither out of line, nor are they the highest. This, of course, doesn't mean that it wouldn't be possible to implement a more rational and

⁶⁶The INCAE study, from which the Guatemalan data reported here was obtained, is aiming at comparing prices of all 53 items in the "canasta". However, since non-food items are usually of very different qualities we have not provided those data in the current paper.

TABLE 29

Consumer Prices of Basic Foodstuff in Central America:

February 1992

(U.S. \$)

		<u>Costa Rica</u>	<u>El Salvador</u>	<u>Guatemala</u>	<u>Honduras</u>	<u>Nicaragua</u>
Red Beans	Kilo	.76	.60	.64	.36	.51
Rice ^a	Kilo	.57	.67	.68	.74	.74
White Corn	Kilo	.28	.21	.20	.16	.24
Milk	Ltr.	.32	.60	.40	.39	.54
Meat ^b	Kilo	1.57	2.20	--	1.66	1.54

^aArroz pilado de primera^bNovillo en canal caliente.Source: IICA.

129

TABLE 30

Retail Price Comparisons Of Selected Food Items

In The "Canasta Basica":

Nicaragua and Guatemala - January 1992

(U.S. \$)

	<u>Nicaragua</u>		<u>Guatemala</u>
Arroz (lbs)	0.31	>	0.27
Beans (lbs)	0.27	<	0.29
Sugar (lbs.)	0.26	>	0.19
Oil (ltr.)	0.97	<	1.09
Salt (lbs.)	0.05	<	0.08
Post de Res (lbs.)	1.57	<	1.80
Chicken (lbs.)	1.20	>	0.85
Fish (lbs.)	1.00	<	1.80
Milk (ltr.)	0.35	<	0.72
Eggs (doz.)	0.92	<	1.20
Cheese (lbs.)	1.62	<	2.00
Tomatos (doz.)	0.27	>	0.18
Onions (doz.)	0.07	<	0.19
Potatoes (lbs.)	0.27	>	0.12
Coffee (lbs.)	1.43	>	0.75

Source: Study commissioned by INCAE.

TABLE 31

Distribution Margins In Selected Food Stuffs

In Central America:

February 1992

	<u>Costa Rica</u>	<u>El Salvador</u>	<u>Guatemala</u>	<u>Honduras</u>	<u>Nicaragua</u>	<u>Panama</u>
Red Beans	38.2%	26.7%	-	10.6%	30.3%	-
Corn (White)	55.9%	27.2%	90.0%	7.3%	64.8%	-
Milk	23.0%	50.0%	60.0%	8.3%	68.8%	102.9%

Source: IICA.

TABLE 32
Distribution Margins*
(February 1992)

<u>Margins</u>	<u>Products</u>
• Less than 30%	- Domestic detergent - Matches
• 30%-40%	- Rice - Sugar - Cooking Oil - Detergent
• 60%-70%	- Brooms - Deodorant (Domestic)
• More than 70%	- Salt

*Wholesale prices sample taken on February 28 at the Mercado Oriental.
Retail Prices samples by INEC during the second week of February.

competitive distribution system that would result in lower margins. A policy of privatizing the distribution channels, curtailing the level of activity of ENABAS, and encouraging competition in this area should help improve efficiency and reduce prices of basic goods to final consumers. To the extent that this goal is achieved, the "cost of living" will tend to decline further, helping from a political point of view the deregulation of the labor market.

In an attempt to gain further insights on the characteristics of the distribution system we implemented in late February a small survey on distribution margins. The results obtained are summarized in Table 32, and show that for the majority of the foodstuffs surveyed the margins are below 30-40%, figures generally considered within normal parameters. The margins appear to be higher, however, for household items and other goods. Overall, however, the information in this table confirms the view that although there is obvious room for improvement in the distribution sphere, it is not realistic to think that the bulk of the required competitiveness adjustment will come from this area.

The discussion presented in this section suggests that an urgent area of reform refers to the deregulation of the labor market. A fundamental step here would be delinking wages from the current "canasta", introducing flexibility to the labor market. This measure would have three important effects. First, wages in the formal sector would tend to fall generating boom in overall employment. Moreover, those people in the informal labor market that are currently underemployed would have access to better jobs, and would see an important increase in their salaries, as wages in the different segments (formal and informal) would tend to converge. The combination of higher overall employment and higher salaries in the informal

143

sector will, with all likelihood, more than compensate the drop in wages in the formal segment, generating a generalized increase in the welfare of the poorer groups of society. Second, the adjustment in wages would help improve the degree of international competitiveness in the country, contributing to a solution of the external sector disequilibrium. Third, the delinking of wages from the canasta would enhance the effectiveness of nominal devaluations as a policy tool, greatly increasing the probability of finding a rapid and efficient solution to the external sector crisis. However, a comprehensive labor market reform should go beyond this, trying to generate a modern and flexible labor code, that would not introduce unduly high costs of contracting or dismissal. In that respect the Labor Code project approved by the Labor Commission of the legislature does not meet these requirements. In fact, the project proposes a highly distortive framework.

There is little doubt that from a political point of view it will be difficult to implement this type of labor market reform. However, its importance cannot be underestimated. It is my opinion that to a large extent the success or failure of the Nicaragua recovery program will depend strongly on it.

1468

VII. Policy Options for Regaining Competitiveness in Nicaragua.

The defeat of hyperinflation in Nicaragua has been largely possible thanks to a policy package that has had a fixed exchange rate as its center piece. By maintaining a fixed rate the government has been able to anchor prices and deflate inflationary expectations. The fact that this fixed exchange rate policy has been accompanied by consistent and prudent credit and fiscal policies has, indeed, been central in the achievement of the price stability observed during the last few months. However, as the discussion presented in the last three chapters indicates, the exchange rate was (unfortunately) fixed at a disequilibrium level and that in the medium run corrective policies will be unavoidable. In this chapter I provide some estimates on the magnitude of the disequilibrium, and I discuss alternative policies for dealing with it.

VII.1. Estimating the Magnitude of Real Exchange Rate Overvaluation.

The distortions introduced to price indices by the hyperinflationary process in Nicaragua has greatly reduced the usefulness of historical comparisons with the pre-1989 period. Also, these data distortions and the repeated changes of economic regime have rendered statistical and econometric analyses highly impractical. For this reason, attempts at computing the magnitude of the RER disequilibrium have to rely, to a large extent, on alternative procedures. Under these circumstances, the natural and most effective way to proceed consists in using a minimal framework to estimate the "required" degree of RER adjustment under alternative plausible scenarios. The virtue of a minimal model approach is that it allows the analyst to know with a high degree of precision the way in which alternative assumptions impinge into the results obtained. This approach is based on a pragmatic perspective that doesn't pretend to be overly "scientific", in the

sense of providing precise and accurate estimates of the future.⁶⁷

However, its simplicity allows us to get approximate orders of magnitude in a framework where different assumptions can be easily monitored.

In analyzing the degree of needed RER adjustment in the medium run I concentrated on the trade account and estimated the necessary RER devaluation required to reduce the trade deficit to certain percentages from its current level.⁶⁸ More specifically, I computed by how much the real exchange rate should be depreciated to reduce the deficit from 28% of GDP -- its expected level for 1992 -- to five alternative levels during the next five years: 10%, 5%, and 3% of GDP. Although a reduction of the trade deficit to 15% or even 10% of GDP cannot be considered as a permanent solution, these alternative targets provide some information on the approximate magnitude of the effort that will be required to achieve different goals. Which of these targets should actually be sought will depend on the external imbalance which can be financed by "sustainable" capital inflows, and this in turn depends on a series of factors, including (and more importantly) the evolution of foreign aid.⁶⁹ The model used for these computations is presented in Appendix III.

⁶⁷Of course, there are tradeoffs. A simple approach will tend to ignore some effects and transmission channels. However, in my judgment these problems are minimal in the Nicaraguan case.

⁶⁸One of the benefits of concentrating on the trade account is that the problems arising from the overblown foreign debt don't have to be addressed directly. This, of course, greatly facilitates the discussion, since it is not clear at this time how the debt issue will in fact be resolved.

⁶⁹It is important to clarify at the outset what this model does and what it is not designed to do. This model is essentially static and provides, for a given set of parameters, estimates of the "required" real devaluation to achieve a certain reduction in the trade deficit by a certain year -- in our base case by 1997. However, given its static nature the model presented in Appendix III is not able to provide a dynamic path for "required" real exchange rate changes. This type of result would require the implementation of a significantly more sophisticated framework. However, in my opinion, the lack of time series data or previous quantitative studies for Nicaragua would result in an exercise of limited

The model decomposes imports of goods into four categories: consumption goods, fuel, intermediate inputs and capital goods. With respect to merchandise exports, I distinguish between traditional exports and nontraditional exports. These computations were undertaken for two basic sets of assumptions regarding the different elasticities involved: a "high response" combination of elasticities and a "low response" combination.

In performing these computations I have assumed that in the next five years there will be a significant improvement in the external terms of trade amounting to 35%. This implies the assumption that in five years the terms of trade will have a level equal to the 1981-91 average. In the basic set of exercises I assumed that the improvement in productivity and the clarification of property rights will, on their own, contribute to an increase in exports of 30% per year. However, in an alternative set of computations I took a less optimistic perspective, and I assumed that productivity improvements would on their own generate an increase in exports of 1% per annum over the next five years. I also made the following assumptions: (1) real GDP will evolve according to the IMF projections over the next 5 years (4.3% on average per year); (2) trade liberalization will have an impact on import prices of -10%. Table 33 contains the estimated real exchange rate devaluations required to achieve, in the next two years, the five alternative levels of trade imbalance described above. As can be seen from this table the "high response" and "low response" elasticities scenarios provide a fairly broad range of values for the estimated required degrees of RER adjustment. However, these estimations have the merit of providing an approximate range of values within value. One possible way to proceed would be to construct a computable general equilibrium analysis. In my opinion, however, the usefulness of this methodology is very limited. They rapidly become "black boxes", and can be easily abused by those policymakers or advisors that believe that the CGE provides a "crystal ball".

which the discussion can concentrate.

We can see from the table that, with the assumptions made here, even if a rather modest reductions of the trade deficit are targeted for the next five years there will be a need for a substantial real exchange rate devaluation, ranging between 15% and 28%. This means that it is utterly unrealistic to expect that it would be possible to face this adjustment exclusively via improvements in productivity and cost reductions. Although higher productivity can (and probably will) make a contribution to the adjustment process, the magnitude of this contribution in the long run will not be sufficient by itself as to generate the required improvement in the external accounts. If we take a less optimistic perspective and assume that in the next five years goods exports increase by 1% per annum due to "productivity gains", the estimated required devaluations become very high. For instance, in this case, and under the "high response" scenario, it is estimated that a real devaluation of 32% would be needed to reduce the trade balance to 15% of GDP. This, of course, suggests quite strongly that there are few alternatives but to implement a nominal devaluation to smooth and accelerate the adjustment and help generate the required RER depreciation. These exercises were also undertaken for a 10 year horizon, with very similar results.

This exercise also gives us some information on the approximate degree of overvaluation of the cordoba. Assuming that a trade deficit of 3% of GDP represents, approximately, a situation of long term sustainable equilibrium, the degree of real exchange rate overvaluation is calculated to be between 38% and 61%. If, on the other hand, we make the less optimistic assumption that the negotiations on the foreign debt are not as successful as expected, and that the trade account should be balanced in order to generate a

10/10

TABLE 33

Estimated Required Real Devaluation
 To Reduce Trade Deficit To Alternative Levels^a
 (1992 level - 28% of GDP)

<u>Trade Deficit as % of GDP</u>	<u>Estimated Required Real Devaluation</u>	
	<u>Low Elasticities Scenario</u>	<u>High Elasticities Scenario</u>
15%	28%	17%
10%	42%	26%
5%	55%	35%
3%	61%	38%
0%	73%	50%

^aThe two elasticities scenarios are given in the Appendix. The computations assume that the adjustment will take 5 years.

Source: Computed by the author.

sustainable current account balance, this exercise suggests that the required real devaluation will be between 50% and 73%.

Although it is not possible to know with precision what the actual degree of overvaluation is, nor what the expected path of the trade account will be, the most plausible configuration of parameter values suggests that it is between 45% and 55%.⁷⁰ It is interesting to notice that a real devaluation of 50% would put the RER index somewhat above its average level for 1989, the year the Sandinista government staged its final (and unsuccessful) attempt at stabilizing the economy.⁷¹ This is, in fact, the case for all CPI based definitions and for two out of the GDP deflator based multilateral real exchange rate definitions considered in Chapter IV.

A difficult policy question is, how fast should the government attempt to move the real exchange rate to a level approximately 50% higher than today? Should an effort be made to move in one major step, or should a step-by-step approach characterized by several smaller devaluations be followed? This will basically depend on three considerations: first, how effective a maxi devaluation is likely to be, including how fast the external account will react to the new relative prices; second, what type of exchange regime should Nicaragua have in the medium and long run; and third, what will be the expected path of foreign aid. Naturally, these decisions will determine by how much the nominal exchange rate should be adjusted in the initial phases of the adjustment program. I address these issues in the

⁷⁰It should be noted that even in the best of cases, when hyperinflation and price distortions is not an issue, it is not possible to know in a precise way what is the actual magnitude of overvaluation. In this type of analysis there is an unavoidable need to make somewhat subjective judgments.

⁷¹I bring up this point since some analysts have used 1989 as an (implicit) base in their discussions on real exchange rate behavior in Nicaragua.

rest of this chapter.

VII.2 The Requirements for a Successful Adjustment

Independently of the actual details of the adjustment path chosen including whether a one-shot or several steps strategy is followed -- the authorities should try to maximize the probability of success of the whole package. In that regard, it is important to note what was said in Chapter III of this paper: in order for nominal devaluations to be an effective tool in the adjustment process it is necessary that they are undertaken jointly with consistent fiscal and credit policies, and that they are not undertaken in a context of indexed nominal wages.

Although the conditions required for a consistent macro policy are (somewhat) in place, the non-indexed wage rate requirement is not currently fulfilled. This means that, as already mentioned several times in this report, any attempt to alter the current parity should be postponed until the labor market deregulation is well on its way. Postponing a nominal exchange rate adjustment has also the advantage of helping consolidate the stabilization program, by introducing a culture that is more clearly geared towards price stability. In a real sense, given the current inflationary culture in Nicaragua, postponing the devaluation will, in its own right, tend to improve the chance of success whenever it is actually implemented.

Regarding the required accompanying macro policies, two points noted in the previous Chapter should be emphasized. First, the recent problems with credit recuperation have pointed out towards a weak area in macro management that should be addressed by the authorities. A lax attitude in this area could indeed compromise the important achievements in the stabilization area. Second, since the actual effects of the recent tax reforms on the budget are not completely clear, the authorities should closely monitor the

behavior of the fiscal side of the economy, and be ready to act in case an imbalance is detected. Also, it should be noted that a nominal devaluation will, on its own, have some effects on the fiscal balance. The proposed restructuring of the state-owned banks is a step in the right direction, regarding a tighter macro control. However, in my opinion this is not enough; only a policy towards privatizing the financial system will provide the required institutional setup that will assure the ability of real credit control. Some preliminary computations suggest that approximately 24% of all government current expenses correspond directly to foreign currency expenditures, and thus will be positively impacted by a higher value of foreign exchange.⁷² In the actual design of the devaluation package this consideration should be taken into account, and the corresponding adjustments should be taken.

VII.3 The Nominal Devaluation and the Exchange Rate System for Nicaragua in the Medium and Long Runs

Recent analyses on exchange rate systems for the developing countries have pointed out that the nominal exchange rates plays an important role as a nominal anchor, providing price stability in the long run.⁷³ In fact, recent research has shown that the most common flexible alternative to fixed rates, the crawling peg system, introduces significant inertia into the macroeconomy, tending to perpetuate inflationary pressures. Evidence from Colombia and Costa Rica, among other countries, has indeed shown that the adoption of a crawling peg system results in the relaxation of financial

⁷²Also some of the government revenues, especially those related to foreign trade, are positively related to the exchange rate.

⁷³These studies -- many of which have been undertaken at the IMF -- suggest that once any exchange rate misalignment has been resolved, the most adequate exchange rate regime in the long run (or steady state) for developing countries is a fixed rate system.

discipline and in a devaluation-inflation spiral. This type of behavior is particularly serious in countries with an inflationary economy, such as Nicaragua.

Given these considerations, in principle, a fixed exchange rate regime indeed seems to be the most adequate for Nicaragua in the long run. It would not only provide stability, but it would also be consistent with the country's historical tradition and with the current trends in the region. Recent Nicaraguan history, however, has shown that there is a serious danger of adopting a fixed exchange rate regime by fixing the nominal exchange rate at the "wrong" level, as in March of 1991. This type of policy is clearly unsustainable in the longer run and will require, at some point, a massive adjustment

To the extent that Nicaragua opts for a fixed rate system in the longer run, the most adequate way for facing the current real exchange rate imbalance is to implement a maxi devaluation, followed by the repegging of the parity. This, however, should not be taken as a rigid recommendation. Under certain circumstances, including a short run inability to control credit, it could be advisable to have a temporary managed rate system. The actual path to take should be defined at the moment the adjustment actually takes place.

What should be the timing of the exchange rate adjustment? This is not an easy question, since a number of tradeoffs are faced. If the adjustment is too soon its effectiveness will probably be low, given the current economic-financial structure and the still-vivid inflationary economy. On the other hand, postponing the devaluation means maintaining a situation of incorrect relative prices, that are not sustainable in the long run. In timing the devaluation it is important to consider the fact that there are

some lags in exports responses to relative price adjustment. In fact, an analysis of the current composition of Nicaragua's exports indicates that, from the exports side, the short run impact of a sizable (real) devaluation will be rather small. The fastest response would take 9 to 15 months, and a greater one can take up to 36 months. Over the longer run, if the real exchange rate is maintained at a competitive level there is significant potential for a sizable response. In fact, according to the simulations reported in Table 33, and under the assumption of a 50% real exchange rate devaluation we can expect a level of exports for 1997 of approximately \$700-\$900 million.

In timing the devaluation, then, these considerations should be taken into account. Given the current availability of reserves, the lack of labor market flexibility and the lags involved in exports response, it would be advisable to postpone the adjustment for some time. Although it is not possible to determine in a precise way what the optimal moment will be, it seems that doing it before the end of 1992 would be premature, while waiting into late 1993 would stretch things too much. Depending on how fast the terrain can be prepared and, in particular, how quickly labor market rigidities can be removed, it could be advisable to implement the adjustment around April or May of 1993.

The nominal devaluation should exceed by a prudent margin the desired level of real exchange rate adjustment. The reason for this is that, even in the case of highly successful devaluations, a fraction of the exchange rate adjustment is passed onto prices. In fact, in terms of the effective-ness index discussed, a level of .5 is considered quite high. In consideration to the data analysis and to the policy discussions undertaken in Part Two of this paper, my main policy recommendation is that Nicaragua

implements, in the next 10 to 12 months, a massive adjustment program that has as its corner stone a nominal devaluation of 70% to 80%. It is also recommended that the authorities immediately engage in a set of policies geared at supporting the devaluation package and, thus, at increasing its probability of success. These policies are of two types: first, a labor market reform aimed at de-linking wages from the "canasta" -- and ideally from any canasta -- should be given very high priority. This reform, in fact, is a necessary condition for the proposed devaluation package to succeed. Second, policies directed at increasing productivity and encouraging exports -- including a resolution of property rights problems should also be pursued. The degree of success of these productivity-enhancing policies in the next few months will, in part, dictate whether the degree of required RER adjustment estimated in this paper (around 50%) should be revised. From a political point of view, it is not clear how these preconditions will be met. At this point it is not possible to rule out a major national accord through a CONCERTACION 3. The timing of this agreement should be carefully set since there is the risk of preannouncing the devaluation, with the consequent costs in terms of speculation.

Since, as argued in Chapter VI, there is a possibility that the authorities will not be able to sustain the current parity for too long, it is important to recognize that preparing the ground for a successful devaluation is an urgent matter. If, by any chance, Nicaragua is forced to devalue before a year's time when the adjustment takes place at least the labor market should be reformed. It is strongly recommended, then, that a set of studies be undertaken as soon as possible in order to prepare the terrain for the exchange rate adjustment.

There is little doubt that a devaluation of the magnitude proposed here

155

will result in immediate and strong demands for wage adjustments. The government position in this respect should be firm, recognizing that large wage increases would defeat the purpose of the program. However, it is unrealistic to think that it would be feasible to undertake a 70-80% nominal devaluation without some wage corrections. In that regard, I would recommend that the government implements a basic emergency measure where government wages are increased by a fixed amount (say 100 cordobas), independently of the actual salary of each worker.

In order to maximize the probability of success of the devaluation, this should be undertaken as part of a broader package aimed at restarting growth. In designing such a package it should be kept in mind that this devaluation does not respond to a balance of payments crisis, where reserves have reached extremely low levels. On the contrary, even with the existence of abundant reserves, the devaluation aims at correcting relative prices. Other components of the package should include productivity enhancement measures, tax simplification measures and a serious social expenditures package aimed at providing a safety net to the poorest of the poor. In addition, this package should include financial sector measures that would introduce greater flexibility to commercial banks allowing them to direct rapidly and dynamically credit towards those areas where profitability is greater. Moreover, some resources should be channeled towards the construction sector as a way to revitalize that important area and encourage employment.⁷⁴ In this way the purchasing power of poorer workers would be relatively more protected.

⁷⁴This, of course, does not mean that subsidies should be granted to this activity.

VIII. Concluding Remarks and Summary of Policy Options

VIII.1 Policy Assignment in The Short Run

There is little doubt that at this point a major question in policy design in Nicaragua refers to the assignment of policy tools to policy targets. In particular, a key issue is whether at the current time exchange rate policy should be mostly used as an anti-inflationary tool, or whether it should be assigned to the task of correcting the international competitive situation. In the short run three main considerations should guide this decision. First, the defeat of the hyperinflation is, without any doubt, the most important accomplishment of the current administration and, thus, it is highly desirable to consolidate the gains obtained in this area. The fixed exchange rate has provided an effective anchor to prices and, as such, has been a fundamental component of the stabilization strategy. Second, and directly related to the previous point, the high degree of dollar-indexation that still exists in the economy, the inflationary memory, and in particular the rigidities in the labor market, indicate that a nominal devaluation is likely to be translated into wage and price increases that at the current time would greatly reduce the degree of effectiveness of the exchange rate adjustment. And third, presently the country is receiving a level of foreign aid that allows it to maintain (at least for some time) the current imbalance.

The combination of these three factors means that at the current time it would not be advisable to alter the 5 to 1 parity of the córdoba. Such a measure would undoubtedly impact on prices, releasing their anchor, and to the extent that it affects formal sector wages, it is likely to have a small impact on competitiveness. At this time, and at least in the short run, the appropriate assignment is to maintain the nominal rate as a central piece of

the price stability strategy, and to assign other tools -- especially of a microeconomic, structural, institutional and fiscal nature -- to the improvement in competitiveness.

However, an urgent area for the short run policy agenda is to address those institutional and structural features of the economy -- and very especially the labor market rigidities -- that have rendered the nominal exchange rate policy an ineffective corrective policy tool.

Of course, in order for this policy of (temporarily) maintaining the current parity to be viable, it is necessary to continue with the implementation of consistent fiscal and credit policies. In that regard, data on the recent evolution of the financial and credit sector provide a cause for some concern. The level of credit recuperation has been significantly below what was anticipated during the first months of 1992. Moreover, the recent behavior of international reserves is signalling the need to monitor closely the supporting macro policies, when evaluating the viability of maintaining the current parity.

Although short term and temporary losses in reserves should not generate overreaction or panic, a sustained loss in international liquidity would place the program in serious jeopardy. As pointed out in the body of this report, the worst possible scenario for Nicaragua would be to return to a situation of reserves depletion, coupled with some sort of rationing, such as the system of an exchange rate "presa". The authorities need to be aware that unless they can control domestic credit the short term strategy, and especially the maintenance of the fixed rate, will be unfeasible. In that regard, a useful aspect of conditionality would be to assure that such "presa" does not emerge. If, for one reason or another, macroeconomic discipline is lost and reserves decline past a given threshold, it would be

advisable (if not unavoidable) to abandon the suggested fixed parity strategy and to implement some kind of exchange rate adjustment. Whether this adjustment should be characterized by a step-wise devaluation or a devaluation followed by some type of flexible arrangement will depend on the progress made on the institutional-structural rigidities in the labor market.

VIII.2 The Magnitude of the RER Equilibrium

One of the most serious casualties of the Nicaraguan hyperinflation has been the reliability of long term price level series. Data on the CPI and the GDP deflator exhibit exceedingly large deviations, rendering historical comparisons of RER indices quite useless. For this reason we relied on other techniques to assess the (approximate) degree of overvaluation of the cordoba. Based on results from a simple model of the trade account, as well as on the analysis of the recent and expected behavior of "fundamentals" it was estimated that the degree of overvaluation of the cordoba is around 55%.

This estimated magnitude of the RER disequilibrium is substantial, suggesting that it is highly unfeasible that microeconomically oriented initiatives will generate, on their own, the degree of correction in the real exchange rate required to achieve medium to long run equilibrium. The evaluation of the existing situation suggests, then, that a nominal devaluation in the medium run is unavoidable.

Some key issues refer to the timing and magnitude of this devaluation. These will depend on a number of factors, including the future evolution of the terms of trade, the speed with which institutional constraints are resolved, the magnitude of foreign assistance, and the effect of productivity enhancing incentives. It is argued in the paper that the authorities should try to hold-off the exchange rate adjustment for a ten to twelve months

period. This should provide time for stability to be consolidated, for the hyperinflationary "culture" to be further eroded and to put into place required reforms in the labor market. Designing a medium term exchange rate policy -- including a supporting macro package -- should be at the top of the priorities list for the authorities.

VIII.3 Institutions, Productivity Enhancing Policies and Competitiveness

There is widespread agreement among both traditional and nontraditional exporters that a resolution of property rights problems is a precondition for a rapid expansion in exports. Directly related, the private sector lists security issues at the very top of their preoccupations. Although at this point it may seem obvious, it is still important to stress the importance of these institutional issues for assuring an increase in investment and export related production. In fact, it may be said that if the property rights issue is not satisfactorily solved, any economic measures (including a devaluation) will be largely redundant, having no effect on the external sector. Also, the implementation of the Direct Foreign Investment Law should eventually be able to attract foreign funds, modern equipment and new technologies.

In addition to tackling these institutional issues, the authorities could implement a number of policies that would directly, or indirectly, help improve competitiveness. A fundamentally important area is related to public investment in infrastructure, such as ports and roads. However, the recent tendency towards exceeding the credit targets the private sector may put this goal in jeopardy, through "private crowding out". The implementation of the "Export Promotion Decree" should also provide some important encouragement for non traditional exports, helping alleviate the magnitude of the disequilibrium. The reduction of some taxes implemented in the

February 28 package should also result in an improved position for Nicaraguan exporters. However, in doing this, an effort should be made in not generating large fiscal costs. A sweeping process of deregulation and a set of measures aimed at simplifying the tax system -- via the consolidation of the large number of taxes into a small and limited set -- would also help improve the degree of competitiveness. Finally, the labor market recommendations discussed below should help improve the efficiency of services, improving the competitive position of Nicaragua.

VIII.4 Credit and Fiscal Policies

From a macroeconomic perspective the potential lack of discipline of the financial sector poses one of the most serious threats to the continuation of price stability. In this sense an acceleration of the financial reform would be beneficial in several respects. First, greater control over commercial banks is necessary to assure that monetary targets will be met without crowding out necessary and urgent funding of public investment. In that regard the possibility of rapidly privatizing (at least parts of the operations) of the BND should be once again considered as a top priority. Second, the Central Bank should greatly increase its supervision of all banks, imposing severe penalties to those that do not comply with the "encaje" or that fail to report their foreign exchange position. If the "Superintendencia" is considered to be still institutionally weak, the Central Bank could temporarily take additional regulatory functions. However, it should be noticed that a risk involved in this suggestion is that if attributions are taken away from it, it is possible that the "Superintendencia" will fail to develop.

In spite of the recent adjustment in interest rates, producers continue to argue that the high lending interest rates currently charged by commerc-

ial banks represent another obstacle to a more rapid reassumption of growth.

A further increase in the degree of flexibility in the financial sector, allowing market conditions to influence the cost of funds, could indeed prove to be highly beneficial. A risk with this measure, however, is that at the present time the banking system is highly concentrated, with the state owned banks having a very large say. This could result in interest rates being manipulated in a perverse way by these large participants either deliberately or as a result of incompetence. For this reason, the Central Bank should continuously monitor the financial market, occasionally intervening.

A clear weakness in the financial market is the increasing importance of dollar denominated transactions. In a way this contrasts with other aspects of the Nicaraguan economy. While the authorities have made an effort to de-dollarize prices and (to some extent) wages, very little effort has been made to de-dollarize the financial sector. Past experiences in Latin America have clearly shown that a highly dollarized financial system is often a cause of instability. However, as time goes by and the inflationary memory subsides, the authorities should try to create additional incentives that would encourage córdoba denominated financial transactions.

VIII.5 Labor Market Rigidities and International Competitiveness

In the body of this paper it is strongly argued that the current segmentation of the labor market in Nicaragua is possibly one of the greatest constraints for increasing competitiveness and exports. It is recommended that the authorities make a serious effort to eliminate (or at least reduce) this segmentation. An important first step would be to de-link nominal wages from the current 53 products "canasta". In that regard, the first best policy would be to abolish completely any type of indexation

mechanism. However, if this proves to be too difficult politically, a smaller, more modest basket should be established to measure the purchasing power of real wages. Moreover, to the extent that some of the efficiency gains in the distribution chain are achieved it would be possible to reduce the dollar value of wages without affecting their real córdoba value. It should be noticed, however, that our own investigation into this matter suggests that there are considerable fewer degrees of freedom in this area than what is usually argued by the economic authorities in Nicaragua.

Naturally, reforms in the labor market area will not be politically easy to implement. The government should engage in an ambitious educational program aimed at explaining the rationale of its policies. At the center of this campaign should be an attempt to explain how desperate the Nicaraguan situation actually is, and the magnitude of the effort required to move the country from its current situation of (approximately) U.S. \$350-400 per capita to one similar to Costa Rica.

It is my judgement that without a broad persuasion campaign it will be difficult to make progress in this vital area. Meetings between senior officials and the media, such as some that took place during February, are helpful but are not enough. One of the surprising aspects of the Nicaraguan economic scene is that lack of a research or think-tank institution that publicly defends and explains the most important elements of a market-oriented economic strategy. This contrasts sharply with the fact that the more interventionist position gets ample media exposure through well written documents attacking the "neo-liberal" experiment.

In order to implement a long term policy in the area of labor markets it is strongly recommended that a series of studies on actual dollar costs of labor are across Central America. This type of study would be relatively

inexpensive, adding significant information to the debate on macroeconomic policy and adjustment.

Another important policy recommendation is to accelerate the implementation of a modern labor code, that would clarify labor relations in an efficient way that is compatible with the current global economy. Preliminary analyses indeed suggest that the current practice of labor-firm relations introduce a laxity in standards, a reduction in productivity and a decline in competitiveness. However, the labor code proposal prepared by the labor commission in the assembly does exactly the opposite, creating a very rigid labor market framework.

The combination of a labor reform de-linking wages from the canasta, and a nominal devaluation would tend to produce a reduction in real wages in the protected sector, an increase in global employment, and an increase in informal sector wages. The combined consequences of these effects would be an improvement in the social conditions of a large number of Nicaraguan families, but their situation will continue to be extremely difficult. A way to deal with this problem is that government institutions, possibly with donors funds, set up a relief program targeted at the most poor segments of the population, and preferably at children. In designing such program, however, it is important to make sure that it does not distort the incentives structure by discouraging employment. A number of international institutions, and especially the World Bank have acquired considerable expertise in this area over the last few years.

VIII.6 The Proposed Exchange Rate Adjustment

In consideration to the data analysis and to the policy discussions undertaken in Part Two of this paper, the main policy recommendation is that Nicaragua implements, in the next 10 to 12 months, a massive adjustment

104

program, that has as its corner stone a nominal devaluation of 70% to 80%. To the extent that it is preceded by productivity-enhancing policies and labor market reforms of the type discussed above, and it is accompanied by prudent fiscal and credit policies, this adjustment will effectively help Nicaragua to eliminate the current situation of relative prices disequilibrium. It is also recommended that this maxi-devaluation is followed, at least initially, by a re-pegging of the exchange rate to the dollar.

There is little doubt that a devaluation of the magnitude proposed here will result in immediate and strong demands for wage adjustments. The government position in this respect should be firm, recognizing that large wage increases would defeat the purpose of the program. However, it is unrealistic to think that it would be feasible to undertake a 70-80% nominal devaluation without some wage corrections. In that regard, I would recommend that the government implements a basic emergency measure where a fixed córdoba amount wage adjustment is granted to all workers. In this way the purchasing power of poorer workers would be relatively more protected.



APPENDIX I

REAL EXCHANGE RATE DATA BASE**I. Introduction**

The purpose of this appendix is to describe in detail the methodology and sources used to construct the real exchange data base. A step-by-step explanation is given about how the multilateral and bilateral real exchange rate indices were estimated. The technical problems typically encountered in this estimation are addressed and the specific solutions applied here are discussed. Also, the full data set utilized in Chapter V of the report is presented in this appendix.

Additionally, instructions are given for updating and maintaining the different data series current. These instructions should serve as a guide to the BRER and MRER LOTUS 1-2-3 files provided with this report, where the bilateral and multilateral exchange rates have been calculated.

II. Multilateral Real Exchange Rates In Nicaragua**II.1 Currencies and Weights**

The first issue that must be tackled in the calculation of a MRER is the choice of currencies that will make the nominal exchange rate index.⁷⁵ This choice is determined by the countries that constitute the most important trading partners of Nicaragua. However, a problem with this is that there are alternative classifications of "importance": percentage participation in the value of exports, or in the value of imports, or in the value of total trade, i.e., the sum of imports and exports. Naturally, at any point in time the

⁷⁵The nominal exchange rate index refers to the weighted multilateral nominal exchange rate index explained in Chapter IV of the text and reproduced in this appendix in Section II.4 as variable MNER.

list of countries will differ depending on these classifications.

Another problem is that the mix of countries tends to change over time. This is particularly relevant for Nicaragua since the U.S. embargo, which was in full force between 1985 and 1990, artificially reduced the importance of the U.S. in Nicaraguan trade. Additionally, other countries appear one year among the ten most important trading partners of Nicaragua and then fade away from its trade statistics. For these reasons, the post-embargo trade structure cannot be considered yet as the definite pattern of Nicaraguan international commerce. A longer perspective must be considered so as to calculate a more reliable percentage participation of nations in Nicaraguan foreign trade.

Once the method on how to define partner countries and the time period (or periods) have been chosen, data availability will force a further round of selection. For example, price series for the former socialist nations are not available, so they are eliminated from MRER estimations on this account alone.

The more stable geographic trade patterns are found in the total trade classification. The trade weights for the periods 1976-82, 1988-89, and 1990-91 for the nine most important countries in Nicaragua's total foreign trade are presented in Table A.1.⁷⁶ These weights were obtained by dividing the actual participation percentages by the percentage that these nine countries as a whole represent in total trade. The weights evidently are considerably greater than the actual trade participation percentages.

Although Honduras was among the ten most important countries in all three periods, it had to be excluded from the analysis because the IMF has

⁷⁶For some periods and classifications more than nine countries were taken into account. See Tables A1-A3.

167

TABLE A.1
Trade Weights
Exports + Imports

	(1)	(2)	(3)
<u>Country</u>	<u>1976-82</u>	<u>1988-89</u>	<u>1990-91</u>
U.S.A.	41.3	---	31.3
Costa Rica	12.9	8.8	9.0
Guatemala	10.3	4.2	4.2
Germany	10.2	16.2	13.8
Japan	9.8	11.6	12.4
Mexico	6.2	4.6	3.5
Italy	3.3	9.2	7.0
Netherlands	3.1	7.3	---
Spain	2.9	8.3	---
Canada	---	19.2	12.9
France	---	7.0	5.7
Great Britain	---	3.6	---
TOTAL	100.0	100.0	100.0

Source: IMF.

- (1) 9 countries represent 68.6% of total trade.
 (2) 11 " " 47.9% " " "
 (3) 9 " " 54.2% " " "

118

TABLE A.2
Trade Weights
Exports

<u>Country</u>	(1) <u>1976-80</u>	(2) <u>1988-89</u>	(3) <u>1990-91</u>
U.S.A.	40.8	---	17.7
Germany	14.9	25.5	24.1
Japan	10.7	16.4	14.1
Costa Rica	9.7	7.1	5.6
Guatemala	6.2	---	---
Netherlands	5.1	4.7	2.1
Belgium	4.4	---	---
Italy	4.2	---	---
Canada	2.1	31.0	23.9
Austria	---	---	5.3
France	---	2.1	4.8
Mexico	---	2.3	2.4
Spain	1.9	6.8	na
Switzerland	---	4.1	---
TOTAL	100.0	100.0	100.0

Source: Ibid.

(1) ten countries represent 77.1% of total exports.
 (2) nine " " 63.9% " " "
 (3) " " " 66.0% " " "

no data on Honduran producer prices and only a very incomplete series on consumer prices, precluding us from using the latter as an approximation. El Salvador, which was among the top ten countries in the 1976-82 period, was also excluded from the analysis for the same reason. These omissions are not too serious, since both countries appeared at the bottom of this short list, with average participation in Nicaragua's foreign trade of about 2% each. Nevertheless, the MRER estimation could be improved if these countries were included.

Tables A.2 and A.3 contain respectively trade weights obtained from the separate evaluation of geographic destination and origin of exports and imports. The method followed to estimate the figures in Tables A.2 and A.3 is identical to that explained for Table A.1.

II.2 The Cordoba/U.S. Dollar Exchange Rate

A fundamental ingredient in the computation of real exchange indices is the nominal exchange rate. In most countries it is straight forward to obtain data on this variable. This, however, is not the case in Nicaragua. In fact, Nicaragua has had, to say the least, a complex exchange rate history. An often changing system of multiple official exchange rates has coexisted with parallel and black currency markets, which leaves no easy choices regarding the appropriate parity to use in RER calculations. The standard way to handle this situation is through the construction of a weighted average of the existing nominal rates. The weighing structure is one that reflects the proportions in which earnings from foreign trade are being exchanged at each rate.

In the case of Nicaragua this is a difficult average to estimate with precision. The major problems encountered here are: firstly, an unknown amount of export proceeds have been transacted at the parallel and black

TABLE A.3

Trade Weights

Imports

	(1)	(2)	(3)
<u>Country</u>	<u>1976-80</u>	<u>1988-89</u>	<u>1990-91</u>
U.S.A.	36.9	---	38.7
Venezuela	16.7	---	---
Costa Rica	11.0	8.6	10.9
Guatemala	10.5	---	6.1
Japan	9.1	6.8	9.9
Germany	7.1	34.8	5.3
Spain	3.8	8.3	---
Mexico	2.5	5.6	3.9
United Kingdom	2.4	---	5.2
France	---	6.5	5.8
Italy	---	13.2	6.6
Netherlands	---	8.3	3.7
Canada	---	7.9	3.9
TOTAL	100.0	100.0	100.0

Source: Ibid.

- (1) nine countries represent 78.9% of total imports.
 (2) " " " 45.9% " " "
 (3) eleven " " 51.4% " " "

market rates, at the same time as some imports are obtained with dollars purchased in this unofficial market. Secondly, the coverage of each of the multiple official import and export rate is usually unclear, so that the relative importance of each rate can only be bounded within a certain range. Thirdly, taxes on the purchase of foreign currency prevailing between 1982 and 1988 rendered the official import rates irrelevant, and an effective rate which adds the cost of the tax must be estimated for those years.

The IMF has provided estimates of a (period average) weighted mean of the multiple import and export rates effective in each period, either monthly or quarterly. Its latest estimates, covering the period 1984-91, are implicitly incorporated in the index 'Exchange Rate in Terms of U.S. dollars' published in the IMF documents "Nicaragua - Staff Report for the 1991 Article IV Consultation", May 28, 1991; and "Nicaragua - First Review Under Standby Arrangement", January, 1992. However, this index displays significant enough inconsistencies to warrant a re-estimation of the weighted average exchange rate.⁷⁷

In order to generate a more accurate record of Nicaragua's exchange rate history, a new weighted average nominal exchange rate is estimated. This new estimation takes into account only official import and export rates, including those that defined a legal percentage of conversion at the

⁷⁷Among the principal problems that the IMF estimation has, is that applying the index to the (unified) official exchange rate in effect at the date that serves as its base -- 1980, the resulting average Cordoba U.S. dollar exchange rate is at various points in time lower than the lowest official parity. In the IMF IFS tape the exchange rate series shows a weighted average parity for 1980 that is higher than the official rate, but applying this rate to the aforementioned index overshoots the present parity by nearly 50%, and it still yields rate estimates that in some quarters undershoot the lowest official rate.

parallel rate.⁷⁸ The main source of information for the construction of this new index is the Picks World Currency Yearbook.

Tables A.4 and A.5 contain the various official export and import rates that have existed in Nicaragua since 1979. The first experiment with multiple exchange rates occurred in 1979. This system lasted only 5 months, as rates were unified again in September of that year at the basic rate of 10.05 Cordobas per U.S. dollar. However, multiple official rates were reintroduced in the first quarter of 1982 and modified no less than once a year till February of 1988. The currency reform implemented at this time, which included a major revamping of the exchange rate system, returned Nicaragua to a unified (official) rate regime.

The weights attached to each parity were estimated by calculating the proportion of imports and exports in total trade of the corresponding year, and then multiplying these percentages by those representing the relative coverage of each rate within imports and exports. Coverage specifications that do not coincide with the disaggregation trade data, such as "essential" and "non-essential" goods, were approximated by regrouping trade data to fit these specifications caring simply not to violate the rules of common sense.

From February 1988 onwards, in the absence of an official multiple exchange rate system, our estimated average parity is the period average official rate based on the data published by the Nicaraguan Central Bank. The quarterly weighted average Cordoba/U.S. dollar exchange rate from 1973 to 1991 is presented in Table A.6. In the MRERDATA file this variable is called aernic and is located in column C.

⁷⁸As mentioned before, abstracting from illegal transactions in the parallel and black markets is a shortcoming with which we will have to bear. However, the analysis is not affected given the (most probably) small proportion of currency exchanged in those markets for trade purposes.

TABLE A.4

Multiple Official Exchange Rates

Export Rates

Period	Rates	
<u>Year. Month</u>	<u>Cordobas</u>	<u>Weights</u>
1973.1-1979.3	7.00	(unified rate)
1979.4-1979.8	8.00	.489
	9.00	.122
1979.9-1982.1	10.05	(unified rate)
1982.3-1984.2	11.85	.180
	17.23	.180
1984.3-1985.1	14.50	.167
	22.60	.167
1985.2-1986.1	28.00	.255
	50.00	*
1986.2-1986.6	70.00	.190
	628.00	.063
1986.7-1987.2	70.00	.173
	312.00	.016
	628.00	.063
1987.3-1988.1	70.00	.173
	3803.00	.071
	7535.00	.005
1988.2	10000.00	(unified rate)

Source: Picks, MED, BCN, IMF.

(*) close to zero

TABLE A.5
 MULTIPLE OFFICIAL EXCHANGE RATES
 Import Rates

Period	Rates	
<u>Year. Month</u>	<u>Cordobas</u>	<u>Weights</u>
1973.1-1979.3	7.00	(unified rate)
1979.4-1979.8	9.00	.024
	10.05	.465
1979.9-1982.1	10.05	(unified rate)
1982.2-1983.12	10.05	.545
	15.10	.096
1984.1-1985.1	10.05	.567
	12.10	.033
	13.10	.033
	15.10	.033
1985.2-1986.1	20.00	.332
	28.00	.250
	40.00	.164
1986.2-1987.5	72.50	.747
1987.6-1988.1	72.50	.538
	170.00	.013
	370.00	.201
1988.2	10000.00	(unified rate)

Source: Ibid.

II.3 Other Nominal Exchange Rates

The cross nominal exchange rates for other trading partners of Nicaragua were obtained from IMF sources. Specifically, the parity of the Cordoba against the other currencies was calculated using triangular arbitrage as follows:

$$E_{ci} = \frac{E_{cd}}{E_{id}}$$

where E_{cd} = nominal exchange rate Cordobas per U.S. dollar, as shown in Table A.6;

E_{id} = nominal exchange rate currency of country i per U.S. dollar;

E_{ci} = nominal exchange rate Cordobas per unit of currency of country i .

The data on E_{id} was obtained from the IFS tape -- rf series -- and updated when necessary from the published rf series appearing in the monthly IFS issues. These are, in all cases, official exchange rates.

In the MRERDATA file these variables have the following names and locations:

E_{ci} = en/e(i) columns AH to AU

E_{cd} = aernic column C

E_{id} = aer(i) columns D to Q

where i refers to country in question. For example, en/eger (column AH) is the nominal exchange rate of cordobas per German mark and is obtained by dividing aernic by aeger. In Lotus format this translates to:

$$\text{en/eger} = \frac{\text{aernic}}{\text{aeger}} = +C(j)/D(j)$$

where C and D are the column location of the variables and j refers to the row number in the file.

TABLE A.6

Average Official Exchange Rate

Cordobas per U.S. Dollar

<u>Year Quarter</u>	<u>Average Rate</u>
1973 I	7.00
1973 II	7.00
1973 III	7.00
1973 IV	7.00
1974 I	7.00
1974 II	7.00
1974 III	7.00
1974 IV	7.00
1975 I	7.00
1975 II	7.00
1975 III	7.00
1975 IV	7.00
1976 I	7.00
1976 II	7.00
1976 III	7.00
1976 IV	7.00
1977 I	7.00
1977 II	7.00
1977 III	7.00
1977 IV	7.00
1978 I	7.00
1978 II	7.00
1978 III	7.00
1978 IV	7.00
1979 I	7.00
1979 II	9.90
1979 III	10.00
1979 IV	10.05
1980 I	10.05
1980 II	10.05
1980 III	10.05
1980 IV	10.05
1981 I	10.05
1981 II	10.05
1981 III	10.05
1981 IV	10.05
1982 I	10.83
1982 II	12.15
1982 III	12.15
1982 IV	12.15
1983 I	12.15
1983 II	12.15
1983 III	12.15
1983 IV	12.15

II.4 Exchange Rate Indices and Base Date

In order to calculate the MRER the E_{c1} rates must be converted into indices, which requires in the first place making a choice about an adequate base date. Although a period of time that is characterized by a situation of equilibrium in the external and internal sectors is theoretically the best choice for a base date, this is very difficult to do.⁷⁸ For this reason in actual MRER computations a statistically convenient base is chosen. Consequently, the base chosen has no implications for measuring whether the RER is in equilibrium or not. As is emphasized in the text, the analysis of the appropriateness of the RER should incorporate a careful analysis of the behavior of "fundamentals".

For the purposes of this report, the year 1989 was chosen as the base date, that is the average of the four quarters equals 100. This choice is motivated by two concerns: the base must not be too far back into the past as to become irrelevant to recent real exchange behavior, and placing the base at a moment in time that coincides with an inflection point in the trend of fundamentals influencing the Nicaraguan economy. Also, by having a whole year as a base, the problem of putting too much emphasis on one quarter alone is avoided.

To construct the exchange rate index (ERI_{c1t}), the following operation must be performed:

$$ERI_{c1t} = \frac{E_{c1t}}{E_{c189}} * 100$$

where E_{c1t} is the nominal Cordoba/country i currency exchange rate at time t, and E_{c189} is the same specifically for 1989.

⁷⁸The idea is to anchor the system into an initial equilibrium condition. This is convenient, but not indispensable as it is in PPP type studies. In fact, it should be stressed, there is no parallel between PPP and modern real exchange analyses.

178

Table A.6 (cont.)

<u>Year Quarter</u>	<u>Average Rate</u>
1984 I	12.56
1984 II	13.39
1984 III	13.39
1984 IV	13.39
1985 I	22.61
1985 II	27.31
1985 III	27.31
1985 IV	27.31
1986 I	80.36
1986 II	106.89
1986 III	109.43
1986 IV	110.71
1987 I	199.08
1987 II	396.12
1987 III	436.72
1987 IV	436.72
1988 I	5,218.36
1988 II	21,126.67
1988 III	114,410.00
1988 IV	622,890.00
1989 I	3,305,176.67
1989 II	9,896,380.00
1989 III	20,837,883.33
1989 IV	28,579,033.33
1990 I	45,179,783.33
1990 II	135,768,486.67
1990 III	736,455,190.00
1990 IV	1,842,419,353.33
1991 I	11,049,397,080.00
1991 II	25,000,000,000.00
1991 III	25,000,000,000.00
1991 IV	25,000,000,000.00
1992 I	25,000,000,000.00

Source: Picks, MED, BCN, IMF.

In MRERDATA file the exchange rate index variables are called in/(i), where *i* refers to country in question, and they are located between columns AW and BJ, e.g., in/ger is column AW.

Specifically, the ERI for Germany for the first quarter of 1988 corresponds to

$$\text{in/ger (88.1)} = \frac{\text{aerger (88.1)}}{\text{aerger (89)}} * 100$$

which in Lotus format is:

$$+ C2/@AVG(C\$6..C\$9) * 100$$

where C\$6..C\$9 refer to the four quarters of 1989 for the variable aerger.

The second step in the analysis consists of computing a Multilateral Nominal Exchange Rate Index (MNER). This can be calculated separately from the MRER, and is done by summing over the multiplication of each ERI_{ci} by its respective weight. Formally,

$$MNER = \sum_i a_i * ERI_{ci}$$

In the MRERDATA file the MNER variables are located in columns BO-BR. These have been obtained by summing over the columns where the variables in/(i) are, times their respective weights. The weights correspond to those in the first column of Tables A.1 to A.3 in this appendix. There are four MNER indices: MNER_{xm}, MNER_m, MNER_x, MNER_s, which combine different selections of trading partners currencies as explained in section II.1 of this appendix.

II.5 Price Indices

The third step in the construction of the MRER index is to obtain the wholesale or producer price indices for the trade partners and the consumer price index for Nicaragua. The data on wholesale price indices for Nicaragua's trading partners was also taken from the IFM tape -- 63 series

and updated with the IFS monthly issues.⁸⁰ Missing observations were proxied with the consumer price index or the GDP deflator. The Nicaraguan consumer price index used in the calculations corresponds to the IMF's 64 series, which coincides with the data published by the BCN. These indices must be transformed so that they have the same base date as the nominal exchange rate indices.

With the price indices of trading partners the variable PT_t can be constructed. This is done by summing over the multiplication of each wholesale or producer price index by its respective weight. Formally,

$$PT_t = \sum_i a_i * PT_{it}$$

There are four tradable price indexes in the MRERDATA file: PTXM, PTM, PTX and PTS, located in columns BK to BN. The difference between them is the mixture of countries used to construct each of them. The individual PT_{it} are called $wpi(i)$ in MRERDATA file, where i refers to specific country located in columns R to AF. For example, $wpigex$ is the producer price index for Germany.

II.6 Multilateral Real Exchange Rate Index

Having calculated independently the MNER, PT, and PN indices as explained above, the MRER is obtained then by applying the general formula:

$$MRER_t = \frac{MNER_t * PT_t}{PN_t}$$

Evidently, the MRER can be obtained directly from the individual price and exchange rate indices, times their respective weights, in the following way:

⁸⁰The price indices for the third and fourth quarters of 1991 and first of 1992 in the cases of Italy and Great Britain were obtained from OECD, Main Economic Indicators, Paris, June 1992.

121

$$MRER_t = \frac{a_1 \cdot EIR_{1t} \cdot PT_{1t}}{PN_t}$$

It should be noted that, although both methods are equivalent, they are not identical and small differences will arise in the numerical estimation of the MRER.

The first method is used in the MRERDATA file, where PN correspond to variable cpinic in column AG.

As explained in Chapter V of the text, four MRER measures were constructed. The first three -- MRERxm, MRERx, MRERm -- were built with the weights (a_1) of the earlier 1976-82 period appearing in Tables A.1, A.2 and A.3. These weights are the benchmark, since the direction of trade arising during 1990-91 is not yet a stable scenario, but indicates a return towards a pattern similar to the one prevalent in the late 1970s. The fourth measure -- MRERs -- uses the SDR weights.

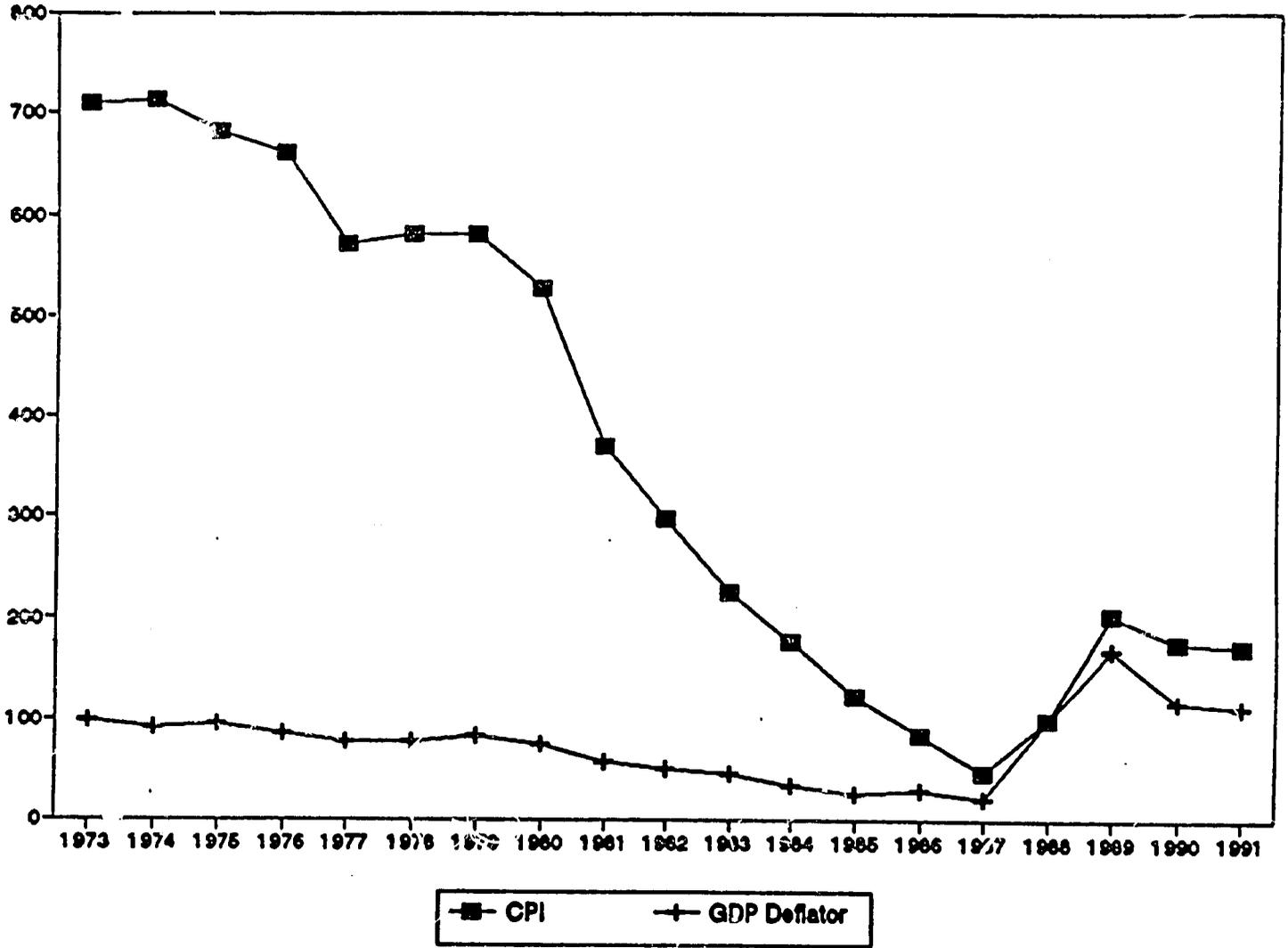
II.7 The Multilateral Real Exchange Rate and the Trade Embargo

Here I investigate the issue whether the U.S. trade embargo and the new trade pattern emerging after it was lifted have affected the long-run behavior of Nicaragua's real exchange rate. For this purpose a fifth multilateral RER was calculated, denoted as MRERw. This index combines the total trade (exports + imports) weights for the three periods presented in Table A.1. Thus, in the MRERw the weights change as the pattern of trade changes in an attempt to capture the effect of past alterations in Nicaragua's trade structure on the evolution of the real exchange rate. The three periods to which the different weights were applied are: 1) 1973.1-1984.4; 2) 1985.1-1990.1; 3) 1990.2-1991.3.

In Figure A.1 the MRERw index is compared with the MRERxm index (introduced in Chapter V of the report), whose weights are fixed and

Figure A1

MMEHW
1988 = 100



correspond to those of the 1976-82 period in Table A.1. It can be seen in this Figure that the changes introduced in the MRERw calculation do not alter the general picture obtained before. The long-run trend remains the same, and the behavior of the real exchange rate during the embargo is unaltered. To some extent this is not surprising since at the time Canada and a handful of European countries replace the U.S. as the principal destination of Nicaraguan trade. It should be noted, however, that this conclusion ignores the impact that trading with Socialist countries had for Nicaragua. Since price data for these countries is not available, the analysis must be limited to changes in trade within the Western Hemisphere. And in this context, we must conclude that the embargo did not affect Nicaragua's real exchange r.

III. Updating the Real Exchange Rate Indices

Two Lotus 1-2-3 files supplement this report. The first file, MRERDATA, contains all the data and calculations required to estimate the quarterly multilateral real exchange rates indices for the period 1988-92⁸¹. It also includes an estimation of a quarterly bilateral real exchange rate index for the same period of time. The second file, BRERDATA, provides the data and calculations for a monthly bilateral real exchange rate beginning January 1988. Detailed explanation about the contents of these files as well as the instructions on how to update them are given below in Sections III.1 and III.3. Hard copies of the contents of these files are provided respectively in appendices I.A. and I.B of this report.

⁸¹First quarter of 1992.

184

III.1 Variables in MRERDATA File

<u>Column</u>	<u>Name</u>	<u>Explanation</u>
A	Year	
B	Q.	Quarter;
C	aernic	Period average nominal Cordoba/U.S. dollar exchange rate;
D	aerger	Period average nominal exchange rate Germany's currency per U.S. dollar;
E	aerita	Same for Italy;
F	aerjap	Same for Japan;
G	aercri	Same for Costa Rica;
H	aergua	Same for Guatemala;
I	aermex	Same for Mexico;
J	aeruki	Same for the United Kingdom;
K	aeraus	Same for Austria;
L	aerfra	Same for France;
M	aernet	Same for Netherlands;
N	aercan	Same for Canada;
O	aerspa	Same for Spain;
P	aerven	Same for Venezuela;
Q	aerbel	Same for Belgium;
R	wpiusa	Wholesale price index for the U.S., base 1989 = 100;
S	wpiger	Same for Germany;
T	wpifra	Same for France;
U	wpijap	Same for Japan;
V	wpiuki	Same for the United Kingdom;
W	wpicri	Same for Costa Rica;
X	wpiita	Same for Italy;

Variables in MRERDATA File (cont.)

<u>Column</u>	<u>Name</u>	<u>Explanation</u>
Y	wpinet	Same for Netherlands;
Z	wpispa	Same for Spain;
AA	wpigua	Same for Guatemala;
AB	wpimex	Same for Mexico;
AC	wpiaus	Same for Austria;
AD	wpican	Same for Canada;
AE	wpibel	Same for Belgium;
AF	wpiven	Same for Venezuela;
AG	cpinic	Consumer price index for Nicaragua, base 1989 - 100;
AH	en/eger	Cross nominal exchange rate of Cordobas per unit of German currency;
AI	en/eita	Same for Italy;
AJ	en/ejap	Same for Japan;
AK	en/ecri	Same for Costa Rica;
AL	en/egua	Same for Guatemala;
AM	en/emex	Same for Mexico;
AN	en/euki	Same for the United Kingdom;
AO	en/caus	Same for Austria;
AP	en/efra	Same for France;
AQ	en/enet	Same for Netherlands;
AR	en/ecan	Same for Canada;
AS	en/espa	Same for Spain;
AT	en/ebel	Same for Belgium;
AU	en/even	Same for Venezuela;

Variables in MRERDATA File (cont.)

<u>Column</u>	<u>Name</u>	<u>Explanation</u>
AV	ienic	Index of Cordoba per U.S. dollar exchange rate; base 1989 - 100;
AW	in/ger	Index of cross nominal exchange rate of cordobas per unit of German currency, base 1989 - 100;
AX	in/ita	Same for Italy
AY	in/jap	Same for Japan;
AZ	in/cri	Same for Costa Rica;
BA	in/gua	Same for Guatemala;
BB	in/mex	Same for Mexico;
BC	in/uki	Same for the United Kingdom;
BD	in/aus	Same for Austria;
BE	in/fra	Same for France;
BF	in/net	Same for Netherlands;
BG	in/can	Same for Canada;
BH	in/spa	Same for Spain;
BI	in/bel	Same for Belgium;
BJ	in/ven	Same for Venezuela;
BK	PTXM	Tradable Price Index: Weighted average of wholesale price indices of the nine most important trading partners of Nicaragua in terms of total trade (exports plus imports) for the period 1976-1982: the U.S., Costa Rica, Guatemala, Germany, Japan, Mexico Italy, Netherlands and Spain;
BL	PTM	Tradable Price Index: Weighted average of wholesale price indices of the nine most important trading partners of Nicaragua in terms of imports for the period 1976-1980: the U.S., Venezuela, Germany, Japan, Costa Rica, the United Kingdom, Mexico, Guatemala and Spain;

Variables in MRERDATA File (cont.)

<u>Column</u>	<u>Name</u>	<u>Explanation</u>
BM	PTX	Tradable Price Index: Weighted average of wholesale price indices of the ten most important trading partners of Nicaragua in terms of e period 1976-1980: the U.S., German Rica, Guatemala, Netherlands, Belgi and Spain;
BN	PTS	Tradable Price Index: Weighted average of wholesale price index of the SDR member countries: the U.S., the United Kingdom, Japan, France and Germany;
BO	MNERxm	Multilateral Nominal Exchange Rate Index: weighted average of nominal exchange rates indices of same set of countries listed for PTXM;
BP	MNERm	Multilateral Nominal Exchange Rate Index: weighted average of nominal exchange rate indices of same set of countries listed for PTM;
BQ	MNERx	Multilateral Nominal Exchange Rate Index: weighted average of nominal exchange rate indices of same set of countries listed for PTX;
BR	MNERs	Multilateral Nominal Exchange Rate Index: weighted average of nominal exchange rate indices of same set of countries listed for PTS;
BS	MRERxm	Multilateral Real Exchange Rate Index: (MNERxm * PTXM)/cpinic;
BT	MRERm	Multilateral Real Exchange Rate Index: (MNERm * PTM)/cpinic;
BU	MRFRx	Multilateral Real Exchange Rate Index: (MNERx * PTX)/cpinic;
BV	MRERs	Multilateral Real Exchange Rate Index: (MNERs * PTS)/cpinic;
BW	BRER	Bilateral Real Exchange Rate: (ienic * wpiusa)/cpinic.

1/3

III.2 Updating the Multilateral Real Exchange Rate

In order to update the MRER indices contemporary quarterly data on the following variables must be added to the MRERDATA file:

- a. The Cordoba/U.S. Dollar exchange rate (aernic);
- b. Nicaragua's trading partners exchange rate against the U.S. dollar (aer(1));
- c. Consumer price index for Nicaragua (cpinic);
- d. Wholesale price index for Nicaragua's trading partners (wpi(1)).

The intermediate and final steps so as to calculate the updated real exchange rate indices will be performed automatically with just a copy command. This procedure is explained in what follows.

Column C is the period average Cordoba/U.S. dollar parity (aernic). While a unified exchange rate system is maintained, and no significant amount of trade is financed through the parallel market, the average of the official parity is an appropriate measure to update this column. If the parallel rate diverges considerably from the official parity and both exporters and importers become active in the former market, an average of the two rates will have to be estimated. The weights should then be calculated according to the proportion in which currency transactions for trade purposes are taking place in each market.

Columns D to Q correspond to the period average exchange rate against the U.S. dollar of Nicaragua's trading partners (aer(1)). These columns must be updated with the quarterly figure of the rf series appearing for each country in the IMF's IFS publication. An exception is the case of Great Britain: the number that goes into the column is the inverse of the rh series, i.e., $1/rh$, so as to obtain the parity of Pound Sterling per U.S. dollar.

189

Columns R to AF contain the price indices for the 15 countries involved in the MRER estimation (wpi(1)). The index that ideally should go in here is the wholesale or producer price index, that is, the series 63 in the IMF's IFS. When not available, the series 63a is the best substitute. If these figures are not available either, then the consumer price index, series 64, should be used as an approximation. The OECD publication Main Economic Indicators is also a good source for obtaining updated series on producer and consumer price indices for OECD member countries.

It is important that the number added to these columns has the same base as the data in the MRERDATA file. The price series in the IFS volumes have a base date 1985 = 100, while the MRERDATA file has a base 1989 = 100. So, the user of this file must be careful not to input the IMF price indexes as they appear in the IFS publication. To update the price indexes correctly, obtain the ratio between the last two quarters of the price index in question as published in IFS, and then multiply this ratio by the last quarter appearing in the MRERDATA file. The resulting number is the latest quarterly price index with base 1989 = 100, which should be placed at the bottom of the price index column in the MRERDATA file.

Column AG is the Nicaraguan consumer price index (cpinic). The same caution must be had here about the base date of the new information.

Once columns C to AG have been updated as instructed above, the MRER and BRER indices, appearing in columns BS to BW, will be calculated automatically by using the copy command on all columns adjacent to AF. Specifically, the cursor must be placed on the last observation in column AH and then operate the following commands, as explained below:

190

<u>Command</u>	<u>Explanation</u>
	With the 'slash' command you access the main Lotus menu a at the top of the screen.
c	Activates the 'copy' procedure.
press 'left arrow' till reaching last column with data, i.e column BW', and press <enter>	With this procedure you are indicating all the columns to be updated with the copy comand, which include all exchange rate indexes, tradable price indexes (PT), nominal multilateral exchange rates (MNER) and real exchange rates (MRER and BRER).
press 'down arrow' placing cursor one row below on the AH column and press <enter>	With this prodedure you are indicating the space where the copy command will operate, i.e, where the updated figures will appear.
At this point the new estimates will appear on the screen, on the last row of the data file. Note that the copy command has copied the <u>formulas</u> into the new cells, not the actual numbers appearing on the screen. The formulas so tranferred to the bottom row operate on the new data introduced	

procedure with the new information you just added to the file.

All the necessary formulas that yield the final indices are in columns AH to BW. The data in these columns are explained in what follows.

Columns AH to AU, titled en/e_1 , contain the nominal exchange rates of the Cordoba against the currencies of Nicaragua's trading partners, and correspond to the variable E_{ci} explained in Section II.3 of this appendix.

Columns AV to BJ correspond to the Cordoba/country i currency exchange rate index, that is, variable ERI_{cit} in Section II.3. In order to change the base press [F2], change the number following the \$ sign for the number of the row corresponding to the date selected as the new base, and press <enter>. Use the copy procedure to recalculate the whole column.

Columns BK to BN show the weighted tradable goods price indices (PT), each calculated with a different set of weights as explained in Section II.1 of this appendix. If the weights need to be changed as new trade patterns emerge, the formula must be edited with the [F2] command.

Columns BO to BR are four weighted multilateral nominal exchange rates (MNER), each estimated with a different set of weights. The weight sets are the same as those used to build the PT variables in the previous four columns.

Columns BS to BW are the four quarterly estimated MRER indices.

Column BW is the estimated quarterly BRER index.

III.3 Changing the Base

To change the base date of the entire data set, the denominator of the formula which yield the indices $ienic$ and $in/(i)$ must be changed. For example, the variable $ienic$ results from the Lotus formula:

+C(j)/@AVG(C\$6..C\$9) * 100

192

where j = row number 2 to 16, and the values 6 to 9 correspond to the four quarters of 1989. To have a different year as a base, say 1990, the row numbers in the denominator need to be changed for those corresponding to 1990, i.e., the formula will now look as follows:

$$+C(j)/@AVG(C\$10..C\$13) * 100$$

This change needs to be performed in one cell only, and with a copy command the rest of the exchange rate indices can be updated to the new base. Also, the wpi(i) variable will need to be changed to the new base. To do this, in a separate space of the file, e.g., cell R18, the old 1989 based price index for the U.S., wpiusa, must be divided by the average of the same index for the selected year. The formula representing this transformation is:

$$+R2/@AVG(R\$x..R\$y) * 100$$

where x and y are the row numbers of the first and last quarters of the year selected as a base. With a copy command the transformation can be operated for the other wpi(i) variables. The next step is to change the newly obtained numbers to "values", which is done with the Range and Value Lotus commands. Now the old values can be erased and replaced by the new ones with the Range, Erase and Move Lotus commands.

To change the date base of the MRER and BRER indices only, then it is advised to keep the data set with base 1989 and recalculate separately new columns for these variables with the newly selected base date. For example, if the new base date were 1990, then introduce the following formula in an empty cell:

$$+BS2/@AVG(BS\$10..BS\$13) * 100$$

and you will obtain the MRERxm (located in column BS) for the first quarter of 1988 with base 1990 = 100. With a copy command the other MRER

and BRER indices can be quickly changed to the new base.

III.4 Updating the Bilateral Real Exchange Rate

In order to update the BRER indexes contemporary monthly data on the following variables must be added to the BRERDATA file:

- a. the cordoba/U.S. dollar nominal exchange rate;
- b. the U.S. wholesale or producer price index;
- c. the Nicaraguan consumer price index;
- d. the Nicaraguan nontradables price index.

The cordoba/U.S. dollar exchange rate, denoted by aernic, is located in column C. This exchange rate is in terms of "old" pre-1988 cordobas, so that the new information added to column C requires the transformation of the current Cordoba Oro exchange rate into "old" cordobas. Column D is the index of the exchange rate in column C with base fourth quarter 1989 = 100. This variable is called irenic and it will be updated automatically with a copy command. Specifically, the cursor must be placed in the last row of this column, then press the following Lotus commands:

/

c

<enter>

(move cursor one row down)

<enter>

Column E is the U.S. producer price index (wpiusa), and should be updated according to the monthly figure of the 63 series appearing in the IMF's IFS publication. However, since this IMF series has a different base than that used in this file, the appropriate (and easiest) way to update column E is to obtain the ratio between the last two months of the 63 series (last month index number/prior month index number) and multiply this ratio

by the figure appearing in the last row of column E. Specifically, place the cursor in the row immediately below the last one, and construct the following Lotus formula in that cell:

+E51*ratio

<enter>

E51 refers to the cell presently in the last row in column E. For subsequent months, the number of the last cell will increase by one and a new ratio will have to be calculated.

Column F is the Nicaraguan consumer price index (cpinic) with base fourth quarter 1989 = 100. To update this series use the percentage change of the domestic CPI for the latest month (CPI%) and introduce it in the following Lotus formula to be located in the cell immediately below the last row of the F column:

+F51*(CPI%/100+1)

<enter>

Column G is the non tradables price index for Nicaragua (ntpi) and should be updated in the same way as the CPI index is. The same formula applies, but with the monthly percentage change in nontradable prices:

+G51*(ntpi%/100+1)

<enter>

Columns H and I are the monthly bilateral real exchange rate indexes. The first one, in column H and denoted by BRERCPI, corresponds to the index constructed with the CPI in the denominator. The second one, BRERNTPI, uses the nontradable price index instead. Both will be updated with a copy command once the information in the previous columns has been added to the file. Specifically, place cursor in last row of column H and operate the following instructions:

c

(move cursor to column I, same row)

<enter>

(move cursor one row down in column H)

<enter>

At this point the estimates of the bilateral real exchange rates for the latest month should appear in the screen.

As a reminder, users of this files should be careful to save the files every time they have been updated. This is done pressing the following

Lotus commands:

/

F

S

R

APPENDIX I.A

Lotus File MRERDATA: Data Set

197

Year	Q.	aernic	aerger	aerita	aerjap	aercri
1988	1	5218.36	1.68	1235.3	128.00	72.79
1988	2	21126.67	1.71	1268.1	125.61	74.87
1988	3	114410.00	1.87	1385.9	133.71	76.80
1988	4	622890.00	1.78	1317.3	125.28	78.76
1989	1	3305176.67	1.85	1357.3	128.45	79.88
1989	2	9896380.00	1.93	1409.0	138.07	80.74
1989	3	20837873.33	1.92	1386.6	142.29	81.91
1989	4	28579033.33	1.81	1335.5	143.04	83.49
1990	1	45179783.33	1.69	1254.6	147.90	85.26
1990	2	135768486.67	1.68	1232.8	155.25	88.11
1990	3	736455190.00	1.59	1177.4	145.23	93.21
1990	4	1842419353.33	1.50	1127.6	130.79	99.74
1991	1	11049397080.00	1.53	1148.3	133.85	109.68
1991	2	25000000000.00	1.73	1288.1	138.31	119.88
1991	3	25000000000.00	1.74	1302.3	137.16	127.21
1991	4	25000000000.00	1.63	1223.7	129.50	132.96
1992	1	25000000000.00	1.62	1218.6	128.43	136.22

Year	Q.	aergua	aermex	aeruki	aeraus	aerfra	aernet
1988	1	2.50	2249.4	0.557	11.78	5.67	1.882
1988	2	2.57	2281.0	0.543	12.00	5.78	1.916
1988	3	2.71	2281.0	0.590	13.13	6.32	2.106
1988	4	2.71	2281.0	0.559	12.48	6.06	2.002
1989	1	2.70	2324.2	0.572	13.01	6.29	2.088
1989	2	2.70	2415.5	0.615	13.61	6.55	2.180
1989	3	2.74	2507.0	0.626	13.54	6.51	2.170
1989	4	3.12	2599.3	0.631	12.77	6.17	2.046
1990	1	3.70	2690.0	0.604	11.90	5.74	1.906
1990	2	4.27	2779.3	0.597	11.81	5.64	1.889
1990	3	4.87	2856.4	0.538	11.21	5.34	1.795
1990	4	5.10	2924.7	0.514	10.56	5.06	1.694
1991	1	5.05	2965.0	0.524	10.77	5.21	1.726
1991	2	4.95	3001.2	0.586	12.20	5.88	1.954
1991	3	5.03	3040.1	0.593	12.28	5.93	1.965
1991	4	5.08	3067.4	0.564	11.46	5.55	1.833
1992	1	5.13	3066.4	0.565	11.40	5.51	1.823

Year	Q.	aercan	aersp	aerbel	aerven	wpiusa	wpijer
1988	1	1.267	113.09	35.06	14.50	93.36	96.10
1988	2	1.230	113.02	35.71	14.50	94.83	96.70
1988	3	1.219	123.55	39.11	14.50	96.21	97.20
1988	4	1.206	116.29	37.19	14.50	96.67	97.71
1989	1	1.192	115.52	38.75	21.56	98.78	99.12
1989	2	1.193	121.63	40.53	37.60	100.53	99.92
1989	3	1.182	120.61	40.27	37.60	100.16	100.13
1989	4	1.169	115.76	38.06	41.97	100.53	100.83
1990	1	1.183	109.11	35.29	43.14	102.00	100.93
1990	2	1.170	104.98	34.61	45.65	101.81	101.43
1990	3	1.153	98.68	32.78	48.97	103.65	101.94
1990	4	1.161	94.96	30.98	49.83	106.78	102.64
1991	1	1.156	95.71	31.52	53.03	104.57	102.94
1991	2	1.149	107.62	35.66	55.01	103.56	103.75
1991	3	1.144	109.18	35.92	58.85	103.39	105.24
1991	4	1.135	103.13	33.49	60.37	103.57	105.44
1992	1	1.177	102.18	33.33	63.76	103.29	105.44

Year	Q.	wpijra	wpijap	wpiuki	wpicri	wpiita	wpinet
1988	1	92.32	97.50	93.28	82.85	92.12	94.65
1988	2	93.43	97.16	94.62	86.35	93.36	95.15
1988	3	95.56	98.06	95.71	88.25	94.42	97.05
1988	4	97.96	97.27	96.81	91.63	96.10	97.25
1989	1	100.28	97.72	98.15	96.85	98.30	99.05
1989	2	100.65	100.31	99.41	98.57	99.71	100.25
1989	3	99.91	101.10	100.59	101.15	100.24	100.25
1989	4	99.17	100.87	101.85	103.42	101.74	100.45
1990	1	98.52	101.32	103.45	105.63	156.78	100.25
1990	2	98.33	102.11	105.63	109.44	105.20	100.65
1990	3	98.52	102.11	106.64	117.00	106.57	101.55
1990	4	99.63	102.79	107.90	127.56	108.58	101.65
1991	1	96.67	102.90	109.92	136.59	110.51	102.05
1991	2	97.32	102.45	111.94	142.73	112.20	102.35
1991	3	98.18	102.16	112.71	151.42	113.34	104.56
1991	4	98.99	101.48	113.39	158.05	113.81	105.33
1992	1	99.64	101.14	114.65	168.37	114.74	105.52

105

Year	Q.	wpispa	wpigua	wpimex	wpiaus	wpican	wpibel
1988	1	94.76	86.50	79.45	98.25	95.76	92.38
1988	2	95.49	88.79	85.69	98.67	96.94	92.38
1988	3	96.31	91.08	88.90	97.93	97.94	94.68
1988	4	97.14	93.36	90.59	98.14	98.75	95.67
1989	1	98.88	96.02	95.54	99.31	100.20	98.96
1989	2	99.61	98.67	98.68	100.27	100.39	100.60
1989	3	100.53	101.33	100.97	99.73	100.02	100.38
1989	4	100.98	103.98	104.81	100.69	99.39	100.05
1990	1	101.63	109.22	112.63	102.18	99.75	99.07
1990	2	101.63	114.46	120.06	102.92	99.93	97.75
1990	3	101.99	119.71	127.01	102.07	100.02	98.74
1990	4	103.27	124.95	133.69	101.96	101.20	100.27
1991	1	103.64	130.64	141.24	104.83	100.93	98.19
1991	2	103.36	136.34	146.62	105.15	99.48	98.40
1991	3	103.66	140.17	150.61	102.63	98.70	99.47
1991	4	104.03	140.86	155.53	102.31	99.25	99.47
1992	1	104.49	143.54	163.96	104.11	99.71	98.83

Year	Q.	wpiven	cpinic	en/eger	en/eita
1988	1	47.64	0.10	3114.0	4.22
1988	2	48.98	0.33	12373.1	16.66
1988	3	51.52	1.16	61309.6	82.55
1988	4	54.42	6.60	350810.5	472.86
1989	1	70.82	32.24	1787283.4	2435.15
1989	2	102.97	60.99	5117386.1	7023.54
1989	3	112.25	123.20	10029178.4	15027.92
1989	4	113.97	183.57	15765098.3	21400.29
1990	1	118.40	309.65	26721361.5	36011.28
1990	2	123.21	1207.57	80912151.6	110126.52
1990	3	131.46	7449.77	462181459.8	625513.49
1990	4	135.83	21132.02	1227646921.5	1633913.96
1991	1	143.33	110976.90	7218506700.2	9622471.20
1991	2	150.58	254481.14	14410849871.2	19407813.28
1991	3	159.49	236667.46	14367816092.0	19196805.65
1991	4	168.79	252741.23	15337423312.9	20429843.92
1992	1	174.40	256356.28	15432098765.4	20515345.48

Year	Q.	en/ejap	en/ecri	en/gua	en/emex
1988	1	40.77	71.69	2087.3	2.32
1988	2	168.19	282.17	8225.8	9.26
1988	3	855.66	1489.73	42295.6	50.16
1988	4	4971.98	7908.74	230273.0	273.08
1989	1	25731.21	41378.67	1224136.8	1422.09
1989	2	71676.49	122566.49	3665317.8	4097.08
1989	3	146446.40	254393.54	7595427.6	8311.87
1989	4	199797.35	342320.24	9156991.1	10995.10
1990	1	305475.00	529910.57	12199186.1	16795.57
1990	2	874514.65	1540922.60	31786146.8	48849.85
1990	3	5070954.23	7900787.85	151247304.5	257824.28
1990	4	14086841.08	18472760.27	361326569.4	629950.92
1991	1	82550532.87	100742132.39	2186318337.8	3726580.56
1991	2	180753249.40	208541875.21	5052299382.3	8330048.52
1991	3	182268883.06	196525430.39	4970178926.4	8223413.70
1991	4	193050193.05	188026474.13	4921259842.5	8150224.95
1992	1	194658568.87	183526648.07	4873294347.0	8152882.86

Year	Q.	en/euki	en/eaus	en/efra	en/enet
1988	1	9371.3	443.06	920.5	2772.2
1988	2	38904.2	1759.97	3655.9	11025.8
1988	3	193960.1	8716.94	18106.0	54324.8
1988	4	1114427.9	49896.18	102763.2	311159.5
1989	1	5776973.0	254107.14	525122.0	1583291.6
1989	2	16085303.4	727299.05	1509949.8	4540030.0
1989	3	33261323.6	1538562.37	3202765.8	9604145.0
1989	4	45303528.6	2238855.35	4634780.3	13968554.2
1990	1	74853685.6	3795433.98	7876792.2	23705545.8
1990	2	227231547.9	11499255.23	24054040.7	71871912.7
1990	3	1370086995.1	65684434.21	137817207.5	410195975.9
1990	4	3583592193.1	174520778.91	364308242.5	1087933917.6
1991	1	21077126807.7	1026226112.70	2120801510.9	6400497864.3
1991	2	42658796516.9	2048622833.79	4252343594.1	12793777106.8
1991	3	42158516020.2	2035830618.89	4215851602.0	12722646310.4
1991	4	44326241134.8	2181500872.60	4504504504.5	13638843426.1
1992	1	44247787610.6	2192982456.14	4537205081.7	13713658804.2

201

Year	Q.	en/ecan	en/espa	en/ebel	en/even
1988	1	4117.3	46.15	148.85	359.886
1988	2	17178.9	186.93	591.60	1457.009
1988	3	93826.9	926.02	2925.28	7890.329
1988	4	516393.2	5356.25	16746.89	42957.842
1989	1	2773027.2	28612.01	85286.58	153302.539
1989	2	8293753.2	81367.24	244187.63	263218.677
1989	3	17624831.3	172777.71	517423.57	554262.587
1989	4	24457210.7	246877.29	750847.64	680887.970
1990	1	38204678.7	414075.17	1280095.59	1047227.773
1990	2	115998611.3	1293290.63	3922611.47	2973949.269
1990	3	638656450.4	7462753.53	22464511.08	15037683.072
1990	4	1586961413.7	19401423.85	59465396.51	36971583.778
1991	1	9559931130.1	115445498.60	350559166.99	208347891.706
1991	2	21759906415.0	232300771.89	700972051.96	454460346.517
1991	3	21853146853.1	228979666.61	695991091.31	424808836.024
1991	4	22026431718.1	242412489.09	746491490.00	414112970.018
1992	1	21240441801.2	244666275.20	750075007.50	392095357.591

Year	Q.	ienic	in/ger	in/ita	in/jap	in/cri
1988	1	0.0	0.0	0.0	0.0	0.0
1988	2	0.1	0.1	0.1	0.2	0.1
1988	3	0.7	0.7	0.7	0.8	0.8
1988	4	4.0	4.2	4.1	4.5	4.2
1989	1	21.1	21.3	21.2	23.2	21.8
1989	2	63.2	61.1	61.2	64.6	64.5
1989	3	133.1	129.3	131.0	132.0	133.8
1989	4	182.6	188.2	186.5	180.1	180.0
1990	1	288.6	319.1	313.9	275.4	278.7
1990	2	867.3	966.1	960.0	788.5	810.3
1990	3	4704.4	5518.8	5452.7	4572.0	4154.7
1990	4	11769.2	14658.9	14243.0	12700.8	9714.1
1991	1	70582.4	86193.8	83879.9	74428.3	52976.2
1991	2	159697.3	172075.3	169179.6	162968.7	109663.8
1991	3	159697.3	171561.4	167340.2	164335.2	103344.8
1991	4	159697.3	183139.2	178088.7	174055.7	98875.6
1992	1	159697.3	184269.7	178334.1	175505.9	96509.3

202

Year	Q.	in/gua	in/mex	in/uki	in/aus	in/tra
1988	1	0.0	0.0	0.0	0.0	0.0
1988	2	0.2	0.1	0.2	0.1	0.1
1988	3	0.8	0.8	0.8	0.7	0.7
1988	4	4.3	4.4	4.4	4.2	4.2
1989	1	22.6	22.9	23.0	21.4	21.3
1989	2	67.7	66.0	64.1	61.1	61.2
1989	3	140.4	133.9	132.5	129.3	129.8
1989	4	169.2	177.2	180.4	188.2	187.8
1990	1	225.5	270.6	298.1	319.0	319.1
1990	2	587.5	787.1	905.1	966.6	974.6
1990	3	2795.5	4154.1	5457.0	5521.1	5583.8
1990	4	6678.3	10149.8	14273.4	14669.2	14760.4
1991	1	40409.0	60042.9	83949.9	86258.8	85926.6
1991	2	93380.1	134214.2	169909.5	172195.7	172288.4
1991	3	91862.3	132496.1	167916.8	171120.5	170809.9
1991	4	90958.1	131316.9	176550.9	183364.7	182505.0
1992	1	90071.6	131359.7	176238.4	184329.8	183829.9

Year	Q.	in/net	in/can	in/spa	in/bel	in/ven
1988	1	0.0	0.0	0.0	0.0	0.1
1988	2	0.1	0.1	0.1	0.1	0.4
1988	3	0.7	0.7	0.7	0.7	1.9
1988	4	4.2	3.9	4.0	4.2	10.4
1989	1	21.3	20.9	21.6	21.4	37.1
1989	2	61.2	62.4	61.5	61.1	63.7
1989	3	129.4	132.6	130.5	129.5	134.2
1989	4	188.2	184.1	186.5	188.0	164.9
1990	1	319.3	287.5	312.7	320.5	253.6
1990	2	968.1	873.0	976.7	982.0	720.2
1990	3	5525.3	4806.6	5636.2	5624.1	3641.8
1990	4	14654.3	11943.5	14652.7	14887.3	8953.7
1991	1	86213.5	71948.4	87189.6	87763.5	50457.5
1991	2	172329.9	163765.9	175442.4	175490.3	110060.7
1991	3	171371.7	164467.6	172934.2	174243.3	102879.7
1991	4	183712.7	165771.7	183079.2	186886.2	100289.4
1992	1	184720.5	159856.3	184781.3	187783.4	94957.2

203

Year	Q.	PTXM	PTM	FTX	PTS
1988	1	91.16	84.16	92.81	94.37
1988	2	92.95	85.78	94.06	95.34
1988	3	94.45	87.42	95.40	96.54
1988	4	95.48	88.75	96.21	97.13
1989	1	97.97	93.47	98.39	98.79
1989	2	99.82	100.35	100.04	100.26
1989	3	100.56	102.53	100.45	100.32
1989	4	101.64	103.65	101.12	100.63
1990	1	105.44	106.03	104.60	101.45
1990	2	105.29	108.08	103.17	101.83
1990	3	108.13	111.77	105.21	102.84
1990	4	111.98	115.72	108.22	104.67
1991	1	113.42	118.04	108.62	103.70
1991	2	114.81	120.34	109.29	103.69
1991	3	116.74	123.33	110.68	104.05
1991	4	118.05	125.85	111.48	104.24
1992	1	120.08	128.34	112.53	104.30

Year	Q.	MNERxm	MNERm	MNERx	MNERs
1988	1	0.04	0.04	0.04	0.04
1988	2	0.14	0.18	0.14	0.14
1988	3	0.75	0.94	0.74	0.74
1988	4	4.14	5.19	4.12	4.17
1989	1	21.72	24.33	21.56	21.72
1989	2	63.76	63.92	63.12	62.88
1989	3	133.24	133.67	132.45	131.75
1989	4	181.29	178.08	182.87	183.65
1990	1	284.01	276.70	291.32	297.22
1990	2	837.86	809.98	866.99	891.65
1990	3	4550.00	4351.53	4773.50	5035.12
1990	4	11520.06	10957.54	12231.14	13117.42
1991	1	67924.14	64263.43	72197.32	77570.85
1991	2	147576.64	140323.86	155048.75	165276.21
1991	3	146417.00	138171.96	154197.45	164967.02
1991	4	148839.24	139422.66	158330.32	171064.37
1992	1	148807.96	138449.28	158399.72	171618.17

201

Year	Q.	MRER _{con}	MRER _m	MRER _x	MRER _s	BRER
1988	1	32.50	37.14	32.93	33.48	31.08
1988	2	39.90	45.80	40.24	41.12	38.36
1988	3	61.22	71.31	61.15	61.90	60.72
1988	4	59.88	69.70	60.09	61.37	58.25
1989	1	66.00	70.55	65.79	66.55	- 64.69
1989	2	104.36	105.18	103.55	103.38	104.21
1989	3	108.76	111.24	107.98	107.27	108.21
1989	4	100.37	100.55	100.73	100.67	99.97
1990	1	96.71	94.75	98.40	97.38	95.07
1990	2	73.06	72.50	74.07	75.19	73.12
1990	3	66.04	65.28	67.42	69.51	65.45
1990	4	61.05	60.01	62.64	64.97	59.47
1991	1	69.42	68.35	70.66	72.49	66.51
1991	2	66.58	66.36	66.59	67.34	64.99
1991	3	72.22	72.00	72.11	72.53	69.76
1991	4	69.52	69.43	69.84	70.55	65.44
1992	1	69.70	69.31	69.53	69.82	64.34

205

TABLE A.8

Costa Rica: Metropolitan Area

Food Stuff "Canasta Basica" (per person/day)

FOOD STUFF	QUANTITY (grams)	CALORIES (kcal)	PROTEIN (grams)	FAT (grams)	COST (CS of July of 1988)
Wheat Flour	2.76	10.12	0.32	0.03	0.07
Small Bread	57.25	169.45	5.95	0.63	3.29
Sliced Bread	23.16	101.42	1.46	3.96	2.09
Pasta	19.30	66.40	1.93	0.11	8.15
Rice	88.86	323.43	6.40	0.53	3.01
Tortilla, Maiz, & Other Cereal	113.94	352.08	11.05	4.33	4.68
Potatoes	35.42	22.32	0.46	0.00	0.85
Yuca	29.08	35.77	0.20	0.09	0.43
Sugar	59.73	228.75	0.00	0.00	1.72
Beans	25.73	86.71	5.66	0.44	1.09
Tomatoes	22.74	5.00	0.16	0.05	0.97
Other Vegetables	37.77	8.68	0.27	0.08	1.61
Plátanos	48.88	59.59	0.49	0.14	0.84
Bananos	25.18	24.17	0.29	0.03	0.25
Oranges	22.97	5.74	0.12	0.02	0.54
Other Fruits	16.82	9.42	0.10	0.02	0.50
Beef	80.91	169.09	14.32	12.05	14.17
Pork	12.68	48.45	1.87	4.17	2.70
Chicken	16.95	22.37	2.53	1.27	1.92
Fresh Fish	5.24	4.03	0.84	0.04	1.03
Milk	139.94	120.35	6.30	6.44	4.66
Cheese	2.85	9.26	0.69	0.68	0.46
Eggs	19.20	25.35	1.92	1.68	1.68
Coffee	7.81	42.96	6.51	2.21	0.67
Soda	78.47	37.67	0.00	0.00	3.88
Cooking Oil	15.99	142.14	0.00	15.99	2.15
Lard	1.84	16.21	0.00	1.82	0.10
Margarine	2.67	20.07	0.02	2.27	0.29
TOTAL	1014.12	2167.00	69.85	59.07	63.81

Source: CEPAL, División de Estadística y Proyecciones.

206

TABLE A.9

Guatemala: Central Urban Area

Food Stuff "Canasta Basica" (per person/day)

FOOD	QUANTITY (grams)	CALORIES (kcal)	PROTEINS (grams)	FAT (grams)	COST (quetzales of Nov. 1986)
Wheat Flour	0.66	2.43	0.08	0.01	0.001
French Bread	44.96	133.08	4.68	0.50	0.072
Sweet Bread	40.11	175.69	2.53	6.86	0.068
Pasta	6.84	23.51	0.68	0.04	0.016
Rice	25.03	91.09	1.80	0.15	0.037
Tortilla	104.70	216.74	5.86	1.36	0.083
Maiz	65.68	240.90	5.22	3.67	0.028
Other Cereals	43.23	132.62	3.13	1.89	0.046
Potatoes	28.72	18.09	0.37	0.00	0.013
Yucca	35.16	25.73	0.42	0.02	0.016
Sugar	72.45	277.36	0.00	0.00	0.046
Beans	38.67	130.31	8.51	0.66	0.049
Other Legumes	0.43	1.45	0.09	0.01	0.001
Tomatoes	44.42	9.77	0.31	0.09	0.034
Guisquil	8.70	2.26	0.07	0.02	0.008
Other Vegetables	35.39	8.02	0.25	0.07	0.028
Bananos	16.23	10.88	0.13	0.02	0.006
Plátanos	22.27	19.15	0.16	0.05	0.013
Oranges	26.29	6.57	0.13	0.03	0.010
Other Fruits	74.48	42.08	0.48	0.10	0.036
Beef	53.94	111.22	9.50	7.88	0.382
Pork	10.02	38.29	1.47	3.30	0.059
Chicken	37.39	49.36	5.57	2.80	0.138
Other Meats	6.21	12.19	1.01	0.86	0.036
Fish	8.16	6.28	1.31	0.06	0.076
Milk	110.94	79.56	4.07	4.26	0.087
Cheese	7.35	15.22	1.52	0.90	0.020
Other Dairy Products	25.73	20.61	1.22	1.12	0.023
Eggs	35.26	46.55	3.53	3.07	0.093
Coffee	4.85	1.50	0.24	0.08	0.068
Sodas	73.37	22.77	0.07	0.02	0.114
Cooking Oil	14.94	132.71	0.00	14.93	0.081
Lard	0.59	5.12	0.00	0.58	0.002
Margarine	3.43	25.80	0.02	2.92	0.012
TOTAL	1126.60	2135.00	64.45	58.31	1.802

Source: CEPAL, División de Estadística y Proyecciones.

201

APPENDIX I.B

Lotus File BRERDATA: Data Set

Year	Month	aernic	iernic	wpiusa	cpinic	ntpi
1987	12	437	0.002	91.70	0.02	0.02
1988	1	437	0.002	92.06	0.03	0.02
1988	2	5218	0.018	91.88	0.06	0.06
1988	3	10000	0.035	92.15	0.10	0.09
1988	4	10430	0.036	92.97	0.13	0.11
1988	5	11480	0.040	93.63	0.16	0.12
1988	6	41470	0.145	94.65	0.26	0.20
1988	7	80000	0.280	94.97	0.47	0.37
1988	8	83226	0.291	95.09	0.57	0.49
1988	9	180000	0.630	95.24	0.85	0.70
1988	10	320000	1.120	95.33	1.36	1.15
1988	11	628670	2.200	95.43	2.89	2.08
1988	12	920000	3.219	96.06	6.55	4.54
1989	1	1963230	6.869	97.15	12.57	11.60
1989	2	3007140	10.522	97.61	18.32	19.41
1989	3	4945160	17.303	98.24	21.99	25.00
1989	4	6413330	22.441	98.97	24.75	28.09
1989	5	7325810	25.634	99.61	28.59	28.08
1989	6	15950000	55.810	99.33	46.38	45.40
1989	7	20000000	69.981	98.70	61.36	55.09
1989	8	20490320	71.697	98.97	66.08	59.77
1989	9	22023330	77.061	99.24	73.95	71.24
1989	10	23741940	83.075	99.24	84.59	85.06
1989	11	27920000	97.694	99.52	98.28	98.91
1989	12	34075160	119.231	101.24	117.15	116.03
1990	1	42779350	149.688	100.79	147.47	146.86
1990	2	46380000	162.287	100.79	169.12	164.17
1990	3	46380000	162.287	100.61	194.50	182.75
1990	4	53289330	186.463	100.42	264.99	235.12
1990	5	114516130	400.700	100.88	573.52	535.40
1990	6	239500000	838.027	100.70	1150.65	1364.54
1990	7	418387080	1463.965	100.70	2144.93	2607.74
1990	8	720645160	2521.587	102.61	3914.71	4983.96
1990	9	1070333330	3745.170	104.24	6216.56	8052.07
1990	10	1377419350	4819.685	106.42	8113.85	10431.28
1990	11	1745000000	6105.875	105.79	10793.86	14202.91
1990	12	2404838710	8414.696	104.51	15920.94	21379.39
1991	1	3453548390	12084.203	104.79	24230.07	32902.72
1991	2	4694642850	16426.878	103.24	34401.86	47297.81
1991	3	25000000000	87476.717	102.33	124242.32	158388.28
1991	4	25000000000	87476.717	102.24	149451.08	198021.59
1991	5	25000000000	87476.717	102.61	139901.16	177614.40
1991	6	25000000000	87476.717	102.42	130024.14	155610.07
1991	7	25000000000	87476.717	102.24	131168.35	156126.79
1991	8	25000000000	87476.717	102.42	128912.25	157079.98
1991	9	25000000000	87476.717	102.24	130510.76	159509.88
1991	10	25000000000	87476.717	102.25	138210.90	174614.14
1991	11	25000000000	87476.717	102.25	139523.90	173965.09
1991	12	25000000000	87476.717	102.25	139384.38	174638.02
1992	1	25000000000	87476.717	102.22	141029.11	NA

APPENDIX II

The Construction of Basic "Baskets" and Poverty Lines

The idea of defining a "canasta" of basic products has its roots in studies on "poverty lines", and its main purpose is to assure "everybody" a minimum standard of living. The standard methodology used in these poverty analyses consists of four basic steps: First, the cost of a basket of food that meet a certain nutritional level (usually 2,400 calories per day per adult male) is calculated. As a second step this amount of money is adjusted by some multiple (usually two for urban areas and 1.75 for rural areas), in order to allow for non-food consumption. In the third step a typical household is defined, and the minimum monthly income required for acquired the above defined basket is calculated. The final step consists of estimating what percentage of the population is below the poverty line. This methodology, of course, is not free of criticism. In fact, it has commonly been argued that establishing absolute (as opposed to relative) criteria for defining "poverty" makes very little economic sense: a "poor" person in the U.S. would be considered to be quite well off in Tanzania.

The U.N. Economic Commission for Latin America (ECLA/CEPAL) has conducted a large number of poverty line studies in Latin America, and has found that a significant proportion of these countries population is below the poverty line.⁸² For instance, in a recent attempt to update the CEPAL studies the World Bank found that for the following percentages of these

⁸²To my knowledge, however, CEPAL has not conducted a poverty line study for Nicaragua.

Year	Month	BRERCPI	BRERNTPI
1987	12	7.23	8.63
1988	1	4.83	6.31
1988	2	30.11	29.81
1988	3	31.78	35.48
1988	4	25.88	32.14
1988	5	24.10	30.22
1988	6	53.08	69.40
1988	7	55.97	72.52
1988	8	48.41	56.83
1988	9	70.74	85.19
1988	10	78.24	92.64
1988	11	72.61	100.90
1988	12	47.19	68.18
1989	1	53.10	57.53
1989	2	56.05	52.91
1989	3	77.31	68.01
1989	4	89.74	79.06
1989	5	89.31	90.93
1989	6	119.53	122.10
1989	7	112.56	125.38
1989	8	107.38	118.72
1989	9	103.42	107.36
1989	10	97.47	96.93
1989	11	98.92	98.29
1989	12	103.04	104.04
1990	1	102.30	102.73
1990	2	96.72	99.63
1990	3	83.94	89.34
1990	4	70.66	79.64
1990	5	70.48	75.50
1990	6	73.34	61.84
1990	7	68.73	56.53
1990	8	66.09	51.91
1990	9	62.80	48.48
1990	10	63.22	49.17
1990	11	59.84	45.48
1990	12	55.24	41.14
1991	1	52.26	38.49
1991	2	49.30	35.86
1991	3	72.05	56.52
1991	4	59.84	45.17
1991	5	64.16	50.53
1991	6	68.91	57.58
1991	7	68.19	57.29
1991	8	69.50	57.04
1991	9	68.53	56.07
1991	10	64.72	51.22
1991	11	64.11	51.42
1991	12	64.17	51.22
1992	1	63.40	NA

countries populations were below the estimated poverty lines in 1989:⁸³

Argentina	36.5
Bolivia	64.8
Brazil	56.2
Chile	54.0
Colombia	63.0
Costa Rica	43.4
Dom.Rep.	36.2
Ecuador	37.0
El Salvador	70.5
Honduras	77.7
Jamaica	38.7
Mexico	47.0
Panama	44.4
Peru	81.6
Uruguay	21.9
Venezuela	79.1.

It is important to note two things with respect to these studies. First, they have basically been descriptive, in the sense of portraying the number of people below a certain living standard. More specifically these studies should not be interpreted as policy prescriptions aimed at fixing wage rates at levels that would place everyone in the country above the poverty line. Second, even in countries such as Costa Rica, with an income per capita many times higher than that of Nicaragua and with a highly acclaimed income distribution pattern, a very high percentage of population

⁸³"Poverty and Income Distribution in Latin America and the Caribbean: An Update", G. Psacharopoulos and assoc., Second Discussion Draft, March 6, 1992.

is still currently below the calculated "poverty" line. This fact -- which of course is not uncommon in poor countries -- clearly captures the futility of attempts in Nicaragua to eliminate poverty through legislation.

Tables A.8 and A.9 contain the basic daily nutritional baskets constructed by CEPAL for Costa Rica and Guatemala. They are presented in order to provide some comparative information on the composition of poverty-line baskets in two important neighboring countries.

APPENDIX III

The Trade Account And The Real Exchange Rate:

A Simple Framework

In this appendix I present a minimal framework for analyzing the interaction between the trade account and the real exchange rate. The parameterization of this simple model allows us to have a broad preliminary idea of the required real exchange rate adjustment under alternative scenarios. The model is given by the following set of equations:

$$T = Xg - M + NFX \quad (\text{A.1})$$

$$Xg = XT + XN \quad (\text{A.2})$$

$$M = MC + MP + MM + MK \quad (\text{A.3})$$

$$XT = XT(p^T, C, e; y) \quad (\text{A.4})$$

$$XN = XN(p^N, C, e; y) \quad (\text{A.5})$$

$$NFX = NFX(e) \quad (\text{A.6})$$

$$MC = MC(p^C(1+r^C), e, y) \quad (\text{A.7})$$

$$MP = MP(p^P(1+r^P), e, y) \quad (\text{A.8})$$

$$MM = MM(p^M(1+r^M), e, y) \quad (\text{A.9})$$

$$MK = MK(p^K(1+r^K), e, y) \quad (\text{A.10})$$

Equation (A.1) defines the trade account as exports of goods, minus imports of goods plus net exports of non-factor services. Equation (A.2) says that exports of goods are equal to the sum of traditional exports (XT) and nontraditional exports (XN). Equation (A.3) breaks down goods imports into consumption (MC), petroleum imports (MP), inputs (MM) and imports

314

of capital goods (MK). Equations (A.4) and (A.5) are the supply for exports functions, and depend on the respective world prices (p_f^* and p_f), a non-RER competitiveness term (C), which measures things such as confidence in the political system, the real exchange rate (e), and real income. This last term captures the fact that exports will indeed tend to grow as income expands.⁶⁴ (A.6) are net exports of non-factor services, assumed to depend on the real exchange rate. Equations (A.7) through (A.10) are the demands for imports of consumer goods, and depend on the real exchange rate, income and tariffs τ . In this analysis I take real income growth as exogenously given at the rate implicitly assumed by the IMF until 1997 and at 5% per year between 1997 and 2000.

An important question at this point is how to treat the demand for petroleum, materials and capital goods imports. In particular, one should address the issue of the compatibility between these imports and the assumed rate of growth. For this reason, in performing this exercise, I make sure that the resulting change in these imports represent a plausible picture. A simple manipulation of these equations gives us the percentage change in the RER (\dot{e}) "required" to achieve a desired change in the trade balance.

The following assumptions were made regarding import and export elasticities:

⁶⁴This is related to the fact that exports are a component of GDP and that there is generally a somewhat stable relationship between these two variables.

	<u>Low</u>	<u>High</u>
A. <u>Exports</u>		
Price-Traditional	0.5	1.0
Price-Nontraditional	0.8	1.5
Income-Traditional	1.0	1.0
Income-Nontraditional	1.0	1.0
B. <u>Imports</u>		
B.1 Price Elasticities		
Consumption Goods	-1.0	-1.5
Petroleum	-0.4	-0.6
Intermediate Goods	-0.4	-0.6
Capital Goods	-0.6	-0.8
B.2 Income Elasticities		
Consumption Goods	0.7	0.7
Petroleum	0.7	0.7
Intermediate Goods	1.2	1.2
Capital Goods	1.2	1.2

216

GLOSSARY

AEROF:	Period Average Official Exchange Rate
BCN:	Banco Central de Nicaragua
BND:	Banco Nacional de Desarrollo
BRER:	Bilateral Real Exchange Rate
BRERCPI:	Bilateral Real Exchange Rate constructed with the Consumer Price Index
BRERNTPI:	Bilateral Real Exchange Rate constructed with the Tradable Price Index
CEPAL:	Commission Economica para America Latina
CGE:	Computable General Equilibrium
CMC:	Consejo Monetario Centroamericano
CPI:	Consumer Price Index
ERER:	Equilibrium Real Exchange Rate
ERI:	Exchange Rate Index
GDP:	Gross Domestic Product
GON:	Government of Nicaragua
IFS:	International Financial Statistics
IMF:	International Monetary Fund
IRWC:	Index of Real Wages in Cordobas
IRWD:	Index of Real Wages in Dollars
MNER:	Multilateral Nominal Exchange Rate
MRER:	Multilateral Real Exchange Rate
MRER _m :	Import based Multilateral Real Exchange Rate
MRER _s :	SDR trade based Multilateral Real Exchange Rate
MRER _x :	Export based Multilateral Real Exchange Rate

MRER_{xm}: Export plus Import based Multilateral Real Exchange Rate

MRER_w: Export plus Import based Multilateral Real Exchange Rate
with Varying Weights Over Time

NTPI: Non Tradable Price Index

PN: Nontradable Price Index

PPP: Purchasing Power Parity

PT: Tradable Price Index

RER: Real Exchange Rate

RERM: Real Exchange Rate of Importables

RERX: Real Exchange Rate of Exportables

SDR: Special Drawing Rights

UFC: Unit Factor Cost

ULC: Unit Labor Cost

WPI: Wholesale Price Index

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