

ECONOMIC REFORMS AND RISING INEQUALITY IN PANAMA IN THE 1990S*

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June 2000

Working Paper 318

* Document prepared for UNDP/World Bank/IDB/CEPAL project “Balance of payments liberalization, employment and income distribution in Latin America”

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ISSN 0921-0210

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ABSTRACT

In the first years of the 1990s, Panama's economy strongly recovered from the deep crisis at the end of the previous decade. The government implemented a stabilization programme and initiated a reform process geared at economic liberalization in the spirit of those implemented throughout Latin America. The surge in capital inflows was the key factor underlying the boom in private consumption and in construction investment, which drove the high growth performance. This allowed for a reduction of unemployment and an increase of wage employment in the formal sector of the economy. Both these labour market outcomes were conducive of a reduction in urban poverty and inequality between 1991 and 1994. Growth slowed down and poverty stabilized during the period of economic reforms implemented between 1994 and 1998, but urban inequality increased again. Applying an innovative method of counterfactual microsimulations, the paper shows that the reduction of both urban and rural poverty and inequality between 1990 and 1997 was principally due to the macroeconomic effects that led to higher rates of economic participation and employment. This positive impact of macroeconomic effects was partially offset by that of the changes in the structure of the labour market, in particular the shift towards greater demand for skilled labour relative to unskilled labour and a rise in the share of informal sector employment. These labour market adjustments associated with the process of trade liberalisation and other economic reforms had the effect of a rise in inequality.

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1. INTRODUCTION

Income inequality in Panama is among the highest in Latin America and hence in the world. The Gini coefficient of per capita income inequality is about 0.60 (1997). By this measure Panama and Brazil lead the league of countries with highest inequality in Latin America. Panama's income per capita is above the Latin American average. Nevertheless, because of the high degree of inequality, poverty is widespread, affecting 42% of the country's population in 1997.¹ Hence, the analysis of trends in income distribution and its causes should be an important ingredient in the search of solutions to the problem of poverty. Income inequality seems to have increased even more under the market reforms that were implemented during the 1990s in Panama.

Economic development in the 1980s was characterized by stagnation and there was a deep crisis at the end of the decade. The old, dualistic pattern of growth in Panama proved to be unsustainable. The old growth model was based on a coexistence of an enclave export sector largely free of government intervention and a highly protected sector oriented at the domestic market. Unemployment, poverty and inequality increased in the 1980s. The informal sector and self-employment acted as the sink of the labour market. Mean incomes of those employed in these activities decreased substantially in the period.

The government implemented a stabilization program in the early 1990s and initiated a reform process geared at economic liberalization in the spirit of the reforms implemented throughout Latin America. The reform process went perhaps more slowly and gradually than in other countries of the region that engaged in sweeping changes in the economic regime. During the first years of the decade the main emphasis was on macroeconomic stabilization measures as a response to the economic (and political) crisis that had put a halt to progress in the second half of the 1980s. Only after 1994 the government took more drastic measures in the direction of the liberalization of foreign trade and capital inflows and towards a more flexible labour market. The implementation of these reform measures was rather gradual. Hence, it could be a bit premature to study the effects of balance of payments liberalization on employment and income distribution in Panama. This is true in part. However, at the same time it can be safely said that with the stabilization programme of 1991, the 'dual' growth model was put to an

¹ This estimate was made on the basis of the income method. The incidence of poverty according to the consumption method is equal to 37.3%.

end and the reduction of tariffs and lifting of restrictions on direct investment did have a visible impact on economic performance during the 1990s. Although Panama already had a very open economy to begin with, its degree of openness increased to 200% at the turn of the century, up from 150% in 1990.²

Besides great trade openness, Panama's financial system also has traditionally been closely integrated with world markets. The US dollar has been used as means of exchange since the beginning of the 20th century and its offshore banking centre was established in the 1970s. In this sense Panama's initial conditions differ from the rest of the continent. Yet, financial integration has not insulated Panama from external shocks and financial problems. At the end of the 1980s it defaulted on its large external debt and access to capital flows was virtually cut off. Stabilization and reform in the 1990s led to a recovery of capital inflows.

In effect, the economy recovered along with the greater macroeconomic stability achieved in the early 1990s. Stabilization and structural adjustment had a visible impact on labour market outcomes and income distribution. In this study we investigate the hypothesis that macroeconomic factors such as economic recovery, real wage adjustment and falling unemployment have contributed to a reduction in inequality, but that microeconomic factors associated with the reform process (sectoral employment and remuneration shifts) have caused greater income inequality. It appears that the macroeconomic factors predominate labour market, poverty and inequality outcomes in the first half of the 1990s, while the structural adjustment factors predominate in the final part of the decade.

The analysis of labour market adjustment, inequality and poverty in Panama is hampered by data limitations. Only for 1997 there is a household survey with national coverage (the living conditions survey, ENV), including areas with high concentrations of indigenous population and the so-called "areas of difficult access" at the border with Colombia. Other surveys have a more limited coverage. We use the ENV 1997 to obtain an in-depth, albeit static picture of the dimensions and determinants of inequality at the national level. To analyse patterns over time we had to recur to the system of Continuous Household Surveys – which mainly provide information for urban areas – and to the 1990 population census, which provides summary statistics on employment and incomes at both the urban and rural level. In search for a "counterfactual" required to

² Openness is defined here as the ratio of the sum of exports and imports of goods and services to GDP.

assess the impact of structural adjustment on employment, inequality and poverty, we apply a novel microsimulations method. For lack of a full-fledged CGE for the economy of Panama, we recur to a sophisticated ‘before-and-after’ approach. We take observed changes in the 1990s in key labour market outcomes which can be associated with, respectively, macroeconomic and structural adjustment factors (respectively unemployment rates and labour participation, and employment structure and wage differentials by sector and skill, etc.). Subsequently, we simulate through a randomized process how each of these shifts and the combination of these shifts have impacted on inequality and poverty at the household level using the 1997 national survey.

The structure of the remainder of this paper is as follows. Section 2 gives a brief narrative of policy change and economic performance in Panama during 1980-99. It also shows observed trends in labour market adjustment, inequality and poverty. Section 3 gives a descriptive analysis of determinants of income distribution and poverty. Methodology and results of the microsimulations to study the impact of macroeconomic performance and structural adjustment on employment, income distribution and poverty are presented in Section 4. In Section 5 we draw some policy conclusions.

2 ECONOMIC POLICY REFORM, GROWTH AND INCOME DISTRIBUTION

Economic performance in the 1980s in Panama was rather dismal. Economic growth slowed down at the beginning of the decade and ended up in a deep crisis by the end of the 1980s. Economic and political crisis went hand in hand between 1986 and 1989 and culminated with a political intervention and military action by the U.S. government. Table 1 shows the growth pattern by sub-periods. The mainstream interpretation of the economic slowdown in the 1980s is that the traditional, dualistic growth model had reached the limits of its potential for further expansion (see e.g. World Bank 1995, República de Panamá 1991, 1994, 1997, 1998; MEF 1999). In particular, the protected domestic sector would have hit limits of a limited market size, while high protection rates underlie the lack of competitiveness of industries. The enclave export sectors showed too few linkages with domestic production sectors to be a sufficiently strong alternative engine of growth. It is likely that the highly skewed income distribution in Panama has been one of the causes limiting domestic demand expansion.

Table 1: Growth of GDP at factor cost (in prices of 1982)
(average annual real growth rates in percentages)

| | 1980-1986 | 1986-1990 | 1990-1994 | 1994-1998 |
|--|-----------|-----------|-----------|-----------|
| <i>Sector</i> | | | | |
| Primary | 4.0 | 1.3 | 2.0 | 2.1 |
| Secondary | 1.7 | -4.1 | 10.8 | 2.6 |
| Tertiary | 3.6 | -1.3 | 5.6 | 3.5 |
| Commercial and financial services | 3.1 | -1.5 | 7.3 | 3.6 |
| Government and personal services | 5.1 | -0.8 | 0.8 | 3.2 |
| <i>Tradables</i> | 2.8 | 0.0 | 5.0 | 2.2 |
| Agriculture | 4.0 | 1.3 | 2.0 | 2.1 |
| Mining and quarrying | -5.6 | -9.9 | 33.1 | 3.6 |
| Manufacturing | 1.9 | -1.1 | 7.5 | 2.2 |
| <i>Non-tradables</i> | 3.4 | -1.9 | 6.5 | 3.5 |
| Financial services (- FISIM) | 5.0 | -2.8 | 8.8 | 3.4 |
| Social services | 5.1 | -0.8 | 0.8 | 3.2 |
| Other non-tradable | 1.8 | -2.0 | 7.9 | 3.6 |
| GDP (at factor cost) | 3.3 | -1.5 | 6.2 | 3.2 |
| GDP (at market prices) | 3.5 | -1.7 | 6.5 | 3.3 |
| <i>GDP per capita (at market prices)</i> | 1.3 | -3.7 | 4.5 | 1.6 |

Source: Own calculations based on data of the Contraloría General de la República

In any case, the crisis that emerged in the second half of the 1980s deepened the country's unemployment, poverty and inequality problems. Trends are analysed in some detail in De Jong and Vos (2000) and summarized by Figures B.1-4 in Annex B. Unemployment rates more than doubled during the decade (Figure B.2)³ and so did the urban poverty incidence (Figure B.1a). Unlike elsewhere in Latin America, real wages did not collapse in the 1980s and even kept a slight upward trend until 1988. In 1989, at the trough point of the crisis, urban wages fell back to levels of the early 1980s (Figure B.1b). Other (self-employed) labour incomes deteriorated at a much faster rate, losing about 25% of their purchasing power between 1985 and 1989. This collapse of mean non-wage incomes is closely linked with the growth of informal sector employment in the crisis period. Informal services and traditional small-scale (subsistence) farming appear to have acted as residual employers in the labour market. Employment in both

³ These trends are the same when using the “national” and “international” definition of unemployment and labour participation (see also Figure B.2). The national definition includes discouraged workers and consequently the national definitions of unemployed and labour force are higher than under the standard international definition. Discouraged workers refer to persons in working age who declared that “it is impossible to find work” and that they “did not have work or were seeking work” in the reference week of the household survey, but “did have work or were seeking work in the 3 month preceding the reference week”.

sectors increased in the second half of the 1980s. Growth of farm employment seems associated with temporary urban-rural migration in the crisis period (see also further below). The rise of unemployment and the concentration of employment growth in low productivity sectors also underlie the observed increase in income inequality during the crisis (see Figure B.1c-e).

The dismal economic performance called for a change in policies. The government of president Endara launched a stabilization and structural adjustment programme at the start of the 1990s (see De Jong and Vos for a detailed description). This programme obtained IMF and World Bank support. An agreement with the IMF was signed and the World Bank disbursed an Economic Recovery loan in 1992. Further financial support came from other international agencies. The free market-orientation of the adjustment programme and the restoration of democracy facilitated renewed political support from the US government. Economic sanctions against the country were lifted and confidence of international investors improved. Macroeconomic stabilization efforts and the surge of aid and capital flows to Panama laid the foundations of a strong economic recovery in 1990-94.⁴ Subsequent evaluations of the reform programme coincide in concluding that, while macroeconomic stabilization targets were met, only slow progress was made with the market reforms.⁵

Given the dollarization of the economy, fiscal adjustment is the only policy instrument left for economic stabilization. Severe fiscal retrenchment helped to turn a large Central Government deficit into a surplus in 1990. The renewed access to international finance allowed for a moderate expansionary fiscal policy in subsequent years, mainly through a lower tax rate and somewhat higher public investment. The tax reform introduced in 1991 did not yield a major improvement of the tax effort. The predominant effect of the large capital inflow was, however, that it stimulated a boom in private consumption and construction investment. A decomposition analysis of aggregate demand illustrates this (see Figure 1). (See Appendix A and Taylor et al. 1999 for the methodology.) The consumption boom was strongest between 1990 and 1992 when

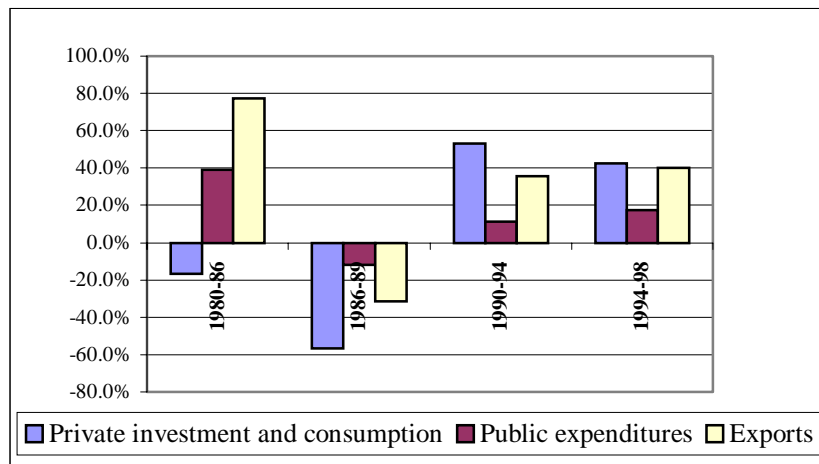
⁴ National accounts data indicate an increase in net official transfers to Panama from 96 million Balboas in 1989 to 334 million in 1992 (CGR 1999a).

⁵ The World Bank concluded (World Bank 1995: v): “The government consistently met the performance criteria set by the IMF with respect to the financing of the adjustment programme, but encountered political obstacles to implement key elements of medium-term fiscal reform required to establish a more sustainable fiscal position. Also little progress was achieved with the structural economic reforms supported by the Economic Recovery Loan (ERL) of the World Bank and the Public Enterprise Reform Loan (PERL) of the Inter-American Development Bank.”

per capita household consumption expenditures grew at 5% per annum and the private savings rate to GDP fell from 9.6 to 7.5%. In subsequent years, the consumption boom slowed down and the private savings rate (s) could recover somewhat with economic growth, to decline again towards the end of the decade (reaching a low of 6.2% in 1998), as shown by Figure 2. The construction boom enabled a spectacular expansion of the industrial sector at a rate of 10.8% per annum during 1990-94 (Table 1) and together with the expansion of private consumption explains about 50% of aggregate demand growth in the period.

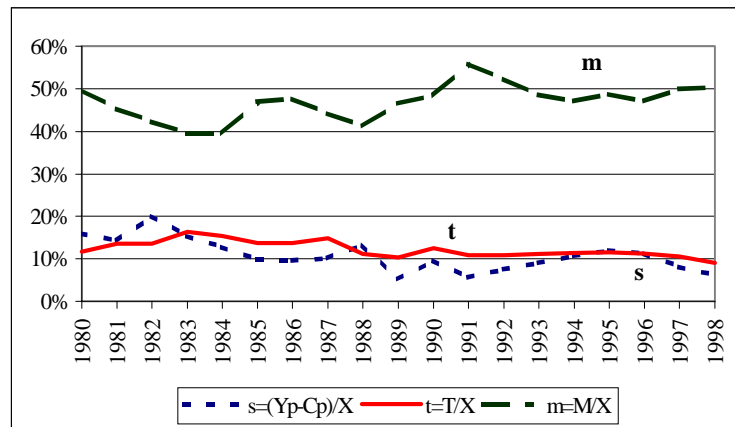
Rapid economic growth allowed for a reduction of unemployment and a rise in wage labour in the formal sector in 1990-94. Lower pressure on labour absorption in the urban informal services sector enabled a recovery of mean incomes of self-employed (see Figure B.1g). Labour participation also increased, particularly among the female population at working age. These factors along with rising per capita income allowed for a substantial reduction in urban poverty (Figure B.1f), as well as a fall – albeit only slight – in income inequality (Figures B.1h-k).

Figure 1: Decomposition of growth of aggregate demand according to main expenditure components, 1980-98



Source: National accounts on the basis of information of the Contraloría General de la República and IDB socio-economic statistics. See Appendix A.1 for the methodology.

Figure 2: ‘Leakage’ effects of aggregate demand



Source: National accounts on the basis of information of the Contraloría General de la República and IDB socio-economic statistics. See Appendix A.1 for the methodology.

Note: s = gross private savings rate (as percentage of aggregate demand = X = GDP + imports), m = import propensity (% of aggregate demand); and t = net tax rate (% of aggregate demand).

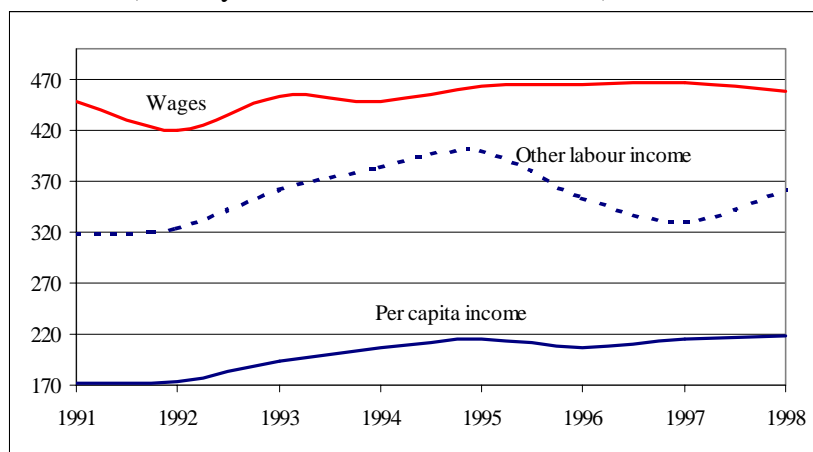
Economic recovery was short-lived. In fact economic growth already started to slow down after 1992. From 1994, economic policies took a more drastic turn in favour of market liberalization. Tariffs were gradually reduced to a band of 0-15%, all non-tariff barriers are eliminated and Panama became WTO member in 1997. Implementation was less forceful than it appeared on paper and the targeted tariff reduction was effectuated only by 1998. Labour mobility was eased with the reform of the labour law (*Código de Trabajo*) in 1995. Again, implementation of the new legislation turned out to be slow. Lifting of domestic price controls was more immediate. Also a new impulse was given to the privatization programme (telecommunications, energy and ports). Various obstacles to foreign direct investment were removed.

As indicated, these reforms could not help economic growth from slowing down. The annual rate of GDP growth fell from 6.5% in 1990-94 to 3.2% in 1994-98. Exports become somewhat more important in determining aggregate growth, but domestic demand factors (private consumption and investment) continue to dominate (Figure 1). Lower growth also slows down the reduction of unemployment and urban poverty. Urban income inequality in turn increased during 1994-98 (see Figures B.1f, h-k and B.2). As shown in De Jong and Vos (2000), there is a renewed shift in (unskilled) employment towards the (informal) services sector, resulting from insufficient labour absorption in industry and formal services. This shift in the employment struc-

ture and the greater demand for skilled labour⁶ form important factors underlying the rise in inequality in this period.

Real wages in urban areas were relatively stable during the 1990s. While consistent with the shifting employment structure, mean incomes of self-employed (predominantly in urban informal services) fell after 1995 (Figure 3).

Figure 3: Labour incomes and per capita income in urban areas in the 1990s (monthly incomes in Balboas of 1998)



Source: DEC, *Encuestas Continuas de Hogares*.

⁶ The share of employed persons with 12 or more years of education increased from 38% in 1991 to 41% in 1998. See also Table A.1.

Table 2: Structural adjustment and changes in productivity, 1991-98

| Sector | Output growth | | Employment growth | | Productivity growth | | Weighted average sectoral productivity growth | | Sectoral labour reallocation | |
|--|---------------|------------|-------------------|------------|---------------------|------------|---|-------------|-------------------------------|------------|
| | dX_i/X_i | | dL_i/L_i | | ρ_i^* | | $(X_i/X) \cdot \rho_i^*$ | | $(X_i/X - L_i/L) \cdot L_i^*$ | |
| | 1991-94 | 1994-98 | 1991-94 | 1994-98 | 1991-94 | 1994-98 | 1991-94 | 1994-98 | 1991-94 | 1994-98 |
| Primary | 2.4 | 2.1 | -4.6 | 0.0 | 7.3 | 2.1 | 0.6 | 0.2 | 0.7 | 0.0 |
| Secondary | 9.6 | 2.6 | 14.3 | 2.6 | -4.1 | 0.0 | -0.7 | 0.0 | 0.3 | 0.0 |
| Tertiary | 4.3 | 3.5 | 6.4 | 4.1 | -2.0 | -0.5 | -1.4 | -0.4 | 0.8 | 0.4 |
| <i>Commercial and financial services</i> | 5.3 | 3.6 | 7.9 | 4.4 | -2.5 | -0.8 | -1.4 | -0.4 | 1.8 | 1.0 |
| <i>Government and personal services</i> | 1.2 | 3.2 | 4.6 | 3.6 | -3.3 | -0.4 | -0.6 | -0.1 | -0.5 | -0.4 |
| Total | 5.1 | 3.2 | 4.9 | 3.0 | 0.2 | 0.2 | -1.5 | -0.2 | 1.7 | 0.4 |

Source: CGR, National Accounts; DEC, Encuestas Continuas de Hogares.

Note: Following Taylor et al. (1998) productivity growth can be decomposed as follows. Labour productivity is defined as: $\rho = X/L = \Sigma X_i/L_i$, where X is output and L is employment. Taking differentials one obtains:

$$\begin{aligned} \rho &= \Sigma[(X_i/X) \cdot X_i^* - (L_i/L) \cdot L_i^*] \\ &= \Sigma[(L_i/L) \cdot \rho_i^*] + \Sigma[X_i/X - (L_i/L)] \cdot X_i^* \\ &= \Sigma[(X_i/X) \cdot \rho_i^*] + \Sigma[X_i/X - (L_i/L)] \cdot L_i^* \end{aligned}$$

Asterisks indicate growth rates. The first line decomposes productivity growth into the difference between output change and employment growth. The second and third lines define productivity growth as the weighted average of sectoral productivity growth plus a “correction term” which refer to sectoral reallocations of, respectively, output and employment. The reallocation weights $[X_i/X - (L_i/L)]$ reflect productivity differences between sectors. A reduction in the production or employment weight of a low productivity sector (e.g. agriculture) could contribute to an increase in productivity of the economy as a whole, or, similarly, an increase in the employment or output of a high productivity sector could equally explain a rise in overall productivity.

Greater openness of the Panamanian economy has not been accompanied by much productivity growth. Table 2 shows that overall productivity growth was a meagre 0.2% per year during 1991-98. More surprising, perhaps, is the fact that only the agricultural sector managed to yield a positive productivity growth in both sub-periods 1991-94 and 1994-98. During the period of economic recovery, productivity in the primary sector grew at a phenomenal 7.3% per year. This trend is explained by a particular characteristic of labour market adjustment in Panama. As indicated earlier, during the crisis of the late 1980s, many urban workers returned to rural areas to work in traditional agriculture, be it as a farmer on their own small dwellings in their home villages or as day labourer on the farms of friends and relatives. After economic stabilization and recovery, these workers returned to Panama City and the other main cities, finding employment in construction and other urban sectors. Despite the construction

boom, productivity in the industrial sector fell in 1991-94 as a consequence of the absorption of large numbers of workers. Something similar occurred in the services sector. As a consequence, the “sectoral labour reallocation” effect has a rather large impact in explaining aggregate labour productivity growth in 1991-94 (see Table 2). In 1994-98, the “exodus” of temporary rural workers ends, but the high labour absorption in the services sector continues, particularly in trade and informal services.

This brief narrative of economic performance and labour market adjustment in Panama during the 1980s and 1990s suggest the following hypotheses for further analysis:

1. Greater economic openness resulted in an increase in the demand for skilled labour to the detriment of demand for unskilled labour in the formal sector. This employment shift has led to greater income inequality.
2. Overall income growth and improvement of macroeconomic indicators (during 1991-94 in particular) counteracted a tendency towards greater income inequality. The economic recovery led to employment growth, a rise in labour participation and a reduction of unemployment. These factors helped to reduce both poverty and inequality. Economic recovery did not prove sustainable.
3. A slowdown of economic growth and the process of structural adjustment in the second half of the 1990s led to inadequate labour absorption in the formal sector. Excess labour was absorbed principally in self-employed informal service activities. Falling mean incomes for this category of workers contributed to rising inequality.

3. DETERMINANTS OF INEQUALITY AND POVERTY IN PANAMA

Despite the many limitations of available information, there is evidence suggesting that poverty in Panama increased at the end of the 1980s. The data also suggest that the economic recovery resulted in a strong reduction of poverty between 1991 and 1994, whereas the incidence of poverty stabilized when the pace of growth slowed down between 1994 and 1998. Results based on a series of continuous household surveys (Encuestas Continuas de Hogares) are reasonably comparable for urban areas, both for the 1980s and for the entire period 1991-1998.⁷ For the analysis at the national level only the Encuesta de Niveles de Vida of 1997 yields reliable

⁷ See De Jong and Vos (2000) for an extensive discussion of the trends in income distribution and poverty, as well as the limitations of the available information.

information, though a comparison with another “national” survey conducted in 1983 confirms the observed trend towards increased urban inequality in the last two decades of the 20th century and suggests a slight reduction of inequality in rural areas. The observed changes in poverty and inequality reflect to a large extent the changes in the labour market observed in the previous section. We will analyse the main trends.

Urban poverty and inequality increased in the 1980s

The increase of urban poverty resulted from both a sharp fall in per capita income and higher inequality (Figure B.1). The reduction of the mean wage level was an important factor contributing to the fall in per capita income. Factors that acted in a similar way are the rise in unemployment, the shift in the structure of the labour market towards (own-account) employment in commercial services, as well as the reduction in the mean level of non-wage labour incomes. A comparison of the trends in Figures B.1 suggest that a large part of the worsening of the distribution of per capita incomes can be explained by higher inequality in the distribution of non-wage incomes. The trends towards greater wage income inequality and towards informalization of employment is also reflected in the more skewed distribution of per capita household income in this period. The higher informality, in turn, is a result of the lack of labour absorption due to exhaustion of the import substitution model and external shocks.

Urban poverty and inequality reduced during the period of economic stabilization (1991-94)

The recovery of the economy in the first years of the 1990s was reflected in higher levels of income and reduction of poverty in urban areas. The incidence, as well as the depth and severity of urban poverty reduced significantly between 1991 and 1994.⁸ The incidence of urban poverty fell from more than 35% to a level slightly above than 25%. Both the poverty gap and the severity of poverty reduced about a third in the same period. Figures B.1 suggest that the reduction of poverty was a result of two forces that contributed to a reduction of the poverty indices. The rate of growth of per

⁸ A statistical dominance test of the changes in poverty shows that the observed trends are robust, see De Jong and Vos (2000) .

capita income was higher in 1992-1993 than in 1991-1992, but reduced after 1993.⁹ At the same time, the inequality according to the Theil and Gini coefficients reduced in 1991-1992, increased in the subsequent year, in order to reduce again until 1994. The lower inequality in the distribution of wage income was an important factor that contributed to the reduction of inequality in the distribution of per capita income between 1993 and 1994.¹⁰

Poverty stabilizes and inequality increases in urban areas during the period of reforms (1994-98)

The Panamanian economy grew on average by 3.3% per year in the period 1994-1998 (see Table 1). One of the reasons of the lower growth in 1994-1998 (compared to 1990-1994) was the less favourable performance of the export sector.

Figures B.2 show that economic growth was not accompanied by a reduction of the unemployment rate. Although rural unemployment reduced until 1997, the trend in urban employment showed an increase until that year. Only the high economic growth in 1997 appears to have reduced somewhat the problem of urban unemployment. Other changes in recent years have been the increase in the rates of economic participation (Figure B.2). These changes explain part of the lack of a reduction of unemployment. The growth of employment was not sufficient to absorb the higher supply of labour.

The structure of employment shifted towards employment in the tertiary sector in 1994-1998 (see Table 2). This shift can be seen more clearly in the rural area. Nevertheless, both in the rural and in the urban area it can be observed that the proportion of commercial and financial services (made up of the industries trade, hotels and restaurants, transport and financial services) increased within the tertiary sector. Part of this increase was a result of the expansion of activities in the Colón Free Trade Zone and of the export of port services, although those activities do not generate much employment. Economic growth was above-average in the more labour-intensive hotels and restaurants sector and, hence, also generated more employment in that sector.

⁹ Growth of per capita income according to the data of the Encuestas Continuas de Hogares was less than growth of GDP. Unlike GDP, urban per capita income did not increase much in 1991-1992 and growth was less than in the subsequent year. The difference can have at least three reasons: (i) the ECHs measure monthly income in August and not annual income; (ii) the estimates in the figure are for urban areas only; (iii) the surveys of 1991 and 1992 are not strictly comparables due to changes in survey design.

However, another part of the increase of service employment must have taken place in commercial services. It may be that the flexibilization of the labour market has contributed to this shift towards commercial and financial services. In any case, due to the slow process of implementation of the changes in the labour laws (the *Código de Trabajo*), no major changes were observed in the wage-setting process in the urban formal sector (Figure 3).¹¹

Despite economic growth, not much reduction in urban poverty was observed between 1994 and 1998.¹² The incidence of poverty increased somewhat in the period 1994-1997, but slightly decreased in 1998. The fall in non-wage labour incomes and the rise in inequality in the distribution of these incomes was an important determinant of the increase in poverty in 1994-97. An additional factor has been the higher number of workers who saw themselves forced to look for work in the informal sector.

Inequality and poverty at the national level

Panama has still an important rural population (of some 40-45% of the total population), and there exists a profound urban-rural income gap. Per capita income in urban areas was in 1997 on average three times as high as in rural areas. Consequently, poverty was less widespread in urban areas. The incidence of urban poverty is estimated at 22% of the population, in comparison with an incidence of 67% in rural areas. The incidence of poverty at the national level is 42% (Table 3). Taking the poverty line of the ENV 1997 and the series of the consumer price indices (IPC) for the Metropolitan Area, a poverty line was constructed for 1983, assuming that the relative price differences between regions did not change between 1983 and 1997. According to the estimated poverty indices for 1983 shown in the second part of Table 3, there was a decrease of poverty between 1983 and 1997 in both urban areas and rural areas (excluding the indigenous areas and areas of difficult access).

¹⁰ It is a bit surprising that the distribution of wages worsened between 1992 and 1993, because the minimum wages were adjusted on the 1st of January 1993. This can only be explained by a relatively larger increase of the highest wage incomes, which suggests that the demand skilled labour increased.

¹¹ Note that the mean wage increased between 1994 and 1995. The growth between 1995 and 1996 was less, despite an increase of the minimum wages as of 1 December 1995. Minimum wages were again raised on the first of August of 1998, but the real mean wage in 1998 was lower than in 1997.

¹² The 1998 ECH includes a component “décimo tercer mes” (13th month) that was not explicitly included in the surveys of previous years. It is possible that in previous years the respondents considered the 13th month income as income falling in the category “Other incomes”. If the 13th month income is excluded from total income in 1998, the incidence of urban poverty would be higher in 1998 than in 1994, though not statistically significant, see De Jong and Vos (2000: Figures B.1 and B.2).

Table 3: Poverty indices, 1983 and 1997 (Income method)

| Year and area | % of the population | Incidence of poverty P_0 | | Depth of poverty P_1 | | Severity of poverty P_2 | |
|------------------|---------------------|-------------------------------|--------------|---------------------------|--------------|------------------------------|--------------|
| | | Index | Contribution | Index | Contribution | Index | Contribution |
| 1997 | | | | | | | |
| Urban | 55.6 | 0.22 | 28.6 | 0.09 | 21.9 | 0.05 | 18.5 |
| Rural* | 35.4 | 0.61 | 51.9 | 0.32 | 51.7 | 0.21 | 50.9 |
| Indigenous | 7.6 | 0.92 | 16.5 | 0.66 | 22.7 | 0.52 | 26.5 |
| Difficult Access | 1.5 | 0.86 | 3.0 | 0.57 | 3.8 | 0.42 | 4.1 |
| National | 100.0 | 0.42 | 100.0 | 0.22 | 100.0 | 0.15 | 100.0 |
| <i>Urban</i> | | | | | | | |
| <i>Rural*</i> | <i>61.1</i> | <i>0.22</i> | <i>35.5</i> | <i>0.09</i> | <i>29.7</i> | <i>0.05</i> | <i>26.6</i> |
| <i>National*</i> | <i>38.9</i> | <i>0.61</i> | <i>64.5</i> | <i>0.32</i> | <i>70.3</i> | <i>0.21</i> | <i>73.4</i> |
| <i>National*</i> | <i>100.0</i> | <i>0.37</i> | <i>100.0</i> | <i>0.18</i> | <i>100.0</i> | <i>0.11</i> | <i>100.0</i> |
| 1983 | | | | | | | |
| Urban | 54.1 | 0.28 | 31.1 | 0.11 | 22.2 | 0.06 | 17.5 |
| Rural* | 45.9 | 0.74 | 68.9 | 0.44 | 77.8 | 0.32 | 82.5 |
| National* | 100.0 | 0.49 | 100.0 | 0.26 | 100.0 | 0.18 | 100.0 |

Source: Own calculations based on the Encuesta de Niveles de Vida 1997 and the Encuesta Socioeconómica 1983

Note: Due to rounding, the percentages in the columns for Contribution do not always add up to 100.

In the cases of Rural* and National* the indigenous areas and areas of difficult access are not included.

This reduction is mainly explained by the growth of per capita income throughout the period 1983-1997 (see De Jong and Vos 2000:Figure 2.2), since inequality rose both in urban areas and at the national level.

The distribution of income in urban areas is less unequal than in rural areas. The Gini coefficients are respectively 0.52 and 0.56 and those of Theil respectively 0.51 and 0.63 (see Table 4). At the national level, the Gini coefficient is equal to 0.60. As mentioned above, this value is higher than in the majority of Latin American countries (see e.g. World Bank 1999:Appendix A.10.1). It is also higher than the Gini coefficient of 0.55 that was calculated on the basis of the Encuesta Socioeconómica of 1983 (see Table 4 and also Sahota 1990:68), which suggests that inequality increased between 1983 and 1997. However, it has to be taken into account that the Encuesta Socioeconómica of 1983 does not include information for indigenous areas and area of difficult access. If observations for said areas are excluded from the ENV, the Gini coefficient takes a value of 0.57, still higher than its value in 1983, though the

difference is smaller. The Theil coefficients also indicate that inequality increased at the national level between 1983 and 1997.

Both the estimated Gini and Theil coefficients clearly indicate that urban inequality rose between 1983 and 1997.¹³ In rural areas (excluding the indigenous areas and areas of difficult access) the inequality appears to lower than in 1983, but remains higher than in urban areas in 1997. The combination of these trends in urban and rural inequality and the growth of per capita income are in accordance with the above-mentioned changes in urban and rural poverty.

Table 4: Indices of the distribution of per capita income, 1983 and 1997

| Area | Gini | | Theil | |
|------------------|------|------|-------|------|
| | 1983 | 1997 | 1983 | 1997 |
| Urban | 0.47 | 0.52 | 0.44 | 0.51 |
| Rural | n.d. | 0.56 | n.d. | 0.63 |
| <i>Rural*</i> | 0.55 | 0.54 | 0.62 | 0.57 |
| National | n.d. | 0.60 | n.d. | 0.67 |
| <i>National*</i> | 0.55 | 0.57 | 0.62 | 0.63 |

Source: Own calculations based on the Encuesta de Niveles de Vida 1997 and the Encuesta Socioeconómica 1983.

Note: In the cases of *Rural** and *National** the indigenous areas and areas of difficult access are not included.

Including the observations for indigenous areas and areas of difficult access results in an even larger difference in urban and rural inequality in 1997 and, hence, an even higher inequality at the national level.

Inequality is explained by a combination of factors. However, considering the determinants in isolation, the most important factor explaining income inequality in Panama in 1997 is the level of education of the head of the household. Other determinants that follow in order of importance are area of residence (urban, rural, etc.), proportion of recipients of labour income in the household and sector of economic activity. The results of the decomposition of the Theil coefficient show that in fact a

¹³ In comparison, according to calculations on the basis of the ECH of August 1997, the Gini and Theil coefficients for urban areas are equal to respectively 0.53 and 0.54.

quarter of the inequality at the national level is due to the difference in per capita income in different areas (Table 5).¹⁴

The combination these factors, other characteristics of the head of the household (sex, age, occupational category) and whether or not pension income is received by the household explain 70% of the inequality at both the national and the urban level, but only 57% of rural income inequality. Possibly in rural areas there are other factors, such as the distribution of agricultural land, that play also an important role.

Table 5: Decomposition of inequality in the distribution of per capita income in 1997

| | National | Urban | Rural |
|--|----------------------|--------------|--------------|
| <i>Theil coefficient</i> | 0.67 | 0.51 | 0.63 |
| <i>Socio-demographic characteristics of the (head of the) household:</i> | <i>R_b</i> | | |
| 1 Sex | 0.00 | 0.01 | 0.00 |
| 2 Education | 0.26 | 0.17 | 0.12 |
| 3 Occupation | 0.08 | 0.05 | 0.04 |
| 4 Sector of economic activity | 0.14 | 0.04 | 0.05 |
| 5 Age | 0.02 | 0.03 | 0.01 |
| 6 Proportion of recipients of labour income | 0.16 | 0.12 | 0.14 |
| 7 Pension income | 0.05 | 0.01 | 0.04 |
| 8 Area/Region | 0.23 | 0.06 | 0.09 |
| <i>Combination of characteristics</i> | | | |
| First 2 | 0.26 | 0.18 | 0.12 |
| First 3 | 0.31 | 0.23 | 0.17 |
| First 4 | 0.34 | 0.24 | 0.18 |
| First 5 | 0.45 | 0.40 | 0.28 |
| First 6 | 0.59 | 0.56 | 0.46 |
| First 7 | 0.65 | 0.64 | 0.52 |
| All 8 | 0.70 | 0.70 | 0.57 |

Source: Own calculations based on the Encuesta de Niveles de Vida 1997.

Note: R_b refers to the proportion that each factor contributes to the explanation of inequality.

It should be noted that age of the head of the household does in itself not explain much of inequality, but does contribute a lot to the explanation, if considered in combination with the first four factors in Table 5. A possible explanation of the higher contribution of age to the explanation of inequality in the distribution of per capita income – if considered in combination with the first four factors – is that the inclusion of age as an additional determinant results in a better differentiation of groups according to education. Results of estimations of Mincerian earnings functions indicate that the return to investment in education is equal to 5.8% and 6.7% per year of

¹⁴ The variable area/region in Table 4 refers to the four areas in Table 3 in the case of the decomposition of the Theil coefficient at the national level, the 3 rural areas in the case of the decomposition for the rural area and Metropolitan and Other Regions in the case of the decomposition for the urban area.

education attained for respectively women and men. Both for women and men the return is higher for primary education than for secondary education (see World Bank 1999b: Annex 11).¹⁵ These estimations show that remuneration differences are better explained if at the same time work experience is included as an explanatory factor. Since there is a correlation between experience and age, the inclusion of age in the decomposition of the Theil coefficient contributes to the explanation of the income differentials between groups of the population defined on the basis of age and other factors.

4 MICROSIMULATIONS: STRUCTURAL AND MACROECONOMIC EFFECTS

Above we observed a change in the pattern of growth in the 1990s. Also a change has been observed in the employment structure, towards both more intensive use of skilled labour – between 1994 and 1998 – and towards self-employment and/or employment in services. These changes in the pattern of growth and in the employment structure apparently had opposite effects on inequality: a positive effect of the economic boom in the first years of the decade, and a negative effect due to reduced economic growth and a structural change in the second half of the 1990s.

In this section we simulate the effects on poverty and inequality of various components of macroeconomic adjustment and stabilization and of structural change, by means of a methodology of counterfactual microsimulations. The idea of this analysis is to isolate the main determinants of the changes in poverty and inequality and associate the mentioned changes with, on the one hand, the process of macroeconomic adjustment and stabilization, and, on the other hand, with the trade liberalization policies.¹⁶

The simulation methodology consists of changing parameters of the labour market structure and determining which effects these changes would have had on income distribution and poverty (cf. Paes de Barros and Leite 1998; Paes de Barros 1999; Frenkel and González 1999). In the application of the methodology to Panama we

¹⁵ It has to be noted that the returns for the primary level are not statistically different from zero. The return to tertiary education is higher than that for secondary education (see World Bank 1999b:Table A11.13).

¹⁶ As explained in Section 2, the main reform in Panama in the 1990s was a trade liberalization that was started in 1994, although its implementation was relatively gradual. The financial markets and the capital account were already largely liberalized in previous decades.

change both in isolated form and sequentially the rate of participation P , the unemployment rate U , the employment structure in terms of respectively sector of economic activity S and occupational category O , the structure of remuneration W_1 , the level of remuneration W_2 and, finally, the employment structure in terms of education M . In the sequential simulation T we change the parameters in this order (see the Technical Appendix for details). We also present the results of sequential simulations in which we each time take one more change into account.

The methodology was applied separately to the data for urban and rural areas, using the information of the ENV of 1997 and of the 1990 Population Census.¹⁷ With the aim of defining a labour market structure, the population at working age in 1990 and 1997 was classified into *four types* of individuals according to sex and two levels of education, while *four segments* of the labour market were defined according to occupational category and sector of economic activity (see Box 1 for the details of the definition of the labour market structure and Table A.1 for the parameters in 1990 and 1997).

The methodology was used in the way described above for lack of:

1. a comparable ENV at both the beginning and end of the period under consideration;
2. a Computable General Equilibrium model to generate the counterfactual (which would be the structure of employment and remuneration “with” and “without” trade liberalization policies?); and
3. comparable national surveys to be able to apply a probabilistic labour market model of, for example, the type developed by Bourguignon (see Bourguignon et al. 1998), in which the estimation of determinants of labour supply is incorporated.

¹⁷ In case that in the ENV a person reported more than one labour income, all labour incomes were aggregated. Persons who reported an income but who were not classified as employed, were reclassified as being employed. In cases in which there was no information about sector of economic activity and occupation of economically active person, those persons were assigned to the tertiary sector terciario and/or non-wage earners.

Box 1: Structure of the labour market

The population of 10 years and above was classified into *four types* according to sex and two educational categories (0-11 years and 12 years or more, or unskilled and skilled). The different types of persons were identified with the index j .

The individuals of type j were classified into three categories according to *labour force status*:

- economically inactive persons;
- unemployed persons; and
- employed persons.

For each group j the rates of participation and unemployment were calculated.

With the aim of defining the *employment structure*, the labour market was divided into *four segments* k according to both sector of activity and occupational category.

- With respect to sector of activity, the labour market was divided into:
 - primary sector (agriculture) or secondary sector (manufacturing, electricity, gas and water, construction); and
 - tertiary sector (transport and communications, wholesale and retail trade, financial services, other services).
- With respect to occupational category the labour market was divided into:
 - wage employees (employees of government or of private sector, as well as domestic servants); and
 - non-wage workers (own-account workers, family workers, employers).

To define the employment structure in terms of *sector of activity*, the proportions of persons employed in each sector were calculated for wage employees and non-wage workers of type j . To define the employment structure in terms of *occupational category*, the proportions of wage and non-wage workers were calculated for each group j within each sector of activity. Finally, to define the employment structure in terms of *skill*, the proportions of skilled men (women) with 0-11 years and with 12 or more years of education were calculated for men (women) in each segment k .

The *remuneration structure* was calculated according to sector of activity, occupational category, sex and skill of the employed persons. Each element jk of the total of 16 elements that define the remuneration structure represents the mean income of a employed person of type j in segment k of the labour market.

Application of the Paes de Barros simulation methodology does not imply that we do not have to make any assumptions about the functioning of the labour market in Panama. The basic and strong assumptions of the methodology (as applied to Panama) are:

1. *Segmentation of the labour market.* As mentioned above, four segments within each geographic zone were defined. Employed persons can move from one segment to another within the zone. However, we do not explicitly analyze the effects on poverty and inequality of possible migration of workers between the urban and rural labour markets.
2. Application of *a randomized process* (due to the lack of a model of the labour market) on average correctly simulates the effects on poverty and inequality of

changes in the labour market structure. The process is repeatedly applied and in each iteration random numbers are used to determine:

- which persons at working age change their labour force status?;
 - for which employed persons is a different level of education considered?; and
 - who change from one segment of the labour market to another?;
- as well as for assigning new labour incomes to individuals in the sample.

In each iteration we calculated the incidence, depth and severity of poverty and the Gini and Theil coefficients of the distribution of both per capita income and primary incomes.¹⁸ Because of the introduction of a process of random assignation, the microsimulations were repeated several (32) times, so as to be able to construct 95% confidence intervals for the indices of inequality and poverty - except in the case of the simulations of the effect of change in the structure and level of remuneration, which do not involve random numbers.

The results of the simulations are summarized in Table 6. Details are presented in Table A.2. A positive sign in Table 6 (or a positive value in Table A.2) means a statistically significant increase of poverty or inequality, if the 1997 value of one or more parameters of the labour market structure is replaced by its 1990 value. Hence, a *positive* sign (or value) for the change in poverty or inequality has to be interpreted as a (simulated) *reduction* of poverty/inequality between 1990 and 1997, due to the changes in the labour market structure that took place between 1990 and 1997. A sign in parenthesis (or a value in grey) means that the change is statistically significant, but less than 2 per cent of the value of the coefficient in 1997.

The counterfactual analysis shows that the main changes in the distribution of per capita income and poverty between 1990 and 1997 are due to what we identify as *macroeconomic effects*, being the impact on poverty and inequality of changes in the rates of unemployment and economic participation.

Imposing the 1990 labour market structure on the data of the ENV 1997 and taking the entire period into account, one can see in Table 6 that the simulated effect is

¹⁸ Mean incomes per decile were calculated in the simulations. These means were assigned to new employed or to already employed persons who changed their sector of economic activity, occupational category or moved from educational group to another. In principle, to assess the impact of changes in the labour market structure, one would have to calibrate the data base prior to simulating the effect of said changes – that is, replace the original labour incomes by mean incomes per decile. A test showed that both the direction of change and the magnitude of the effect does not change if one uses the original values of the labour incomes instead of calibrated values. For this reason, we depart from the original values, because then the interpretation of the results is easier.

a rise in income inequality. That is, income inequality decreased according to the sequential simulation T , due to all the changes in the labour market structure that took place between 1990 and 1997.

The results of the intermediate steps (1-2) to (1-6) of the sequential simulation are in general very consistent. Only the effects on the inequality in the distribution of labour incomes are less consistent. Below we will point out the main results for respectively urban and rural areas.

Urban area

As mentioned in Section 2, the inequality in the distribution of per capita income reduced somewhat between 1991 and 1994, while it increased again in the period 1994-1998. Inequality in the year 1990 was probably higher than in the subsequent year, since it had increased much during the economic and political crisis at the end of the 1980s.

The “*macroeconomic*” effects, or the effects of the reduction of unemployment, accompanied by the rise in the rate of participation (which effectively took place in the period 1991-1994), are a reduction of urban inequality throughout the period (see the results of the sequential simulation $I-2$ in Table 6). This simulated effect was partially offset by the “*structural or microeconomic*” effect, being the effect due to changes in the employment structure and in the level and structure of remunerations, that rather led to more income inequality.

The shifts in the employment structure towards the informal sector and - especially - the (relative) reduction of remuneration in that sector resulted in an increase of urban poverty (simulations S and W_I). At the same time, the increase of remuneration in general contributed to the overall reduction of poverty (albeit at the cost of somewhat higher inequality), see the results of simulation W_I . The increased importance of skilled labour (simulation M) had a similar effect on urban poverty.

Changing all parameters of the labour market structure sequentially (simulation T) results in a (small) reduction of inequality among recipients of labour income. This result has to be interpreted as a (small) increase in inequality in the distribution of labour incomes between 1990 and 1997, due to the changes in the labour market structure that occurred in that period.

The conclusion is that the distribution of labour incomes did apparently not improve in the urban area (as can also be observed on the basis of the information of

the Encuestas Continuas de Hogares, see Figure B.5), but that inequality at the level of per capita household income did improve between 1990 and 1997, possibly reflecting a substantial reduction in the first year of the 1990s. Moreover, it is likely that the rise in the participation rate in the 1990s – particularly that of women – contributed to the improvement in the distribution of per capita income. At the same time, this rise as such appears to have had the effect of a worsening distribution of labour incomes.

Finally, the reduction of urban unemployment (simulation *U*) did not affect the distribution of primary incomes, nor did it affect the distribution of per capita incomes as measured by the Gini coefficient.

Rural area

Like in the urban area, the changes (or reductions) in rural per capita income inequality reflect the relatively high impact of the change in the rates of participation and unemployment observed in the 1990s. In other words, here as well predominate the so-called “macroeconomic” effects. An increase of the mean level of incomes also contributed to a reduction of rural poverty. Unlike the results for urban areas, the changes in the rate of unemployment resulted in less inequality in the distribution of labour incomes. The change of the parameters in the sequential simulations (1-4) to (1-7) yields a (small) reduction in that inequality according to the Gini coefficient, but does not show an effect in case of the Theil coefficient.

Table 6: Effect on inequality and poverty of changes in the labour market

| | Urban area | | | | | | | Rural area | | | | | | |
|---|----------------|----------------|----------------|-------------|-------------|-------------|-------------|----------------|----------------|----------------|-------------|-------------|-------------|-------------|
| | P ₀ | P ₁ | P ₂ | Gini YPC | Theil YPC | Gini YPI | Theil YPI | P ₀ | P ₁ | P ₂ | Gini YPC | Theil YPC | Gini YPI | Theil YPI |
| Value observed in 1997 | 0.22 | 0.09 | 0.05 | 0.52 | 0.51 | 0.61 | 0.74 | 0.67 | 0.39 | 0.27 | 0.56 | 0.63 | 0.64 | 0.86 |
| <i>Direction of change in case of alteration of the:</i> | | | | | | | | | | | | | | |
| (1) rate of participation | + | + | + | + | + | (-) | (-) | + | + | + | + | + | (-) | - |
| (2) rate of unemployment | + | + | + | (+) | + | 0 | 0 | + | + | + | (+) | (+) | (+) | + |
| (3) employment structure according to sector of activity | (-) | (-) | (-) | (-) | (-) | 0 | 0 | (-) | (-) | (-) | (-) | (-) | (-) | (-) |
| (4) employment structure according to occupational category | - | (-) | 0 | (-) | (-) | (-) | (-) | 0 | + | + | (+) | 0 | (+) | 0 |
| (5) remuneration structure | - | - | - | (-) | (-) | (-) | - | - | - | (-) | (-) | (-) | (-) | (-) |
| (6) level of remuneration | (+) | (+) | (+) | (-) | (-) | 0 | 0 | + | + | + | (+) | (+) | (+) | (-) |
| (7) employment structure according to level of education | (+) | (+) | (+) | (-) | (-) | (+) | (+) | (-) | (-) | (-) | (-) | (-) | 0 | (+) |
| <i>Direction of change in case of alteration of parameters:</i> | | | | | | | | | | | | | | |
| (1-2) | + | + | + | + | + | 0 | 0 | + | + | + | + | + | 0 | 0 |
| (1-3) | + | + | + | + | + | 0 | 0 | + | + | + | + | + | (-) | 0 |
| (1-4) | + | + | + | + | + | (-) | 0 | + | + | + | + | + | (+) | 0 |
| (1-5) | + | + | + | + | + | - | - | + | + | + | + | + | + | 0 |
| (1-6) | + | + | + | + | + | (-) | - | + | + | + | + | + | + | 0 |
| (1-7) | + | + | + | + | + | (-) | - | + | + | + | + | + | + | 0 |

Source: Own calculations based on Encuesta de Niveles de Vida de 1997 and 1990 Population Census. See Table A.2 for details. The Gini and Theil coefficients also refer to the degree of inequality in the distribution of per capita households income and labour income per recipient (YPI).

Note: Zero value: difference not statistically significant

+/-: difference statistically significant and at least 2%

(+)/(-): difference statistically significant, but less than 2%

In case of changes in the employment structure, the mean incomes to be assigned were calculated for the employed persons in each sector of activity, occupational category or group of employed persons according to skill level, excluding the agricultural labourers with zero incomes.

The results of simulation W_I suggests that the relative growth of labour income of the male non-wage earners in the primary/secondary sector in the period 1990-1997, as shown in Table A.1, contributed to the small increase in rural inequality due to changes in the remuneration structure. It is possible that these changes in the remuneration structure reflect the increase in agricultural labour productivity and the related rural-urban migration in the 1990s (see Seccion 2), given that mainly men work (as self-employed) in that sector.

Finally, the shift in the female employment structure towards the tertiary sector (informal services) has also contributed to the small increase in rural poverty and inequality.

5 CONCLUSIONS

The process of economic liberalization in Panama was perhaps slower and less aggressive than in other Latin American countries. It has to be stressed that historically Panama has always had a very open economy, as well as a financial system that is dollarized and largely integrated with international markets. The beginning of the decade of the 1990s principally marked a recovery of the economy following the economic and political crisis from which the country suffered at the end of the eighties. The stabilization measures predominated the effective actions of the structural adjustment programme of 1991-1994, whereas the trade liberalization policy was implemented more slowly and more gradually. Nevertheless, the package seemed to be sufficient to reestablish the confidence of foreign investors and multilateral banks. The economic boom was based on a resurgence of capital flows to Panama, which resulted in a boom of consumption and investment in construction. The pace of growth was however not maintained when the economic liberalization process was reinforced in the second half of the 1990s. Although the growth attained throughout the decade helped to reduce (urban) poverty, the process of economic liberalization appears to be associated with a change towards more inequality in the distribution of incomes, which was already one of the worst in the world.

Effectively, the microsimulations have shown that it were the favourable macroeconomic conditions that facilitated the reduction of both poverty and inequality. However, the effects of structural adjustment that could be attributed to the trade liberalization in particular, had the effect of an increase in inequality. These structural effects dominated the macroeconomic effects when economic growth slowed down in the second half of the 1990s.

The main factors that resulted in the decrease of inequality have been a rise in the rates of economic participation and a reduction of unemployment (as well as the higher level of remuneration, in the case of poverty). As also analyzed in detail in De Jong and Vos (2000), the improvement of the levels of education have led to a reduction of poverty, though at the same time has been less favourable in terms of income distribution. Changes in the remuneration structure (in favour of male wage

earners in urban areas and of male non-wage earners in rural areas) did not contribute to reduce inequality – at least not in the urban area.

For this reason, elements of policies to improve the distribution of income and reduce poverty should include economic and social policies aimed at stimulating employment in the formal sector, economic participation – especially of women – and education. Policies to raise productivity and hence incomes – particularly of groups that have hitherto not (much) benefitted from growth – appear to be relevant. In this respect, one could suggest some objectives for reorienting the formulation of (labour market) policies towards reducing inequality and poverty in Panama (see De Jong and Vos 2000): (i) generation of more formal sector employment, possibly through stimulation of labour-intensive export-oriented activities; (ii) raising productivity (of small farmers) in agriculture; (iii) stimulation of labour force participation, especially that of women, through for example better availability and access to child daycare centers and improving their access to education; and (iv) increasing the investment in education and improving its efficiency.

Obviously, given the profound income inequality and – partly as a result of economic liberalization – the trend towards even more inequality, the achievements in the above-mentioned areas of intervention should be important to arrive at less inequality. Given the historically modest growth rates, said reduction of inequality will make the objective of a reduction of persistent poverty more attainable in a not too distant future.

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TECHNICAL APPENDIX

Decomposition of aggregate demand

Taylor et al. (1998) have developed a methodology to decompose total demand in a number of components. This methodology is as follows.

GDP can be disaggregated into private incomes Y_p and net incomes T . Adding imports M on both sides of the equation, we arrive at aggregate supply as the sum of private incomes, net taxes and imports:

$$X = Y_p + T + M$$

At the same time we have:

$$GDP = C_p + I_p + G + E - M$$

Again, adding imports M at both sides, we arrive at aggregate demand:

$$X = C_p + I_p + G + E$$

Defining “leakage parameters” s, t, y, m as function of output X , where $s = (Y_p - C_p)/X$, $t = T/X$ $y, m = M/X$, one can write the Keynesian multiplier as:

$$X = \frac{1}{s_p + t + m} \cdot (I_p + G + E)$$

or, alternatively as

$$X = \frac{s_p}{s_p + t + m} \cdot \frac{I_p}{s_p} + \frac{t}{s_p + t + m} \cdot \frac{G}{t} + \frac{m}{s_p + t + m} \cdot \frac{E}{m}$$

The ratios I_p/s_p , G/t and E/m are called direct “own” multiplier effects on output due to respectively private investment, public expenditure and exports. The overall effects (or components) are defined as the product of the direct “own” multiplier effects and respectively the savings, tax and import propensities.

In the case of Panama, the series of GDP, consumption and C_g , investment and (central) government investment I_g , imports and exports in current and constant prices are obtained from the national accounts compiled by the Contraloría General de la República, the IDB and the World Bank. We approximate the variable T by the revenues of the public sector (excluding “grants”) *minus* transfers and subsidies.

Public consumption was subtracted from overall consumption in current prices, with the aim of arriving at an estimate of private consumption C_p . Similarly, public investment was subtracted from total investment, to arrive at an estimate of private investment I_p . All series in current prices were expressed in constant prices, using available deflator. To deflate T we used the deflator of public consumption.

The microsimulations

The microsimulations were carried out separately for urban and rural areas on the basis of data of the *Encuesta de Niveles de Vida 1997* (ENV97). An alternative structure of the labour market was defined on the basis of data of the 1990 Population Census. In each iteration of the microsimulations a random number was assigned to each individual (of a sub-group) of the population in 1997. This number was used to rank the individuals. An analysis was made of the effects on poverty and inequality of the following changes in the structure of the labour market (which were considered separately or sequentially):

1. Change of the *participation rate* of each group *j* of the population.

- *Objective:* Determine the indices of poverty and inequality if the participation rates in 1997 were to be equal to those in 1990.
- *Procedure:* Within each group *j* the persons of 10 years and older were in the first place ranked according to labour force status – starting with the economically active – and in the second place on the basis of the random numbers. Because for each type *j* the participation rate in 1990 was lower than in 1997, the last economically active persons of type *j* were reclassified as economically inactive and their labour income was set to zero.

2. Change of the *unemployment rate* of economically active persons of type *j*.

- *Objective:* Determine the indices of poverty and inequality if the unemployment rates in 1997 were to be equal to those in 1990.
- *Procedure:* Only the economically active population was considered. Within each group *j* the individuals were in the first place ranked according to employment condition – starting with the employed – and in the second place on the basis of the random numbers. For the types *j* with higher rates of unemployment in 1990 than in 1997, the last employed persons of each type *j* were reclassified as unemployed and their labour income was set to zero. In case of types *j* with lower rates of unemployment in 1990, the new employed were grouped into deciles on the basis of the random numbers and assigned the mean labour income of the corresponding decile of employed persons in 1997.

3. Change of the *sector of activity* of wage employees and non-wage workers of type *j*

- *Objective:* Determine the indices of poverty and inequality if the proportion of persons employed in the tertiary sector would not have changed between 1990 and 1997.
- *Procedure:* Only the employed population was considered. Mean incomes per decile of employed persons of type *j* in each sector were calculated for both occupational categories. Within each group *j* the individuals were in the first place ranked according to sector of activity – starting with the primary/secondary sector – and in the second place on the basis of the random numbers. In groups in which the proportion of persons working in the tertiary sector was lower in 1990 than in 1997, the first persons of the tertiary sector moved to the primary/secondary sector. In groups *j* in which the proportion of persons in the tertiary sector was higher in 1990 than in 1997, the last persons of the primary/secondary sector moved to the tertiary sector. Within each group *j* the persons who changed from one sector to the other were classified into deciles on the basis of their random number and their labour income was replaced by the corresponding mean income of the decile of all persons who in 1997 were actually working in the sector of destination.

4. Change of the *occupational category* of employed persons of type *j* in each sector of activity.

- *Objective:* Determine the indices of poverty and inequality if the proportion of wage employees in 1997 were to be the same as in 1990.
- *Procedure:* Only the employed population was considered. Mean incomes were calculated per decile of wage employees and non-wage workers of type *j* in each sector of activity. For both sectors of ac-

tivity within each group j the individuals were in the first place ranked according to occupational category – starting with the wage employees – and in the second place on the basis of the random numbers. In groups in which the proportion of wage employees was lower in 1990 than in 1997, the last wage employees became non-wage workers. In groups in which the proportion of wage employees was higher in 1990 than in 1997, the first non-wage workers became wage employees. Within each group j the persons who changed from one occupational category to the other were classified into deciles on the basis of their random number and their labour income was replaced by the corresponding mean income of the decile of all persons who in 1997 were actually working in the occupational category of destination.

5. Change of the remuneration structure.

- *Objective:* Determine the indices of poverty and inequality if the structure of labour incomes in 1997 were to be that of 1990.
- *Procedure:* Only the employed population was considered. Mean labour incomes were calculated for each of the 16 groups jk of employed persons, as well as an overall mean, for both 1990 and 1997. Subsequently, the following relative mean incomes were calculated for 1990:

$$s_{jk} = \frac{\overline{yl90}_{jk}}{\overline{yl90}}$$

The mean labour income in 1997 of each group was multiplied by the corresponding s_{jk} in order to obtain a new mean labour income for each group jk in prices of 1997:

$$\overline{yl}_{jk}^* = \frac{\overline{yl90}_{jk}}{\overline{yl90}} \cdot \overline{yl97}$$

In turn, the new mean incomes of the groups jk were expressed as a proportion of the corresponding mean in 1997, and subsequently the 1997 labour income of each individual i in group jk was multiplied by the proportion for the group:

$$yl_{jki}^* = \frac{\overline{yl}_{jk}^*}{\overline{yl97}_{jk}} \cdot yl97_{jki}$$

6. Change of the level of remuneration.

- *Objective:* Determine the indices of poverty and inequality if the level of real incomes of 1997 were to be that of 1990.
- *Procedure:* Only the employed population was considered. New labour incomes were calculated by multiplying the 1997 labour income of each income recipient by the the ratio of mean income in 1990 (in Balboas of 1997) to that in 1997:

$$yl_{jki}^{**} = \frac{\overline{yl90}}{\overline{yl97}} \cdot yl97_{jki}$$

7. Change of the level of skill of employed men/women in segment k .

- *Objective:* Determine the indices of poverty and inequality if the proportion of skilled workers in 1997 were to be same as in 1990.
- *Procedure:* Only the employed population was considered. Mean incomes were calculated per decile of employed men/women in each segment k . Individuals within each group defined by sex and segment were in the first place classified according to skill – starting with the unskilled workers – and in the second place on the basis of the random numbers. In groups in which the proportion of skilled workers was higher in 1990 than in 1997, the last unskilled workers were reclassified as skilled

workers. In case of groups with lower proportions of skilled workers 1990, the first skilled workers move to the category of unskilled workers. Within each group j the persons who changed from unskilled to skilled were classified into deciles on the basis of their random number and their labour income was replaced by the mean income of the corresponding decile of all persons who were actually skilled in 1997. In the reverse case, the actual 1997 incomes were replaced by that of the corresponding decile of unskilled workers.

The simulations were carried out both separately and sequentially. Simulations 1 to 4, 7 and the sequential simulations were repeated 32 times with the aim of constructing a 95% confidence interval.

Due to changes in the participation rate and the unemployment rate it is possible that persons become classified as employed, but that there is no information concerning occupational category for these persons. For this reason, in the part of the sequential simulations in which the employment structure according to sector of activity is changed, mean proportions of persons employed in the tertiary sector en 1990 were used (instead of different proportions for wage employees and non-wage workers separately) in cases of lack of information concerning the occupational category.

ANNEX A: ANNEX TABLES

Table A.1: Structure of the labour market in 1990 and 1997

| | Urban | | | Rural | | |
|---|------------------|----------|---------------------|------------------|----------|---------------------|
| | 1990 Cen- sus | ENV 1997 | Change 1990-1997 | 1990 Cen- sus | ENV 1997 | Change 1990-1997 |
| Rate of participation | | | | | | |
| <i>Women</i> | | | | | | |
| 0 - 11 years of education | 0.252 | 0.383 | 0.131 | 0.134 | 0.306 | 0.172 |
| 12 or more years of education | 0.588 | 0.717 | 0.129 | 0.513 | 0.664 | 0.150 |
| <i>Men</i> | | | | | | |
| 0 - 11 years of education | 0.552 | 0.614 | 0.062 | 0.706 | 0.768 | 0.062 |
| 12 or more years of education | 0.798 | 0.891 | 0.093 | 0.848 | 0.931 | 0.084 |
| Rate of unemployment | | | | | | |
| <i>Women</i> | | | | | | |
| 0 - 11 years of education | 0.157 | 0.122 | -0.035 | 0.146 | 0.210 | 0.064 |
| 12 or more years of education | 0.180 | 0.092 | -0.088 | 0.289 | 0.102 | -0.187 |
| <i>Men</i> | | | | | | |
| 0 - 11 years of education | 0.159 | 0.058 | -0.101 | 0.081 | 0.044 | -0.036 |
| 12 or more years of education | 0.135 | 0.056 | -0.078 | 0.150 | 0.054 | -0.096 |
| Proportion employed in the tertiary sector | | | | | | |
| <i>Women with 0 - 11 years of education</i> | | | | | | |
| Wage earners | 0.89 | 0.91 | 0.03 | 0.85 | 0.87 | 0.02 |
| Non-wage workers | 0.79 | 0.83 | 0.04 | 0.30 | 0.46 | 0.16 |
| <i>Women with 12 or more years of education</i> | | | | | | |
| Wage earners | 0.91 | 0.94 | 0.02 | 0.92 | 0.91 | 0.00 |
| Non-wage workers | 0.87 | 0.90 | 0.03 | 0.81 | 0.74 | -0.07 |
| <i>Men with 0 - 11 years of education</i> | | | | | | |
| Wage earners | 0.69 | 0.66 | -0.03 | 0.34 | 0.33 | -0.02 |
| Non-wage workers | 0.63 | 0.73 | 0.11 | 0.12 | 0.16 | 0.04 |
| <i>Men with 12 or more years of education</i> | | | | | | |
| Wage earners | 0.80 | 0.76 | -0.04 | 0.69 | 0.61 | -0.08 |
| Non-wage workers | 0.74 | 0.72 | -0.02 | 0.44 | 0.38 | -0.06 |
| Proportion of non-wage earners | | | | | | |
| <i>Women with 0 - 11 years of education</i> | | | | | | |
| Primary or secondary sector | 0.27 | 0.43 | 0.15 | 0.81 | 0.83 | 0.02 |
| Tertiary sector | 0.16 | 0.26 | 0.10 | 0.25 | 0.38 | 0.13 |
| <i>Women with 12 or more years of education</i> | | | | | | |
| Primary or secondary sector | 0.11 | 0.21 | 0.10 | 0.21 | 0.37 | 0.16 |
| Tertiary sector | 0.07 | 0.14 | 0.06 | 0.10 | 0.14 | 0.04 |
| <i>Men with 0 - 11 years of education</i> | | | | | | |
| Primary or secondary sector | 0.38 | 0.21 | -0.17 | 0.73 | 0.56 | -0.17 |
| Tertiary sector | 0.32 | 0.27 | -0.05 | 0.42 | 0.34 | -0.08 |
| <i>Men with 12 or more years of education</i> | | | | | | |
| Primary or secondary sector | 0.27 | 0.21 | -0.06 | 0.49 | 0.08 | -0.40 |
| Tertiary sector | 0.20 | 0.18 | -0.03 | 0.25 | 0.05 | -0.20 |

Table A.1 (Continuation): Structure of the labour market in 1990 and 1997

| | Urban | | | Rural | | |
|--|------------------|----------|---------------------|------------------|----------|---------------------|
| | 1990 Cen- sus | ENV 1997 | Change 1990-1997 | 1990 Cen- sus | ENV 1997 | Change 1990-1997 |
| Proportion with 12 or more years of education | | | | | | |
| <i>Women in the primary or secondary sector</i> | | | | | | |
| Wage earners | 0.47 | 0.52 | 0.05 | 0.24 | 0.28 | 0.04 |
| Non-wage workers | 0.23 | 0.28 | 0.05 | 0.02 | 0.04 | 0.03 |
| <i>Women in the tertiary sector</i> | | | | | | |
| Wage earners | 0.55 | 0.61 | 0.06 | 0.38 | 0.37 | -0.01 |
| Non-wage workers | 0.34 | 0.41 | 0.07 | 0.16 | 0.13 | -0.03 |
| <i>Men in the primary or secondary sector</i> | | | | | | |
| Wage earners | 0.32 | 0.39 | 0.07 | 0.08 | 0.08 | 0.00 |
| Non-wage workers | 0.22 | 0.38 | 0.17 | 0.03 | 0.06 | 0.03 |
| <i>Men in the tertiary sector</i> | | | | | | |
| Wage earners | 0.46 | 0.51 | 0.05 | 0.26 | 0.22 | -0.04 |
| Non-wage workers | 0.32 | 0.37 | 0.05 | 0.14 | 0.13 | -0.01 |
| Relative mean income (1) | | | | | | |
| <i>Women</i> | | | | | | |
| 0 - 11 years of education | | | | | | |
| Primary or secondary sector | | | | | | |
| Wage earners | 0.56 | 0.43 | -0.13 | 1.30 | 0.51 | -0.79 |
| Non-wage workers | 0.28 | 0.26 | -0.02 | 0.16 | 0.17 | 0.01 |
| Tertiary sector | | | | | | |
| Wage earners | 0.47 | 0.41 | -0.06 | 0.86 | 0.57 | -0.29 |
| Non-wage workers | 0.47 | 0.24 | -0.22 | 0.76 | 0.44 | -0.32 |
| 12 or more years of education | | | | | | |
| Primary or secondary | | | | | | |
| Wage earners | 1.08 | 0.84 | -0.24 | 1.86 | 1.37 | -0.49 |
| Non-wage workers | 0.78 | 1.21 | 0.42 | 0.87 | 0.29 | -0.58 |
| Tertiary | | | | | | |
| Wage earners | 1.21 | 1.14 | -0.07 | 2.49 | 1.86 | -0.63 |
| Non-wage workers | 1.18 | 0.67 | -0.51 | 1.65 | 1.15 | -0.50 |
| <i>Men</i> | | | | | | |
| 0 - 11 years of education | | | | | | |
| Primary or secondary sector | | | | | | |
| Wage earners | 0.75 | 0.68 | -0.07 | 1.23 | 1.05 | -0.18 |
| Non-wage workers | 0.44 | 0.35 | -0.09 | 0.48 | 0.67 | 0.19 |
| Tertiary sector | | | | | | |
| Wage earners | 0.79 | 0.84 | 0.05 | 1.68 | 1.44 | -0.24 |
| Non-wage workers | 0.63 | 0.65 | 0.02 | 1.20 | 1.38 | 0.18 |
| 12 or more years of education | | | | | | |
| Primary or secondary sector | | | | | | |
| Wage earners | 1.52 | 1.55 | 0.03 | 2.47 | 2.00 | -0.46 |
| Non-wage workers | 1.23 | 0.78 | -0.44 | 1.49 | 1.72 | 0.24 |
| Tertiary sector | | | | | | |
| Wage earners | 1.81 | 1.89 | 0.08 | 3.43 | 2.43 | -1.00 |
| Non-wage workers | 1.74 | 1.66 | -0.09 | 2.61 | 2.01 | -0.60 |

Source: Own calculations based on Encuesta de Niveles de Vida de 1997 and 1990 Population Census.

Note: (1) Mean income of group *jk* expressed as a proportion of the overall mean

Table A.2: Effects of changes in the labour market on poverty and inequality (urban area)

| | | | | | Per capita income | | Labour income per recipient | |
|---|-------------|----------------|----------------|----------------|-------------------|---------------|-----------------------------|---------------|
| | | P ₀ | P ₁ | P ₂ | Gini | Theil | Gini | Theil |
| Value observed in 1997 | | 0.2158 | 0.0871 | 0.0496 | 0.5247 | 0.5082 | 0.6122 | 0.7356 |
| | -2% | 0.2115 | 0.0853 | 0.0486 | 0.5142 | 0.4981 | 0.6000 | 0.7209 |
| | +2% | 0.2201 | 0.0888 | 0.0506 | 0.5352 | 0.5184 | 0.6245 | 0.7504 |
| <i>Values in case of change of the:</i> | | | | | | | | |
| (1) rate of participation | Mean | 0.2665 | 0.1194 | 0.0729 | 0.5425 | 0.5460 | 0.6096 | 0.7266 |
| | Lower limit | 0.2651 | 0.1186 | 0.0722 | 0.5414 | 0.5431 | 0.6084 | 0.7221 |
| | Upper limit | 0.2679 | 0.1202 | 0.0735 | 0.5435 | 0.5489 | 0.6109 | 0.7311 |
| (2) rate of unemployment | Mean | 0.2451 | 0.1063 | 0.0638 | 0.5346 | 0.5300 | 0.6131 | 0.7377 |
| | Lower limit | 0.2440 | 0.1056 | 0.0632 | 0.5334 | 0.5269 | 0.6121 | 0.7338 |
| | Upper limit | 0.2461 | 0.1070 | 0.0644 | 0.5359 | 0.5330 | 0.6142 | 0.7415 |
| (3) employment structure according to sector of activity | Mean | 0.2116 | 0.0859 | 0.0492 | 0.5229 | 0.5049 | 0.6117 | 0.7346 |
| | Lower limit | 0.2108 | 0.0855 | 0.0490 | 0.5224 | 0.5035 | 0.6112 | 0.7329 |
| | Upper limit | 0.2124 | 0.0862 | 0.0495 | 0.5234 | 0.5063 | 0.6122 | 0.7363 |
| (4) employment structure according to occupational category | Mean | 0.2098 | 0.0865 | 0.0500 | 0.5225 | 0.5033 | 0.6073 | 0.7240 |
| | Lower limit | 0.2088 | 0.0860 | 0.0496 | 0.5218 | 0.5015 | 0.6065 | 0.7219 |
| | Upper limit | 0.2108 | 0.0870 | 0.0504 | 0.5232 | 0.5051 | 0.6081 | 0.7262 |
| (5) remuneration structure | | 0.1958 | 0.0813 | 0.0468 | 0.5219 | 0.5017 | 0.6031 | 0.7100 |
| (6) level of remuneration | | 0.2190 | 0.0884 | 0.0503 | 0.5244 | 0.5080 | 0.6122 | 0.7356 |
| (7) employment structure according to level of education | Mean | 0.2193 | 0.0885 | 0.0506 | 0.5212 | 0.5033 | 0.6134 | 0.7415 |
| | Lower limit | 0.2185 | 0.0883 | 0.0504 | 0.5206 | 0.5015 | 0.6128 | 0.7394 |
| | Upper limit | 0.2201 | 0.0888 | 0.0508 | 0.5218 | 0.5050 | 0.6141 | 0.7436 |
| <i>Values in case of change of parameters:</i> | | | | | | | | |
| (1-2) | Mean | 0.2943 | 0.1389 | 0.0877 | 0.5529 | 0.5693 | 0.6118 | 0.7320 |
| | Lower limit | 0.2923 | 0.1377 | 0.0866 | 0.5514 | 0.5652 | 0.6102 | 0.7270 |
| | Upper limit | 0.2964 | 0.1401 | 0.0887 | 0.5544 | 0.5733 | 0.6133 | 0.7370 |
| (1-3) | Mean | 0.2904 | 0.1373 | 0.0871 | 0.5507 | 0.5635 | 0.6103 | 0.7289 |
| | Lower limit | 0.2884 | 0.1364 | 0.0864 | 0.5488 | 0.5579 | 0.6082 | 0.7221 |
| | Upper limit | 0.2925 | 0.1382 | 0.0879 | 0.5526 | 0.5691 | 0.6124 | 0.7357 |
| (1-4) | Mean | 0.2881 | 0.1369 | 0.0871 | 0.5495 | 0.5600 | 0.6087 | 0.7229 |
| | Lower limit | 0.2858 | 0.1356 | 0.0860 | 0.5480 | 0.5563 | 0.6068 | 0.7171 |
| | Upper limit | 0.2905 | 0.1383 | 0.0882 | 0.5510 | 0.5637 | 0.6106 | 0.7287 |
| (1-5) | Mean | 0.2702 | 0.1297 | 0.0828 | 0.5438 | 0.5440 | 0.5964 | 0.6844 |
| | Lower limit | 0.2676 | 0.1285 | 0.0820 | 0.5417 | 0.5382 | 0.5943 | 0.6781 |
| | Upper limit | 0.2728 | 0.1308 | 0.0837 | 0.5458 | 0.5498 | 0.5984 | 0.6908 |
| (1-6) | Mean | 0.2721 | 0.1300 | 0.0828 | 0.5478 | 0.5551 | 0.6007 | 0.6987 |
| | Lower limit | 0.2701 | 0.1288 | 0.0818 | 0.5463 | 0.5509 | 0.5990 | 0.6933 |
| | Upper limit | 0.2741 | 0.1313 | 0.0839 | 0.5493 | 0.5593 | 0.6023 | 0.7042 |
| (1-7) | Mean | 0.2840 | 0.1350 | 0.0860 | 0.5415 | 0.5418 | 0.6002 | 0.7007 |
| | Lower limit | 0.2809 | 0.1336 | 0.0849 | 0.5396 | 0.5368 | 0.5980 | 0.6941 |
| | Upper limit | 0.2870 | 0.1364 | 0.0870 | 0.5434 | 0.5469 | 0.6024 | 0.7074 |

Source: Own calculations based on Encuesta de Niveles de Vida de 1997 and 1990 Population Census.

Note: Zero value: difference not statistically significant

Bold values: difference statistically significant and at least 2%

Grey values: difference statistically significant, but less than 2%

Underlined values: poverty/inequality would have been higher if rate/structure were to be that of 1990

In case of changes in the employment structure, the mean incomes to be assigned were calculated for the employed persons in each sector of activity, occupational category or group of employed persons according to skill level, excluding the agricultural labourers with zero incomes.

**Table A.2: Effects of changes in the labour market on poverty and inequality
(rural area)**

| | | | | | Per capita income | | Labour income per recipient | |
|---|-------------|----------------|----------------|----------------|-------------------|---------------|-----------------------------|---------------|
| | | P ₀ | P ₁ | P ₂ | Gini | Theil | Gini | Theil |
| Value observed in 1997 | | 0.6735 | 0.3887 | 0.2739 | 0.5640 | 0.6310 | 0.6432 | 0.8631 |
| | -2% | 0.6600 | 0.3809 | 0.2684 | 0.5528 | 0.6184 | 0.6303 | 0.8458 |
| | +2% | 0.6870 | 0.3965 | 0.2794 | 0.5753 | 0.6436 | 0.6560 | 0.8803 |
| <i>Values in case of change of the:</i> | | | | | | | | |
| (1) rate of participation | Mean | 0.7102 | 0.4299 | 0.3112 | 0.5776 | 0.6650 | 0.6352 | 0.8387 |
| | Lower limit | 0.7089 | 0.4293 | 0.3105 | 0.5758 | 0.6549 | 0.6329 | 0.8228 |
| | Upper limit | 0.7114 | 0.4306 | 0.3118 | 0.5795 | 0.6752 | 0.6374 | 0.8546 |
| (2) rate of unemployment | Mean | 0.6897 | 0.4031 | 0.2865 | 0.5658 | 0.6373 | 0.6509 | 0.8865 |
| | Lower limit | 0.6889 | 0.4026 | 0.2859 | 0.5647 | 0.6314 | 0.6495 | 0.8771 |
| | Upper limit | 0.6906 | 0.4036 | 0.2870 | 0.5670 | 0.6431 | 0.6522 | 0.8960 |
| (3) employment structure according to sector of activity | Mean | 0.6716 | 0.3879 | 0.2732 | 0.5626 | 0.6283 | 0.6403 | 0.8589 |
| | Lower limit | 0.6707 | 0.3874 | 0.2727 | 0.5620 | 0.6268 | 0.6397 | 0.8570 |
| | Upper limit | 0.6726 | 0.3884 | 0.2736 | 0.5632 | 0.6298 | 0.6408 | 0.8608 |
| (4) employment structure according to occupational category | Mean | 0.6739 | 0.3984 | 0.2834 | 0.5700 | 0.6254 | 0.6467 | 0.8513 |
| | Lower limit | 0.6726 | 0.3976 | 0.2826 | 0.5679 | 0.6144 | 0.6443 | 0.8317 |
| | Upper limit | 0.6751 | 0.3991 | 0.2842 | 0.5720 | 0.6364 | 0.6492 | 0.8710 |
| (5) remuneration structure | | 0.6336 | 0.3763 | 0.2695 | 0.5733 | 0.6414 | 0.6474 | 0.8543 |
| (6) level of remuneration | | 0.6894 | 0.4027 | 0.2845 | 0.5623 | 0.6263 | 0.6432 | 0.8631 |
| (7) employment structure according to level of education | Mean | 0.6702 | 0.3867 | 0.2723 | 0.5629 | 0.6275 | 0.6434 | 0.8662 |
| | Lower limit | 0.6697 | 0.3863 | 0.2720 | 0.5625 | 0.6266 | 0.6430 | 0.8652 |
| | Upper limit | 0.6707 | 0.3871 | 0.2726 | 0.5633 | 0.6283 | 0.6437 | 0.8673 |
| <i>Values in case of change of parameters:</i> | | | | | | | | |
| (1-2) | Mean | 0.7250 | 0.4440 | 0.3240 | 0.5828 | 0.6846 | 0.6442 | 0.8752 |
| | Lower limit | 0.7236 | 0.4431 | 0.3231 | 0.5812 | 0.6765 | 0.6425 | 0.8627 |
| | Upper limit | 0.7263 | 0.4450 | 0.3249 | 0.5843 | 0.6927 | 0.6459 | 0.8877 |
| (1-3) | Mean | 0.7226 | 0.4401 | 0.3196 | 0.5800 | 0.6784 | 0.6404 | 0.8590 |
| | Lower limit | 0.7208 | 0.4388 | 0.3185 | 0.5784 | 0.6704 | 0.6387 | 0.8470 |
| | Upper limit | 0.7244 | 0.4413 | 0.3207 | 0.5817 | 0.6864 | 0.6421 | 0.8710 |
| (1-4) | Mean | 0.7249 | 0.4505 | 0.3301 | 0.5845 | 0.6618 | 0.6521 | 0.8432 |
| | Lower limit | 0.7227 | 0.4495 | 0.3291 | 0.5816 | 0.6471 | 0.6491 | 0.8213 |
| | Upper limit | 0.7270 | 0.4515 | 0.3310 | 0.5875 | 0.6766 | 0.6552 | 0.8652 |
| (1-5) | Mean | 0.7066 | 0.4487 | 0.3350 | 0.5942 | 0.6748 | 0.6627 | 0.8573 |
| | Lower limit | 0.7048 | 0.4474 | 0.3337 | 0.5908 | 0.6567 | 0.6585 | 0.8291 |
| | Upper limit | 0.7084 | 0.4501 | 0.3363 | 0.5976 | 0.6929 | 0.6669 | 0.8854 |
| (1-6) | Mean | 0.7071 | 0.4494 | 0.3350 | 0.5967 | 0.6887 | 0.6658 | 0.8786 |
| | Lower limit | 0.7048 | 0.4478 | 0.3338 | 0.5935 | 0.6721 | 0.6623 | 0.8534 |
| | Upper limit | 0.7095 | 0.4509 | 0.3363 | 0.5998 | 0.7053 | 0.6694 | 0.9039 |
| (1-7) | Mean | 0.7269 | 0.4646 | 0.3473 | 0.5903 | 0.6681 | 0.6633 | 0.8641 |
| | Lower limit | 0.7233 | 0.4625 | 0.3455 | 0.5875 | 0.6528 | 0.6601 | 0.8398 |
| | Upper limit | 0.7305 | 0.4666 | 0.3491 | 0.5931 | 0.6833 | 0.6665 | 0.8883 |

Source: Own calculations based on Encuesta de Niveles de Vida de 1997 and 1990 Population Census.

Note: Zero value: difference not statistically significant

Bold values: difference statistically significant and at least 2%

Grey values: difference statistically significant, but less than 2%

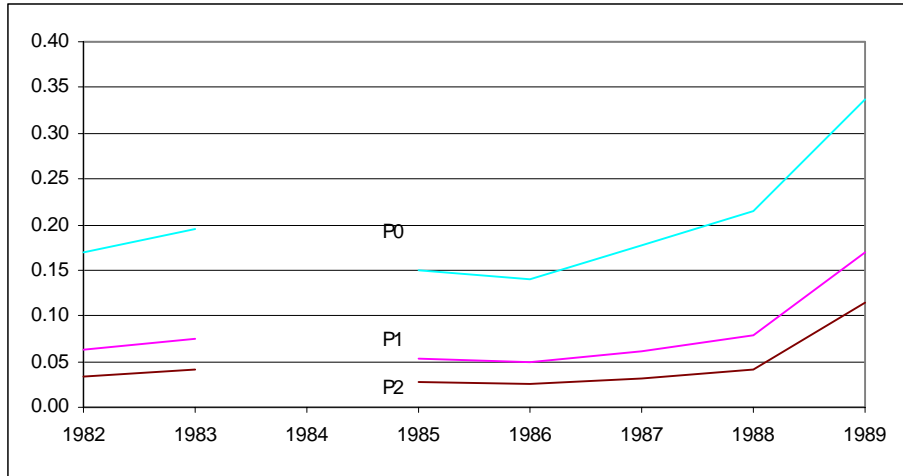
Underlined values: poverty/inequality would have been higher if rate/structure were to be that of 1990

In case of changes in the employment structure, the mean incomes to be assigned were calculated for the employed persons in each sector of activity, occupational category or group of employed persons according to skill level, excluding the agricultural labourers with zero incomes.

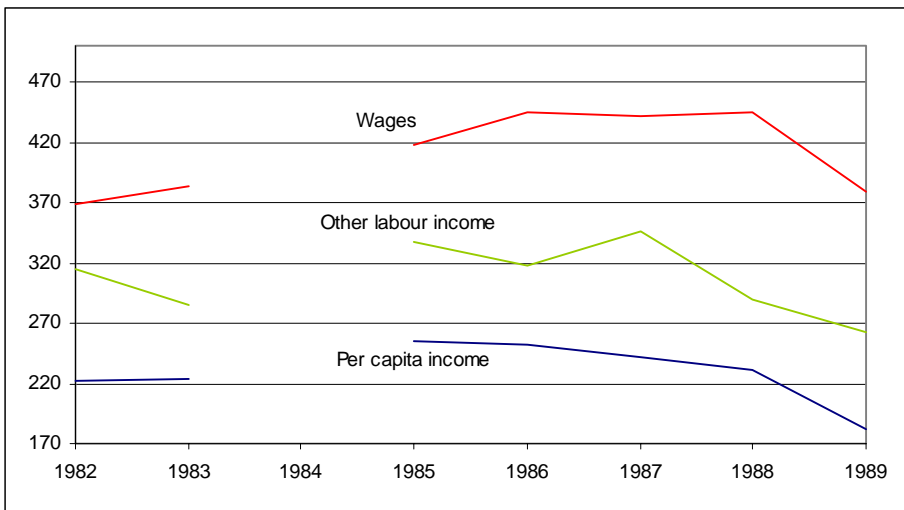
ANNEX B: ANNEX GRAPHS

Figure B.1: Trends in urban incomes, poverty and inequality (1980s)

a: Poverty indices



b: Mean incomes (in Balboas of 1998)



c: Inequality in the distribution of per capita income

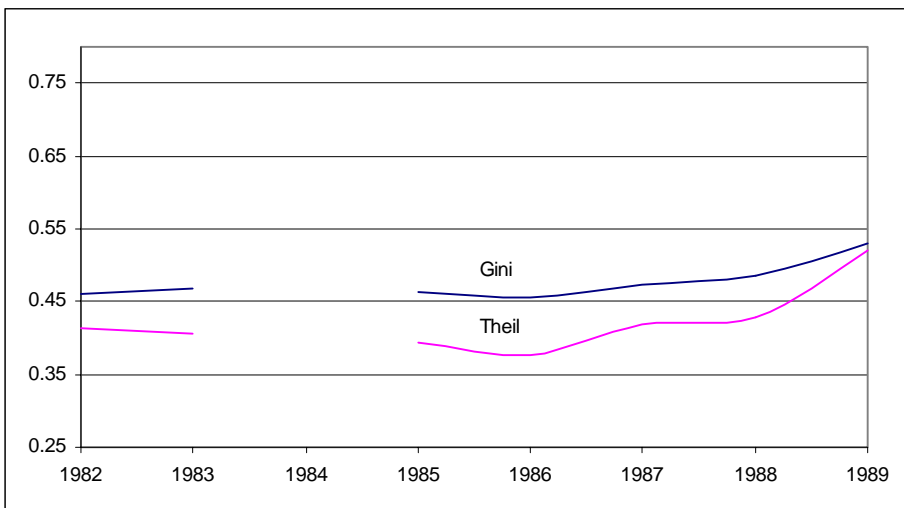
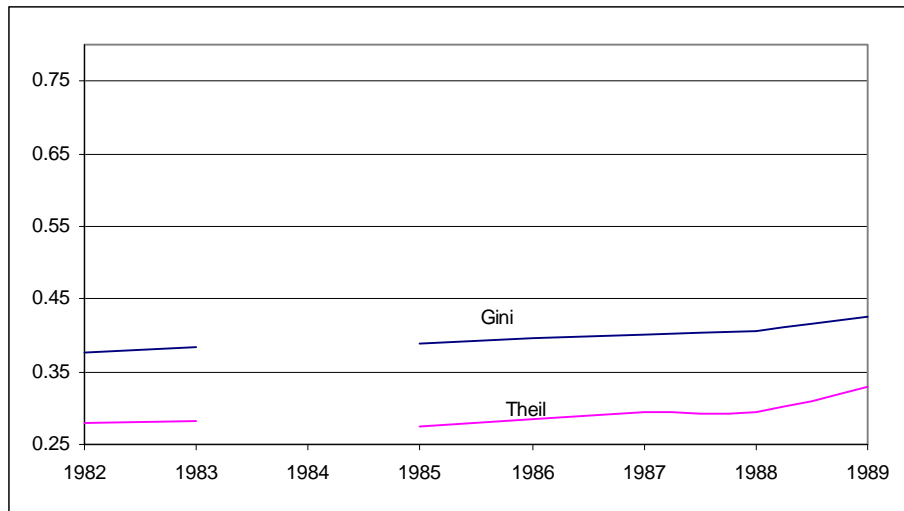


Figure B.1 (continued): Trends in urban incomes, poverty and inequality (1980s)

d: Inequality in the distribution of wages



e: Inequality in the distribution of other labour income

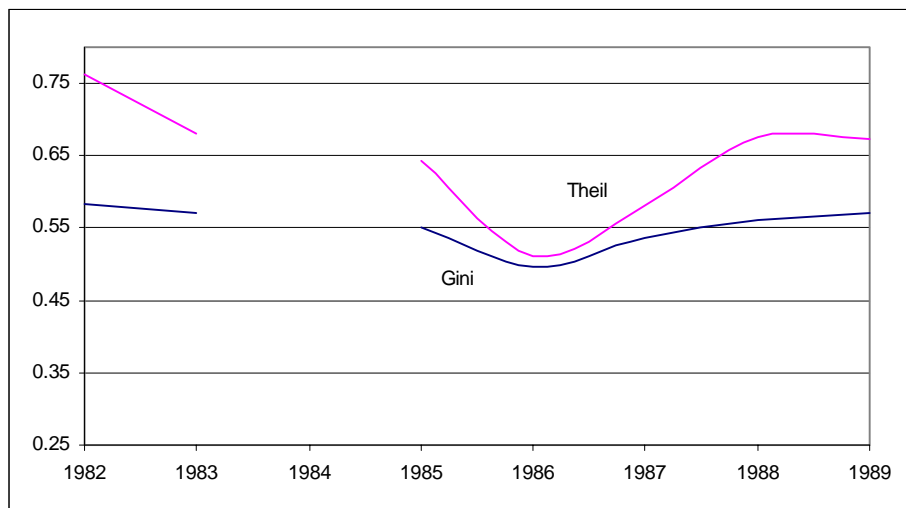
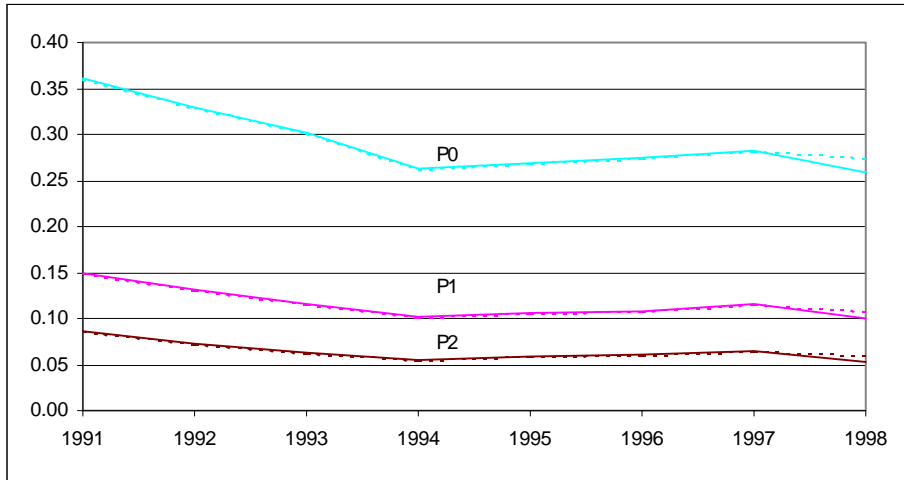
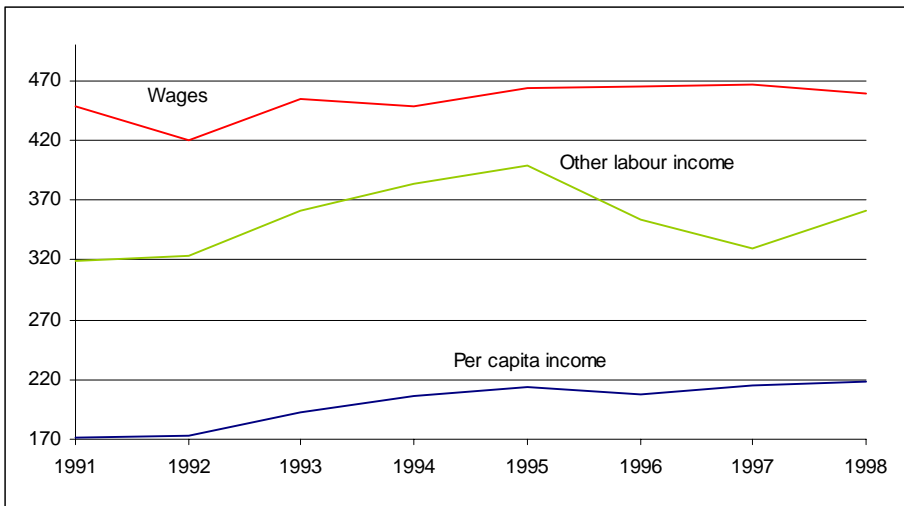


Figure B.1 (continued): Trends in urban incomes, poverty and inequality (1990s)

f: Poverty indices



g: Mean incomes (in Balboas of 1998)



h: Inequality in the distribution of per capita income

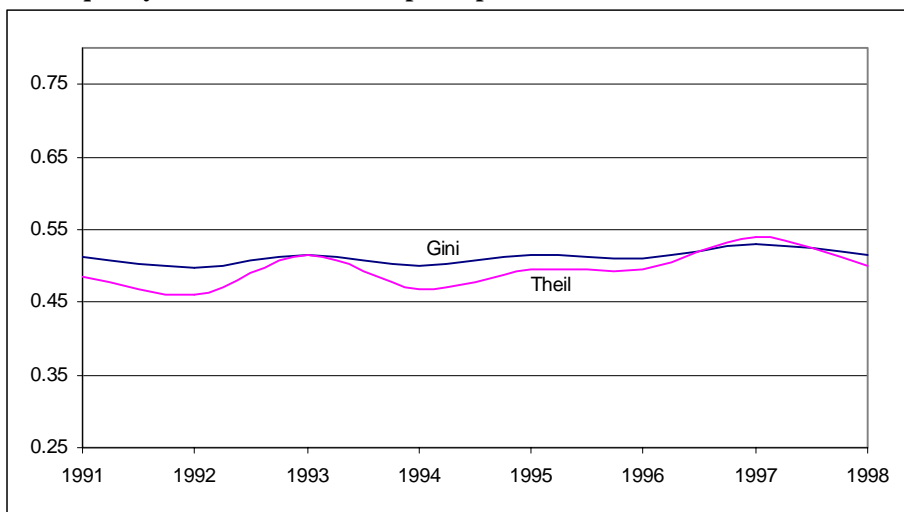
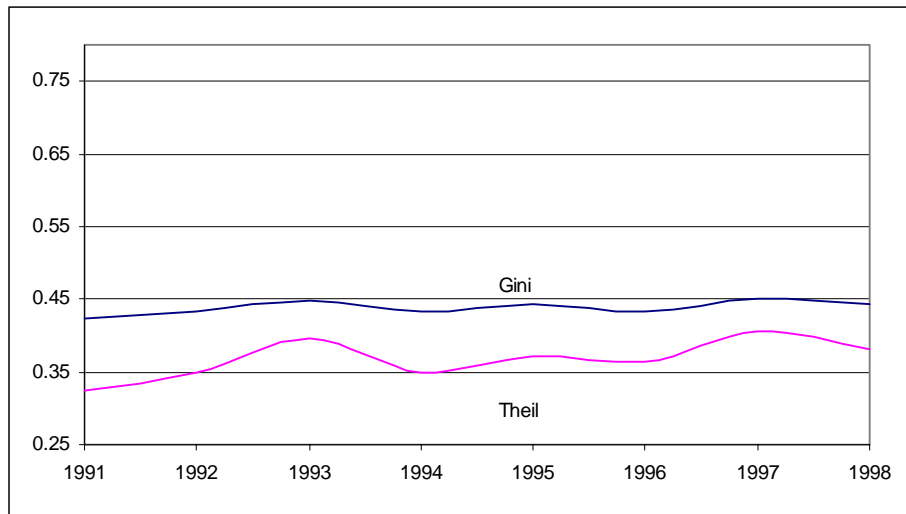
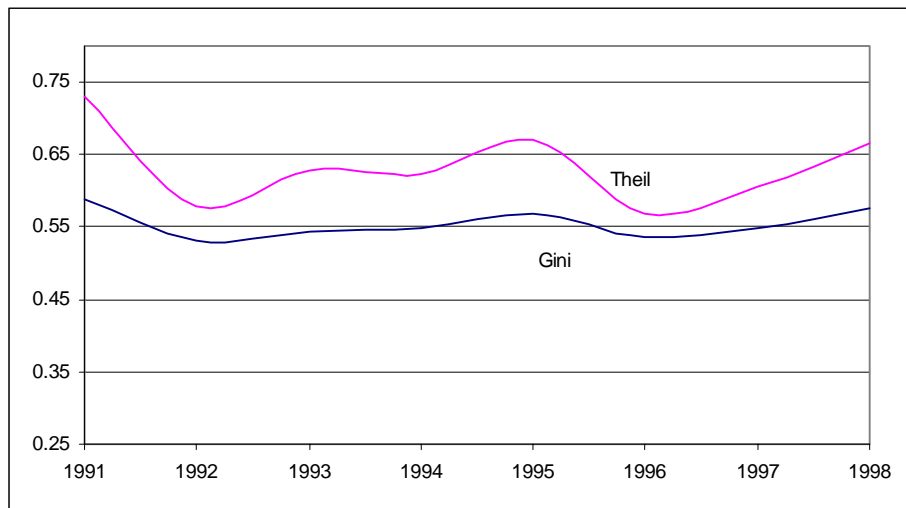


Figure B.1 (continued): Trends in urban incomes, poverty and inequality (1990s)

j: Inequality in the distribution of wages



k: Inequality in the distribution of other labour income

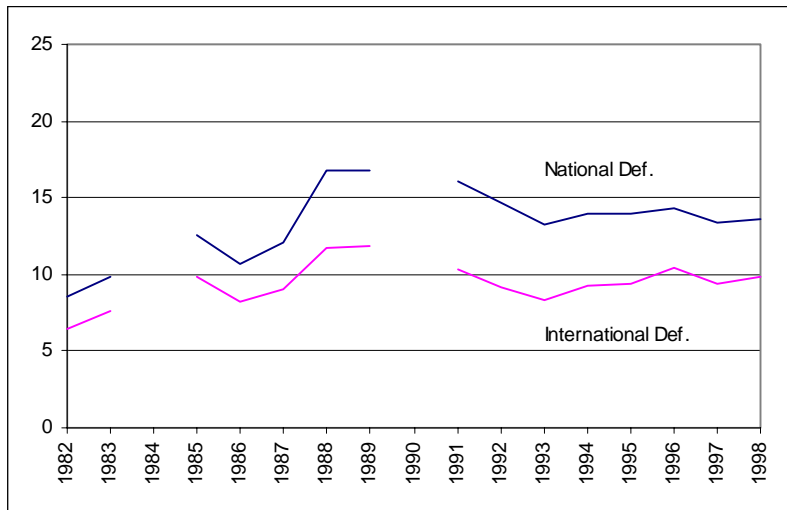


Source: Own calculations based on Encuestas Continuas de Hogares

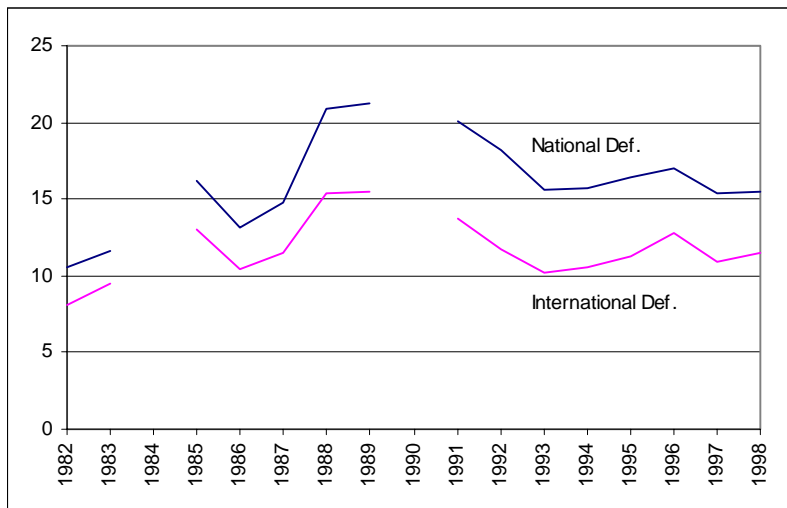
Note: Data of incomes in the 1980s are not comparable with those of the 1990s due to the fact that the data bases for the 1980s does not include observations for the population of 10 to 14 years and household members who are no relatives.

Figure B.2: Rate of unemployment
 (% of the economically active population)

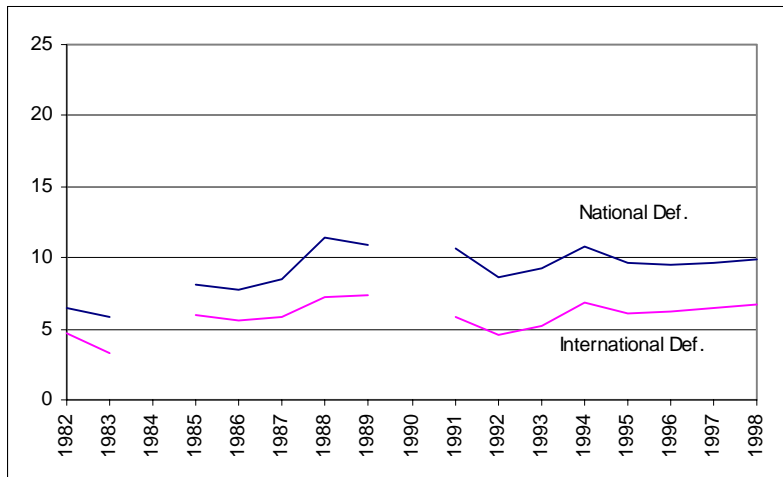
National



Urban



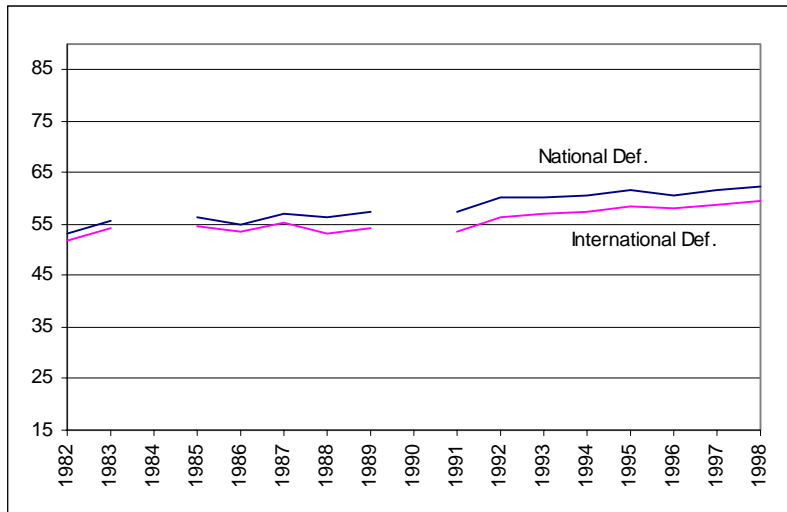
Rural



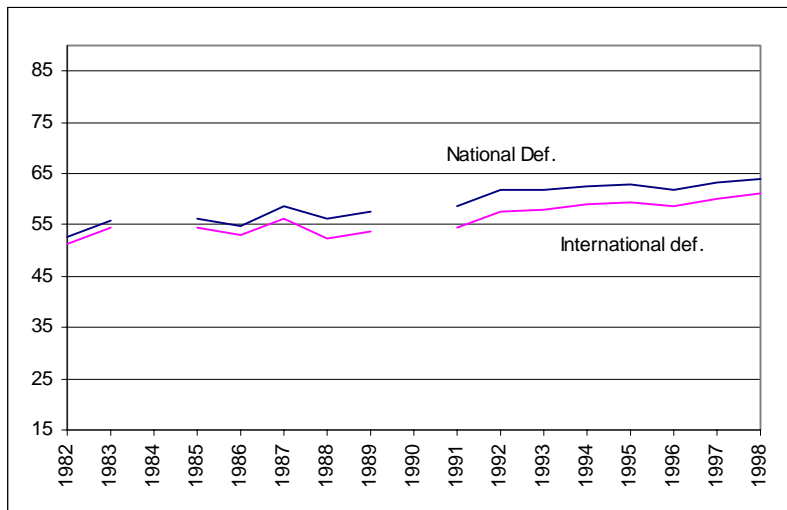
Source: Own calculations based on Encuestas Continuas de Hogares

Figure B.3: Rate of economic participation
 (% of the population at working age)

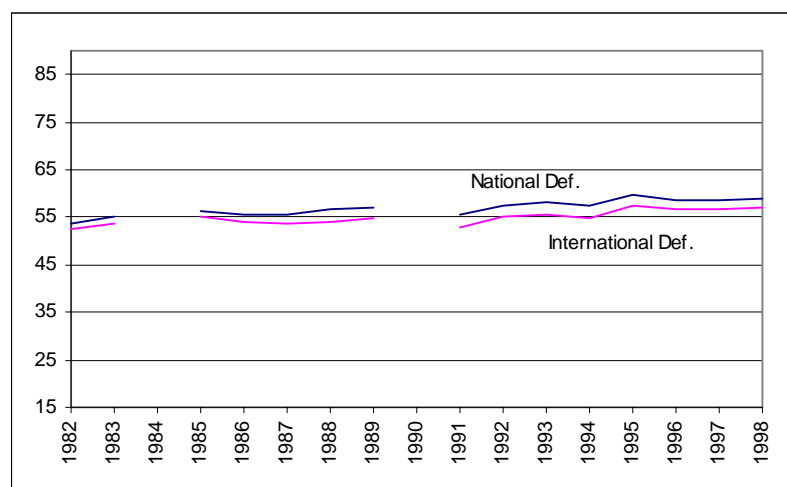
National



Urban

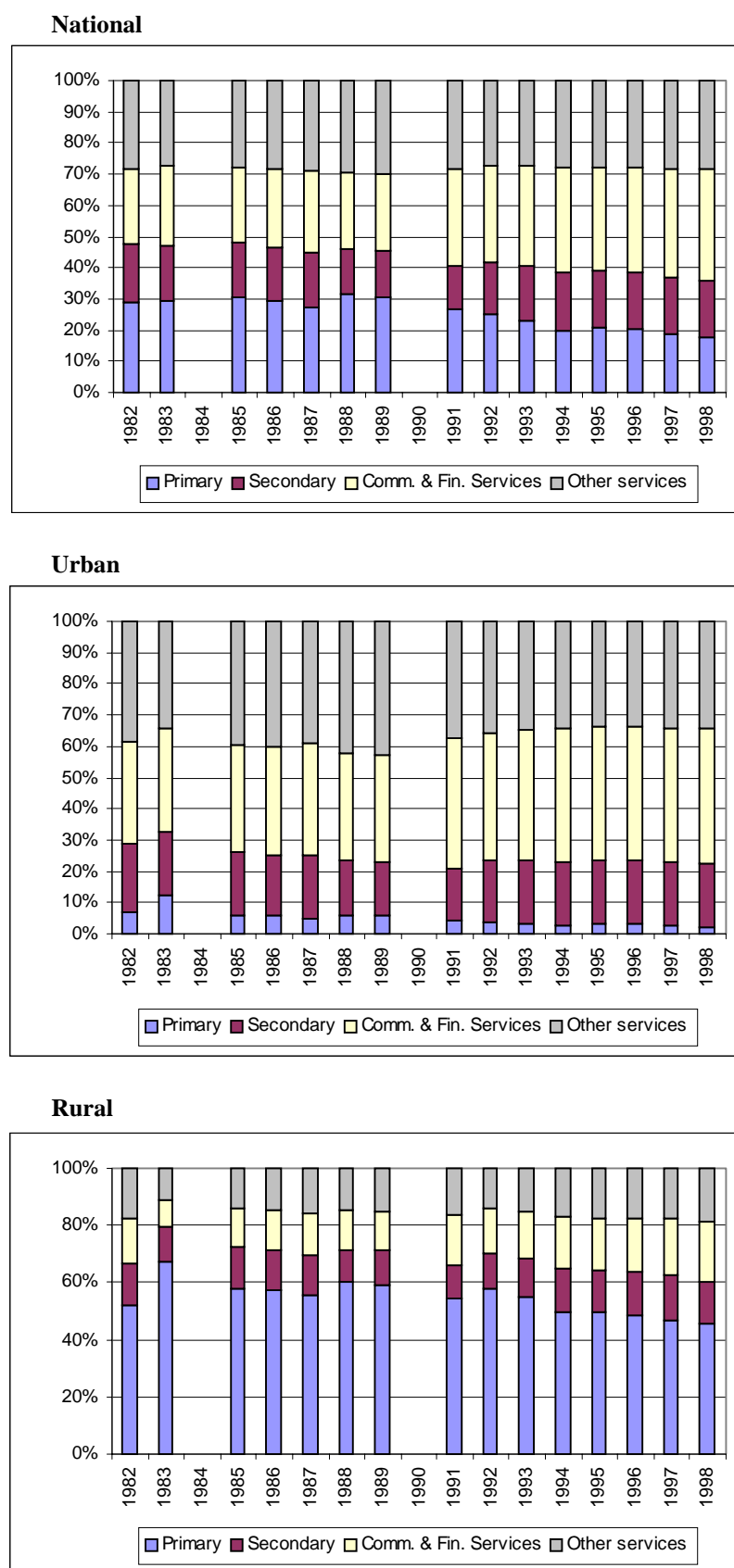


Rural



Source: Own calculations based on Encuestas Continuas de Hogares

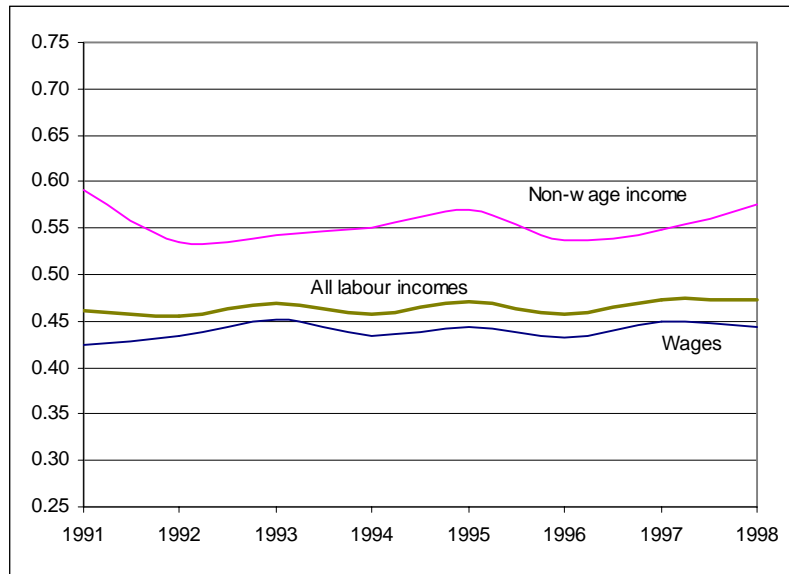
Figure B.4: Employment structure according to sector of economic activity



Source: Own calculations based on Encuestas Continuas de Hogares

Figure B.5: Distribution of labour incomes

Gini coefficient



Theil coefficient

