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REGIONAL PRO-POOR GROWTH
AND CONVERGENCE IN TUNISIA

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Abstract

This paper studies the evolution of total and regional poverty in Tunisia using the Growth Incidence Curve (GIC) approach based on individual consumption and education level from the household consumption surveys and other official publications during the period 1990-1995. Three main results are found, first, growth is pro-poor in Tunisia and poor households benefit from growth in the whole country as well as many different governorates. Second, the different social incidence curves (SGICs) using education as a social indicator confirm the fact that growth is generally pro-poor. This result means that education and human capital accumulation are important factors in decreasing poverty especially in rural areas. Third, the empirical analysis tends to confirm the existence of conditional and unconditional convergence in terms of poverty between regions, where poor governorates tend to grow more rapidly (with a high pro-poor growth) and to catch up with rich ones.

ملخص

تدرس هذه الورقة تجذير شامل وقطري للفقر في تونس باستخدام أسلوب منحني وقوع النمو الذي يعتمد على استهلاك الأفراد ومستوى التعليم المأخوذ من مسح استهلاك العائلات ومطبوعات رسمية أخرى في الفترة بين 1990 و 1995. وقد اكتشف ثلاث نتائج مهمة هي: أولاً: النمو في صالح الفقراء في تونس فقد استفادت العائلات من النمو في كافة أنحاء ومحافظات تونس. ثانياً: بالنسبة لمنحنيات الوقوع الاجتماعية المختلفة والتي استخدم التعليم فيها كمؤشر اجتماعي أكدت حقيقة أن النمو كان في صالح الفقراء. وتعني هذه النتيجة أن التعليم وتراكم رؤوس الأموال البشرية يعدان عاملان مهمان في عملية انخفاض معدل الفقر وخاصة في الأماكن الريفية. ثالثاً: يميل التحليل التجريبي إلى تأكيد وجود متقابلة شرطية وغير شرطية للفقر بين المناطق حيث تنمو المحافظات الفقيرة بسرعة أكبر (مع معدل نمو عالي في صالح الفقراء) بحيث تصبح قادرة على اللحاق بالمحافظات الغنية.

1. Introduction

Since achieving independence, Tunisia has deliberately chosen a development strategy based simultaneously on growth promotion and poverty alleviation. As a consequence, poverty has fallen dramatically, largely due to growth achievements which have provided jobs and resources for the government to spend on equity and poor households. Continued progress in poverty alleviation will nonetheless present some challenges. Poverty reduction becomes more difficult as poverty levels approach the extreme poor — those at the very bottom of expenditure distribution. Moreover, continued poverty reduction requires an adequate system for monitoring poverty developments and identifying the key target groups for public policy as they evolve.

In recent years, the term “*pro-poor growth*” has become pervasive in the discussions of development policies. However, despite the widespread use of this term there is not much consensus on the strict meaning of pro-poor growth¹. In fact, economic growth is seen as pro-poor according to Kakwani and Pernia (2000) if poverty is reduced by the change in income distribution. Ravallion and Chen (2003) adopt a broader definition where growth is pro-poor if the poverty measure decreases. In this paper, for pro-poor growth we adopt the definition developed by Ravallion and Chen (2003) and we apply the growth incidence curve (GIC) approach. The GIC measures the rate of growth in consumption between two points in time at each percentile of the expenditures distribution and it is estimated using household expenditures micro data. The rate of pro-poor growth (RPPG) is thus the average growth in consumption over the population up to the headcount index.

The GICs are estimated for the whole country, different governorates, as well as urban and rural areas during the period 1990-1995. The data is extracted from Household Consumption Surveys (HCS) carried out by the “Institut National de la Statistique” (INS). Other data is also provided by different issues of other official publications (Budget de l’Etat, Rapport de la Banque Centrale (BCT), Caisse Nationale de Sécurité Sociale (CNSS) and Commissariat de Développement Régional). The Datt-Ravallion (DR) decomposition of changes in the headcount index is also simulated for the different regions of the country.

The aim of the paper is to see if growth has been pro-poor in Tunisia either for the whole country or its different governorates. We also introduce non-monetary or social indicators for the analysis of pro-poor growth according to Grosse, Harttgen and Klasen (2006). We construct for that *unconditional* and *conditional* social incidence curves. The *unconditional* social incidence curve which classifies households according to education level and provides the rate of growth of this indicator for each percentile. In the *conditional* social incidence curve allows analyzing the distribution of education evolution along the consumption distribution. These two methods are important in poverty analysis since they present the advantage of seeing if very poor households in the monetary approach are the same in terms of education.

We also develop in this paper a convergence analysis in terms of poverty to check if a poor governorate (having a high poverty rate) tends to grow more rapidly (with a high pro-poor growth) than a rich governorate (i.e. the poor region will catch up with the rich one). This is similar to the concept of β -convergence developed by Barro et Sala-I-Martin (1990) in the case of GDP per capita convergence across countries.

¹The objective of pro-poor growth measures is to see if poor households benefit from economic growth. The Pro-poor growth is defined with two approaches. First, the *absolute* pro-poor growth studies if poor individuals have increased their income independently from the evolution of inequalities. Second, the *relative* pro-poor growth studies if poor households benefit more from growth than rich ones which tends to reduce inequalities.

This paper finds three main results. *First*, growth is pro-poor in the whole country as well as many governorates. This outcome means that poor households benefit from growth more than other components of the society. *Second*, public expenditures for social purposes play a crucial role in poverty reduction in the country. The different social incidence curves (SGICs) using education as a social indicator confirm the fact that growth is generally pro-poor. This result means that education and human capital accumulation are important factors in decreasing poverty especially in rural areas. *Third*, the empirical analysis tends to confirm the existence of conditional and unconditional convergence in terms of poverty between regions where poor governorates tend to grow more rapidly (with a high pro-poor growth) and to catch up with rich ones. This result means that economic growth also provides resources for the public treasury which permits creating jobs, finding sufficient resources to make social transfers and investing in public infrastructure in poor governorates.

The rest of the paper is organized as follows: Section 2 reviews growth and poverty trends in Tunisia. Section 3 presents the growth incidence curve and the headcount index decomposition in the whole country, urban and rural areas and governorates. In Section 4 we discuss the social growth incidence curve and in Section 5 we discuss the convergence in terms of growth between poor and rich governorates. Finally, Section 6 concludes the paper with some policy recommendations.

2. Growth and Poverty in Tunisia

At the early sixties, Tunisia was a poor country with a low income per capita. However, due to growth performances during the following decades, the average GDP rate was close to 5% over the period 1960-2000. However, the growth path was not stable because of local and international exogenous shocks and switches in economic policies implemented by the government. The economy benefitted from favorable oil shocks in the seventies, which gave the country bountiful financial resources due to the sharp rise in oil prices. These resources provided the state with possibilities to grant large fiscal incentives and subsidies to private and public enterprises.

The eighties featured a slowdown in economic growth — especially during the first half — due to political instability and bad economic management. During 1980-1990, the average GDP growth rate was just over 3%. However, the worsening economic conditions in 1986 pushed the government to adopt structural reforms of the economy. These reforms took a few years to provide beneficial effects. Indeed, the cost of macroeconomic stabilization and structural adjustment was small since economic growth declined from 3.7 % in the first half of eighties to 3 % in the second half.

The first half of the nineties, which corresponds to the period of poverty analysis in this paper, featured a recovery of the economy despite some climate difficulties that affected the agricultural sector. The GDP per capita rose by about 1.2 % during the period 1990-1995. The second half of the nineties (1996-2000) saw a rapid growth in per capita income, spurred by exports, and the average rate reached more than 4% per annum — the highest rate since the seventies.

These growth achievements over the last four decades have been accompanied with a significant reduction in the incidence of poverty. The growth strategy has targeted, among other things, a substantial decrease in poverty through an active participation in the labor market (mainly labor intensive industries with a substantial female participation and export oriented manufacturing) and an improvement in education quality and productive assets accumulation. In addition, public authorities implemented social policies² that were efficient

² Such as “fighting underdevelopment program (1956-1972)” , “the rural development program (1973-1983)” and other special programs (the national solidarity fund (1993) and national solidarity bank (1998)).

in reducing poverty. The average rate of public expenditures to fight poverty (with respect to total current receipts) was close to 15 % during the period 1973-1996 and the rate of social transfers (in % of GDP) was close to 20 % in 1995. As a consequence, poverty declined substantially³ from more than 30 % in the mid-sixties to about 4 % in 2000.

3. The Monetary Growth Incidence Curve (MGIC) and the Headcount Index Decomposition

3.1 The Monetary Growth Incidence Curve (MGIC) and Pro-poor Growth Rates

The GIC has been proposed by Ravallion and Chen (2003). It is estimated on the basis of household expenditures micro data, and it measures the rate of growth in consumption between two points in time for each percentile of the expenditures distribution. Ravallion and Chen (2003) define the RPPG as follows:

$$RPPG = \int_0^{H_t} g_t(p) dp / H_t \quad (1)$$

Where $g_t(p)$ is the rate of growth of per capita real consumption expenditures for the percentile p of the distribution and H_t the headcount index at the initial point in time (t). The *RPPG* is the area under the GIC up to the headcount index. It is also the average growth in consumption over the population up to the headcount index. Consumption is considered as the best well-being indicator since the monetary income evolution is randomly distributed and may hold more error measures.

The GICs are estimated for the whole country and the different governorates as well as urban and rural areas for the period 1990-1995 based on the HCS for 1990 and 1995. The samples are composed of 2640 and 2505 households in 1990 and 1995 respectively (the definition of variables and sampling methods are identical). The surveys provide food and non-food agricultural expenditures and socio-demographic features of each household (size, age of household head, his education level, socio-professional classes, residence area ...). However, it is still impossible to exploit the surveys of 2000 and 2005 carried out by the INS because of information retaliation motives⁴.

Table 1 shows that for the whole country the different RPPGs are positive and decreasing for the whole country and rural areas, however, they are particularly high and increasing in rural areas. This result means that inequalities tend to be reduced between urban and rural areas.

For the different governorates, (Table 2) real growth is pro-poor for 20 % of poor population in many governorates with the exception of Bizerte, El Kef, Sousse, Gafsa and Tozeur. In the governorates of Zagouhan, Jendouba, Médenine, Kébili and Tataouine — with higher poverty concentration — the RPPGs are high in general which allows reducing the poverty gap between poor and rich governorates. Nevertheless, in some other governorates, even with some having high poverty rates, the RPPGs are weak and even negative which extends the poverty gap.

In addition, the rich governorates with lower poverty concentration like Ariana, Bizerte, Sousse and Sfax also have weak and negative rates. However, the exception is Monastir and Mahdia which are considered as relatively rich with low poverty concentration. They recorded the highest RPPGs which improved their ranking with respect to other governorates.

³ The time comparisons are made with caution because of the nature and quality of household expenditures surveys.

⁴ Due to data availability on prices, we do not use a consumer price index to deflate individual consumption in carrying out regional poverty analysis.

The performance of these governorates is accounted for mainly by the development of textile industries considered intensive in female labor force.

These results show that we have convergence in terms of poverty between governorates where those with high poverty concentration converge toward those with weak poverty concentration. This fact may explain the reduced inequalities between the different regions of the country.

Figures 1, 2 and 3 in the appendix display the GICs for the whole country and for urban and rural sectors. Indeed in Figure 1 the GIC is a decreasing function featured by high growth rates of the first percentiles of the population. The growth rate remains positive until the last percentile which means that the different income groups of the population have benefitted from growth with the exception of the highest income group. Accordingly, growth has not only been pro-poor according to absolute poverty definition, but has also been accompanied by a substantial decrease in social inequalities.

The monetary growth incidence curve for urban areas (Figure 2) is in line with the results of pro-poor growth for the whole country. The rate of growth is positive until the 8th percentile. The curve is decreasing for poor households yet it is increasing between the 2nd and 4th percentiles after which it regains its decreasing slope. Growth is therefore pro-poor in the urban areas and poor households highly benefit from real growth and wealth distribution (at the same time). Although the households of the 2nd, 3rd and 4th percentiles certainly benefit from growth (positive rate of growth), they experience more unequal distribution of income (decreasing slope).

In rural areas (Figure 3), real growth is pro-poor in absolute terms since the rate of growth is positive for the different income groups. However, the slope is fluctuating which means that poor households benefit from real growth but the wealth distribution varies according to the level of consumption with weak amplitude. This fact may be accounted for by income fluctuations in agricultural activities. The evolution of growth rates in the whole country between the percentiles is important with respect to urban and rural areas. The result may be explained by migration income transfers from urban to rural areas.

At the regional level, Tunisia is divided into six regions⁵ which are North East (NE), North West (NW), Center East (CE), Center West (CW), South East (SE) and South West (SW). Poverty is more concentrated in the North West, Center West and South West. Table 1 shows that poverty incidence has decreased in different regions but with non-linear and heterogeneous proportions. The North West and Center West regions have seen a dramatic decline in poverty during the period 1980-2000, whereas poverty remained stable in the South West. Moreover, the metropolitan area of Tunis featured the lowest poverty incidence with a headcount of only 1%.

The growth incidence curves (GICs) for the different governorates (Figures 4 to 23 in the appendix) show that real growth is pro-poor in relative and absolute terms in the governorates of Tunis, Zaghuan, Mahdia and Gabès. However, in the governorates of Ben Arous, Béja, Siliana, Nabeul, Jandouba, Kébili, Médenine, Tataouine and Monastir growth is only pro-poor in absolute terms (positive rate of growth). For the governorate of Ariana which belongs

⁵ The different regions are :

North East region: Tunis, Ariana, Ben Arous, Nabeul and Bizerte;

North West region : Béja, Jendouba, Le Kef, Siliana and Zaghuan;

Center West region : Kairouan, Kasserine, Sidi Bouzid and Gafsa;

Center East region : Sousse, Monastir, Mahdia and Sfax;

South West region : Tozeur, Kebili, Tataouine, Gafsa and Tataouine;

South East region : Gabes, Medenine.

to the greater Tunis area, real growth is pro-poor (weak percentiles) but is not in favor of rich households (higher percentiles). Inversely, In Sousse, Tozeur and Gafsa, growth has not been in favor of poor households but their situation has deteriorated less than wealthy persons.

Real growth is found to be only pro-poor households in the governorates of Bizerte and El Kef and neutral (neither pro-poor nor pro-rich households) in the governorate of Sfax, since the rate of growth of consumption fluctuates around zero.

3.2 Decomposition of Changes in the Headcount Index

Datt and Ravallion (1992) proposed a decomposition of changes in the headcount index in three components. *First*, a growth component which measures the change in poverty if the Lorenz curve has not been modified (constant redistribution). *Second*, a redistribution component which evaluates the change in poverty due to a shift of the Lorenz curve (average constant income). *Third*, a residual component which measures the interaction between growth and redistribution effects. The Datt and Ravallion decomposition enables us to determine growth and redistribution effects after a change in poverty. The individual expenditures are deflated by the consumer price index.

For the whole country as well as urban and rural areas (Table 3) there is a decline and the correlation between redistribution and poverty reduction is confirmed. In addition, poverty reduction is accounted for mainly by the redistribution effect at urban and national levels⁶ and growth and redistribution effect in rural areas.

At the regional level (Table 4), the poverty variation decomposition reveals that poverty increased in Tunis, Bizerte, El Kef, Sousse, Gafsa and especially Tozeur. In this latter governorate, the rise in poverty rate is explained by the weakness of the redistribution effect which does not compensate for the positive growth effect. However, in the governorates of Zaghouan and Jandouba poverty significantly declined because of the growth effect. In the governorates of Ariana, Sfax and Gabès, the decline in poverty is due to the redistribution effect which is more important than the growth effect. Finally, the decrease in poverty in Zaghouan, Siliana, Monastir, Mahdia and Médenine is accounted for simultaneously by growth and redistribution effects.

In 1995, the agricultural activity witnessed a sharp decrease in production mainly in governorates where the principal activity is based on cereals, which in turn influenced poverty. However, the income redistribution has paid off the poverty incidence with transfers of national and international migration, antipoverty policies.

4. The Social Growth Incidence Curve (SGIC)

The recent literature has introduced non-monetary or social indicators for the analysis of pro-poor growth. In fact, based on Grosse, Harttgen and Klasen (2006), we have constructed social incidence curves according to two methods. We have implemented, in a first step, the *non-conditional* social incidence curves which classify persons according to education and provide the rate of growth of this indicator for each percentile. It allows measuring the evolution of the education measure according to its distribution. Accordingly, the very poor percentile has the very weak education average.

In a second step, we represent the *conditional* social incidence curves where we classify the households according to a monetary indicator i.e. real consumption on the X axis and the growth rate of the social indicator (education) for each percentile on the Y axis. Accordingly, the conditional curve allows us to analyze the distribution of education evolution along the

⁶ This result may explain how the average rate of growth of GDP per capita during the period 1990-1995 is pro-poor.

consumption distribution. These two methods are important in poverty analysis since they have the advantage of seeing if very poor households in the monetary approach are the same in terms of education. In poverty analysis, we use several social indicators such as the average education level, childhood malnutrition and mortality. In this paper, because of the lack of data, we use the average levels of education for both children and adults.

There is a high correlation between education and poverty in Tunisia. In 2000, about 61.6% of poor household heads are illiterate, 33.7% have primary education and only 4.8% have reached the secondary school. Moreover, 56 % of the population in the first percentile has no education, 39% have a primary level of education and 5 % a secondary level. The household heads of higher percentiles relative to rich ones have a higher level of education. The percentage of family heads having higher education is now increasing with respect to the distribution of the population for each percentile of consumption level as shown in Table 5 in the appendix.

4.1 The Non-conditional Social Incidence Curve

The different households are classified according to their education level after which we compute the average growth rates for each percentile. Figures 24 to 27 underline the unequal distribution of these social indicators inside the population and between urban and rural areas.

In the growth incidence curves relative to the education level of young and adult population, the growth rates of weak percentiles are absent. This fact may be accounted for by the fact that most poor household heads have no education at the initial period.

The incidence curve of the education of young population for the whole country has a decreasing slope with the exception of the middle percentiles where the slope is close to zero. This result means that growth is pro-poor in absolute and relative terms. For urban and rural areas, the incidence curves confirm the former results of pro-poor growth in absolute terms. However, fluctuations in these latter curves do not provide a clear cut answer for the effect of growth on income inequality.

For the education of the adult population, the incidence curve for the whole country shows that the sample contains an increasing number of poor adults with no education at all in 1990. Moreover, almost 50 % of the household heads of the sample have no education at the beginning of the period. A deeper analysis of the curve shows also that growth rates for rich households are positive and decreasing which means that they have benefitted from real growth in absolute and relative terms. The evolution of incidence curves in urban and rural areas features a pro-poor growth in absolute terms. However, growth rates are higher in urban areas and the percentage of illiterate households at the initial period is higher in rural than urban areas.

4.2 Conditional Social Incidence Curve

We display the conditional growth incidence curve where households are classified according to their consumption levels. These curves are more volatile than unconditional ones. The education level, especially for young population, has increased only for poor percentiles. For the whole country, the results confirm the improvement of the social indicator for poor percentiles. In urban and rural areas, real growth has decreased the inequalities since the social indicator had improved in the case of poor and rich households in rural areas whereas it had declined in the urban ones.

5. Regional Poverty Convergence

The convergence analysis developed in the paper is based on the intuition that a poor governorate (having a high poverty rate) tends to grow more rapidly (with a highly pro-poor growth) than a rich governorate in such a way that makes poor region catch up with the

poverty rate of rich one. This is similar to the concept of β -convergence developed by Barro and Sala-I-Martin (1990) in the case of GDP per capita convergence across countries.

5.1. Absolute or Non-conditional Convergence

We have absolute β -convergence when it depends only on initial conditions. In this case testing convergence is carried out by estimating the relationship between PPGR and the initial poverty rate. The estimated equation is the following one:

$$PPGR_{i, 1995-1990} = a + b PR_{i, 1990} + \varepsilon_i \quad (2)$$

Where $PPGR$ is the pro-poor growth rate, PR is the poverty rate, ε is the error term and finally a and b are parameters. A positive estimated coefficient b implies the convergence between governorates in terms of poverty: those which start with high initial poverty rates tend to have high pro-poor growth. When b is equal to unity ($b = 1$) we have a perfect convergence. However, we have divergence between governorates in terms of poverty when b is negative. Two pro-poor growth rates are introduced in the empirical investigation: the pro-poor growth rates of the two first percentiles ($PPGR_{20}$) (20% of very poor population) and the average pro-poor growth rate ($APPGR$). The different estimates with these dependant variables are presented in Table 9.

The first estimation of equation (2) in Table 9 seems to indicate the existence of an imperfect convergence between governorates in terms of poverty since the coefficient of the poverty rate is positive and significant at a 5 % risk level. The result means that poor governorates have benefitted more than rich ones from growth. Figure 36 tends to confirm this finding since the relationship between the PPGR and the initial poverty rate is positive. The second regression in Table 9, where the $APPGR$ is the dependant variable, is similar to the preceding one and tends to confirm the regional convergence hypothesis too. The coefficient associated to the initial poverty rate is weak but positive (0.302) and significant at the 99 % confidence level. Figure 37 shows that the initial poverty rate is positively correlated with the average growth rate.

5.2. Conditional Convergence

The conditional convergence depends on special features of each governorate. Among the local factors having potential incidence on pro-poor growth that should be taken into consideration in testing conditional convergence we have human resources, infrastructure, the number of created companies, regional policies, transfer of funds from urban areas, unemployment and fiscal advantages offered by poor governorates.

To test the conditional β -convergence hypothesis we use the same specification as in equation (2) augmented with other determinants of pro-poor growth as follows:

$$PPGR_{i, 1995-1990} = a + b PR_{i, 1990} + cX_i + \varepsilon_i \quad (3)$$

Where X_i represents a vector of variables influencing pro-poor growth (human capital, investment rate, public infrastructure, social expenditures to fight poverty ...). However because of the lack of data in some governorates, we use the enrolment rate for students whose age is ranging between 6 and 14 years as a proxy of human capital. As a measure of public infrastructure we use the power connection rate (the average for 1990-1995) and the drinking water connection rate (the average for 1990-1995)⁷. We introduce also in the X_i vector a dummy variable that reflects the sample heterogeneity, that takes the value of 1 in rich coastal governorates and 0 in governorates inside the country.

⁷ Migration is not present as a determinant of pro-poor growth because it is not reported in the surveys of 1990 and 1995.

Table 10 displays the output of the different OLS regressions⁸ of equation (3). These estimations tend to confirm the existence of conditional β -convergence between governorates in terms of poverty, since the coefficient of initial poverty rate is significant at the 1 % risk level. This result means that poor governorates have benefitted more from growth than rich ones. The estimated value of β is higher than in the case of absolute convergence (0.8 with respect to 0.25). This fact may be accounted for by the determinants of pro-poor growth introduced which have permitted to differentiate governorates having different development levels.

The rest of the variables reflecting the effect of the education policy and public infrastructure enter with significant coefficients in the dynamic process of conditional convergence. The coefficient of enrolment rate is positive and significant which means that education raises growth and diminishes poverty. Likewise, the coefficients of public infrastructure, as proxied by power connection rate and drinking water connection rate, are positive and significant which tends to confirm the role of public policy in reducing poverty.

Finally, the dummy variable, introduced to take into account the heterogeneity between rich coastal governorates and those inside the country, enters also with a positive and significant coefficient at the 5 % level. This result means that coastal governorates are likely to contribute to pro-poor growth more than the other ones.

6. Conclusion and Policy Recommendations

In the last four decades, Tunisia has achieved a good growth performance which caused a significant reduction in poverty. In this paper we have shown that, *first*, growth has been essential for poverty reduction of households in the whole country as well as in many regions and governorates. *Second*, the different social incidence curves (SGICs) — using education as a social indicator — confirm the fact that growth was generally pro-poor. This result means that education and human capital accumulation have been important factors in decreasing poverty especially in rural areas. *Third*, the empirical analysis tends to confirm the existence of conditional and unconditional convergence in terms of poverty between regions where poor governorates tend to grow more rapidly (with a high pro-poor growth) and to catch up with rich ones.

However, in spite of these achievements, the government is called on to maintain its commitment to fighting poverty. This can be achieved through the development of labor intensive industries, public infrastructure and services in urban as well as in rural areas. The poverty reduction effort also needs the strengthening of social policies and public programs destined to help needy families. Finally, easing official migration to European countries is likely to reduce poverty through an agreement on services liberalization and labor mobility with EU. External migration has for a long time been an important factor in reducing poverty through easing pressure on the local job market and income transfers and remittances.

However, other challenges lie ahead especially with rapid transformations of the international environment (dismantling of the Multi Fibre Agreement, the rise in the prices of energy and cereals, and broadening Europe). The rise of oil and cereal prices has increased the amount of subsidies destined to help poor households which may represent a threat for social policies to fight poverty.

⁸ We are constrained to achieve regressions with a low number of observations (19) due to data limitations.

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Appendix (1): The Growth Incidence Curves (GICs)

Figure (1): The Growth Incidence Curve in Tunisia, National Level (1990-1995)

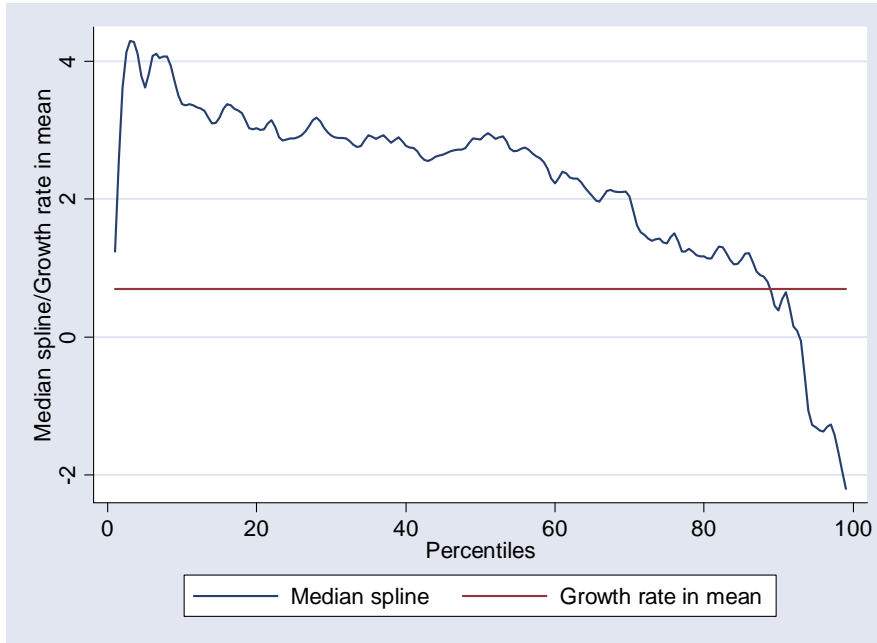


Figure (2): The Growth Incidence Curve in Tunisia, Urban Area 1990-1995

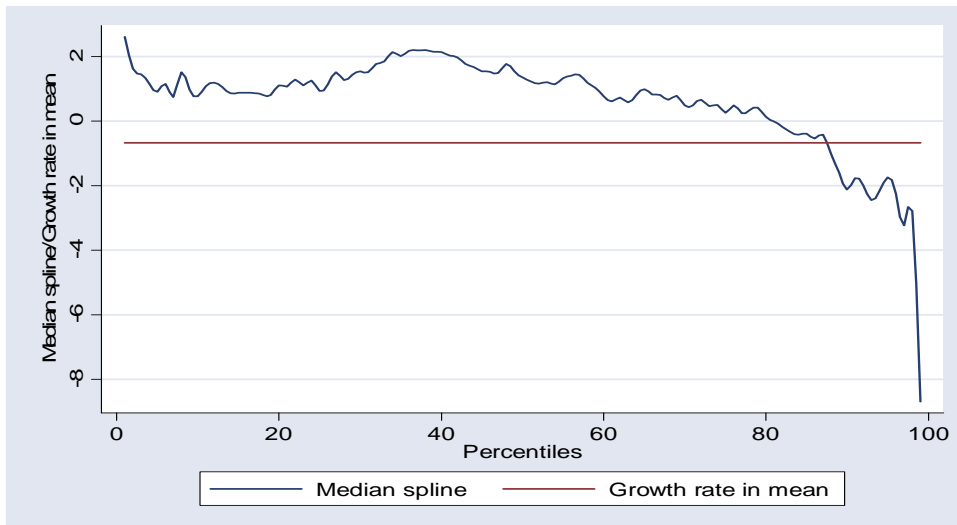


Figure (3): The Growth Incidence Curve in Tunisia, Rural Area 1990-1995

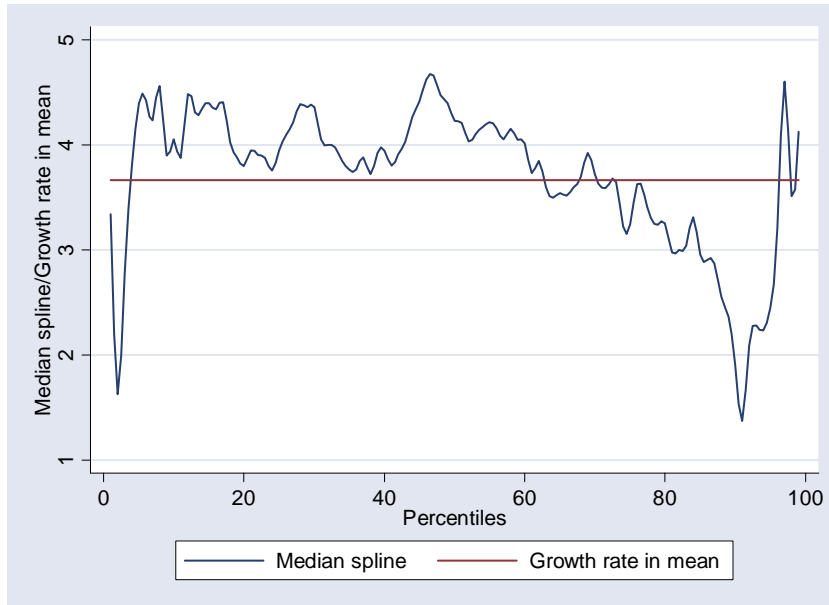


Figure 4 : The Growth Incidence Curve, Governorate of Tunis, 1990-1995

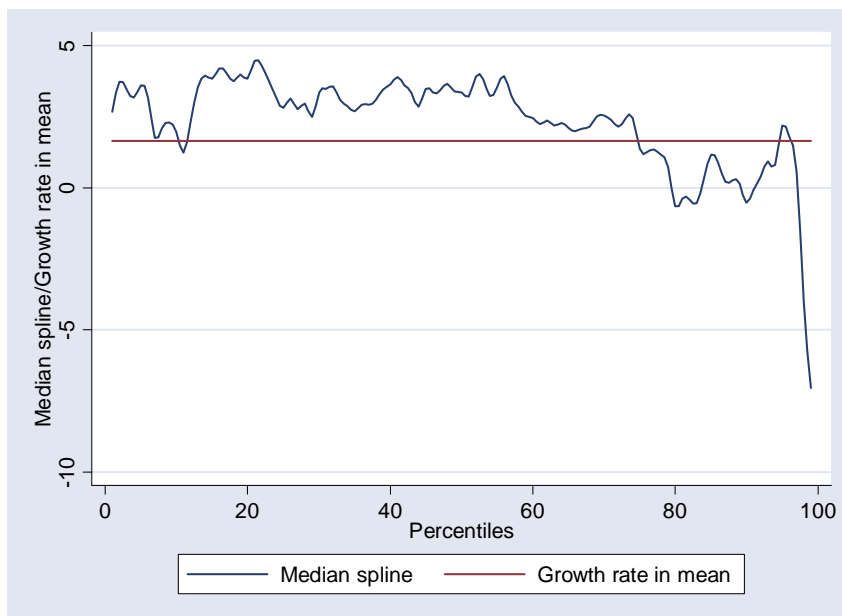


Figure 5 : Growth Incidence Curve, Governorate of Ariana 1990-1995

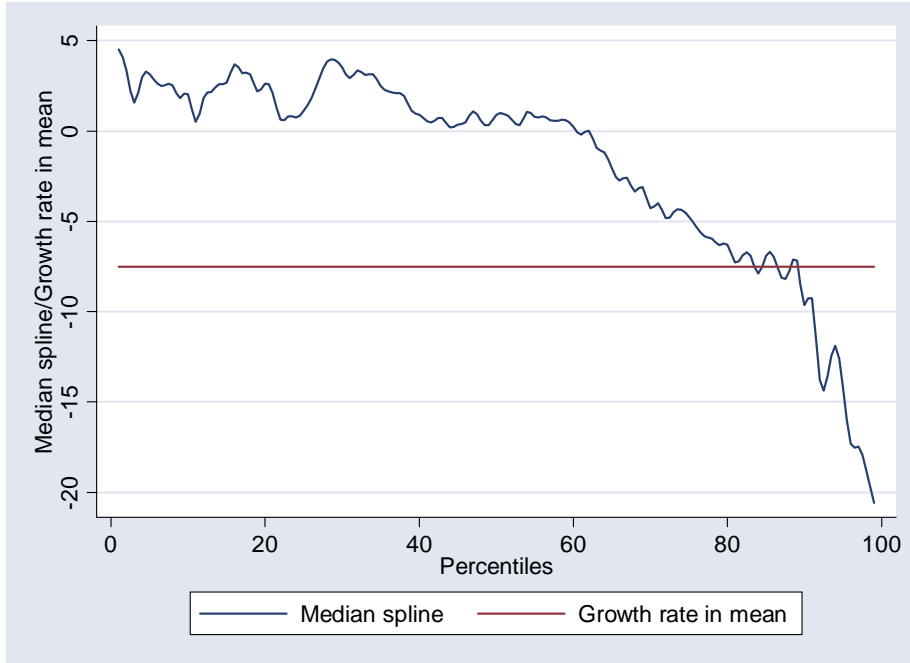


Figure 6 : Growth Incidence Curve, Governorate of Ben Arous, 1990-1995

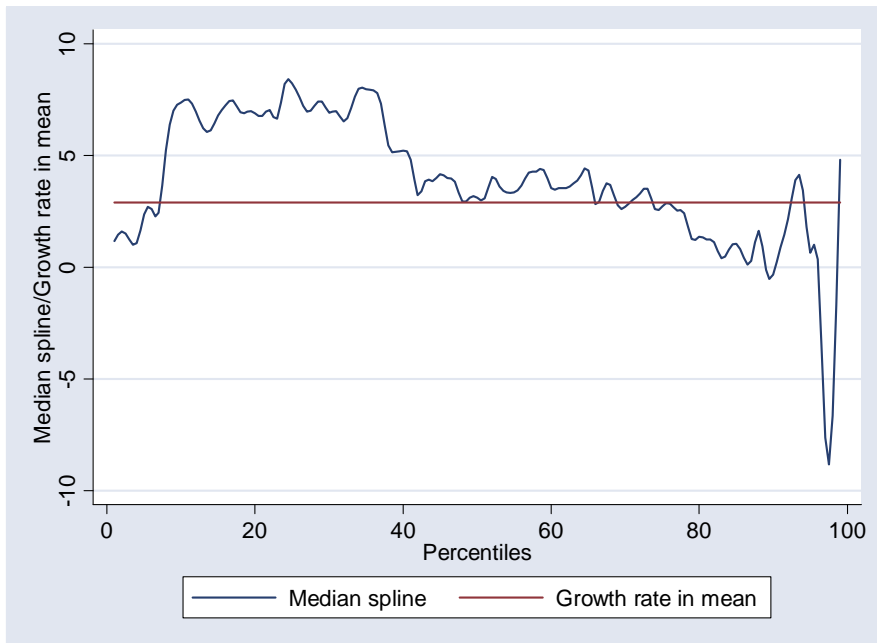


Figure 7 : Growth Incidence Curve, Governorate of Nabeul 1990-1995

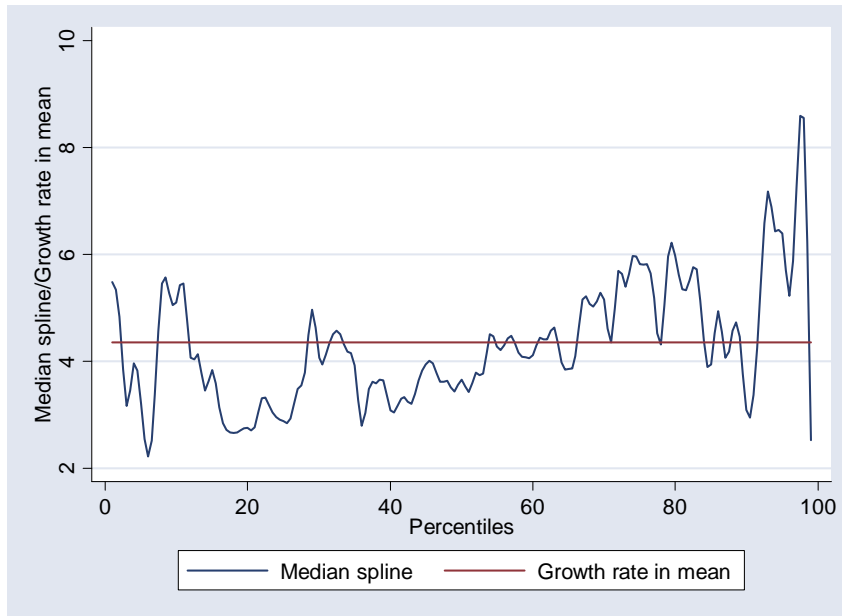


Figure 8 : Growth Incidence Curve, Governorate of Zaghouan (1990-1995)

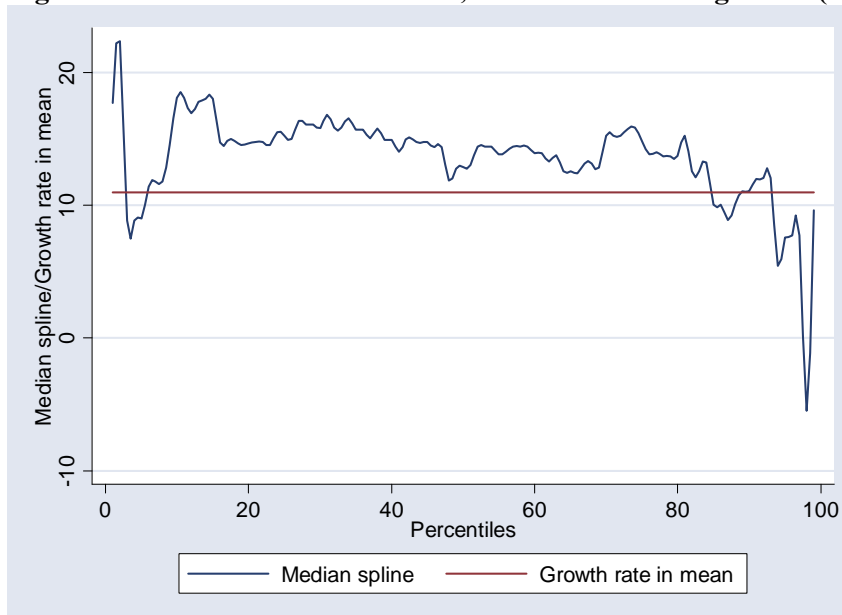


Figure 9 : Growth Incidence Curve, Governorate of Bizerte (1990-1995)

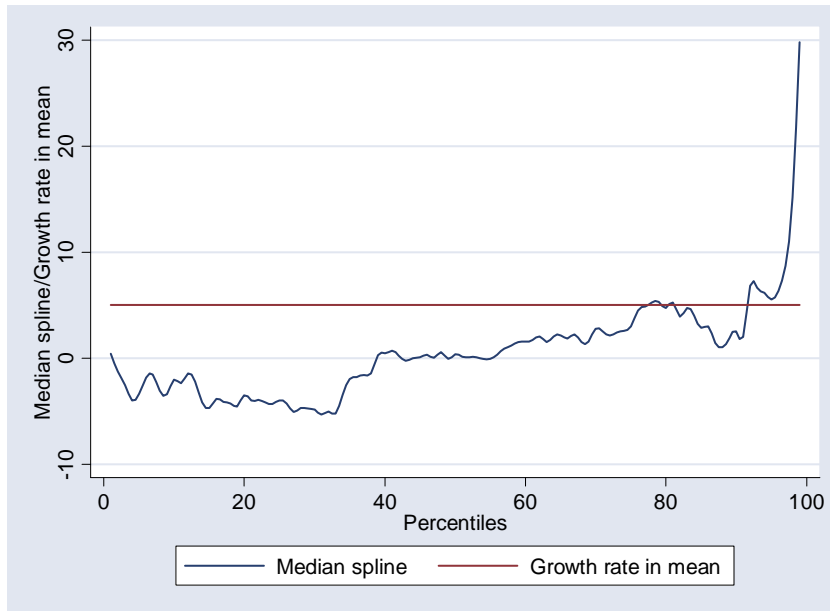


Figure 10 : Growth Incidence Curve, Governorate of Beja (1990-1995)

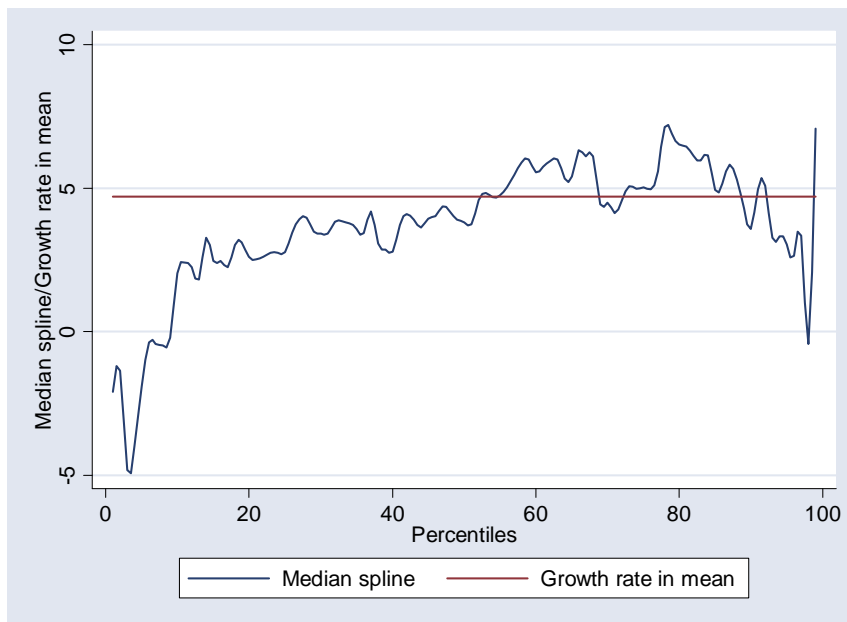


Figure 11 : Growth Incidence Curve, Governorate of Jandouba (1990-1995)

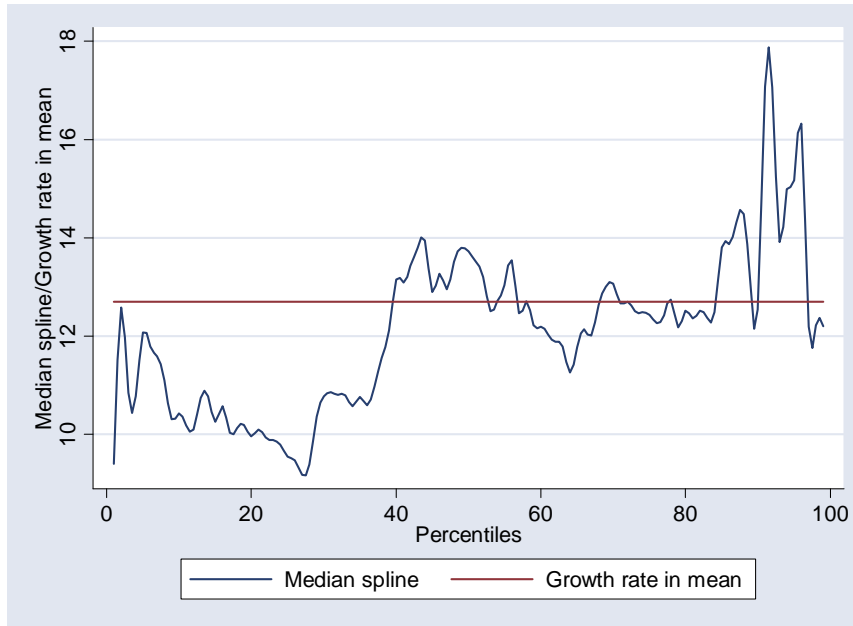


Figure 12 : Growth Incidence Curve, Governorate of El Kef (1990-1995)

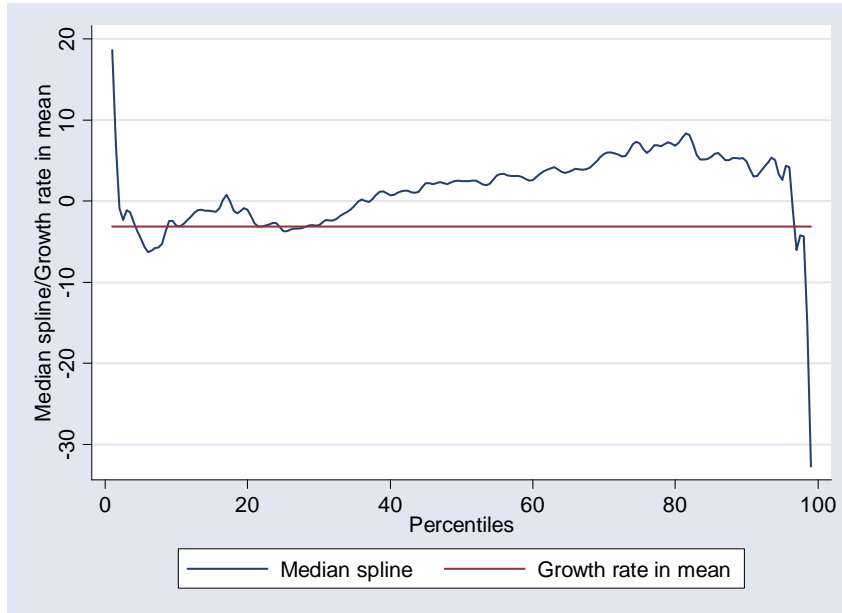


Figure 13 : Growth Incidence Curve, Governorate of Siliana (1990-1995)

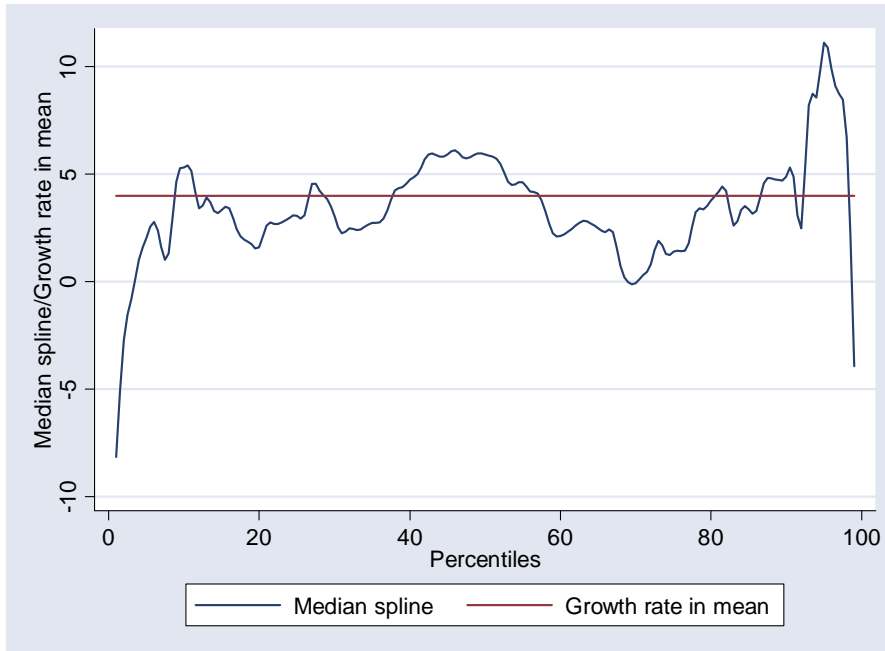


Figure 14 : Growth Incidence Curve, Governorate of Sousse (1990-1995)

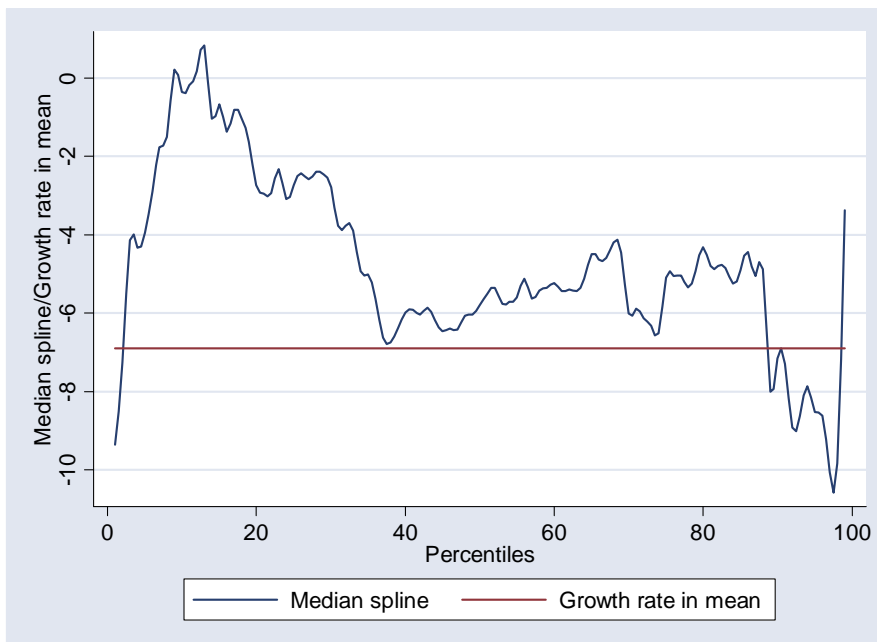


Figure 15 : Growth Incidence Curve, Governorate of Monastir (1990-1995)

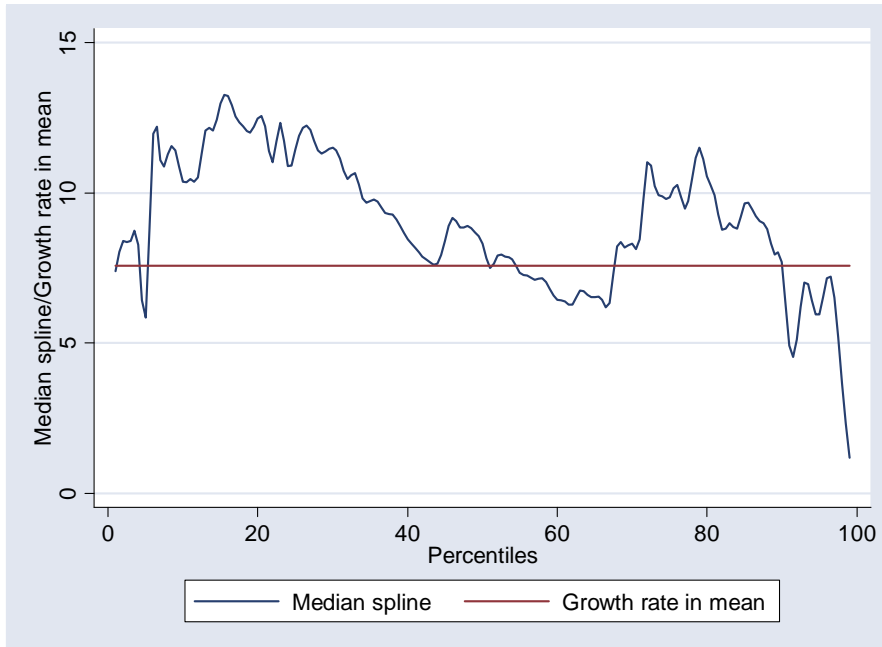


Figure 16 : Growth Incidence Curve, Governorate of Mahdia (1990-1995)

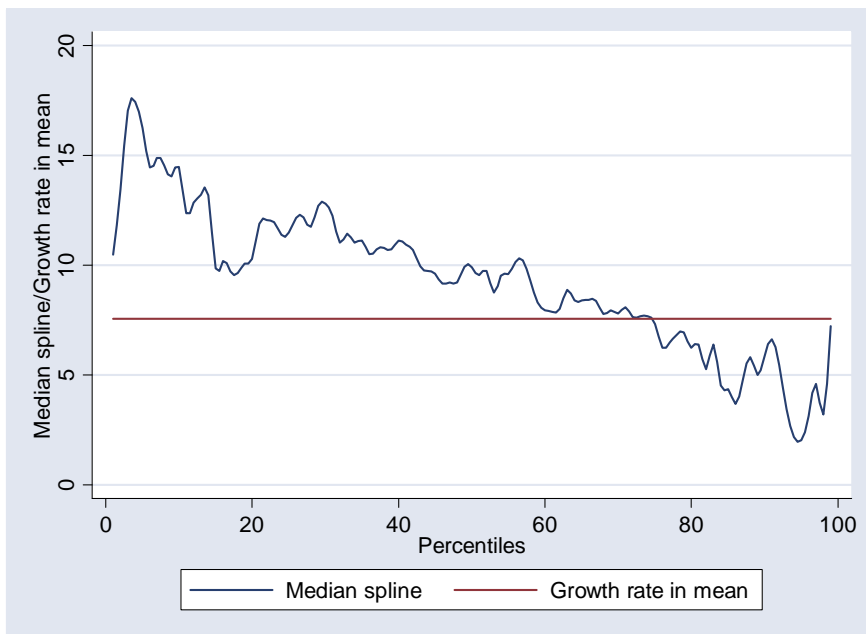


Figure 17 : Growth Incidence Curve, Governorate of Sfax (1990-1995)

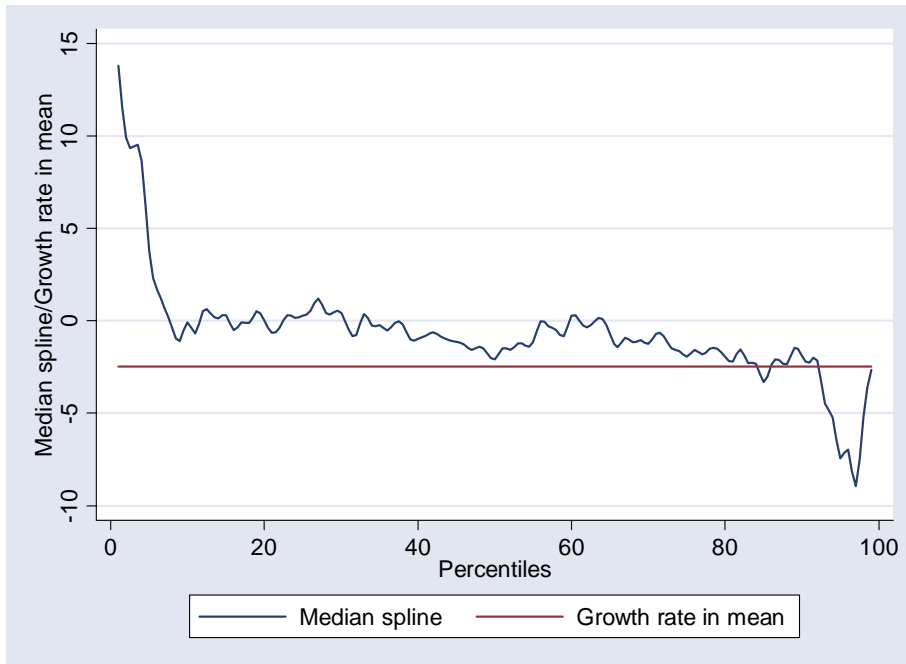


Figure 18 : Growth Incidence Curve, Governorate of Gafsa (1990-1995)

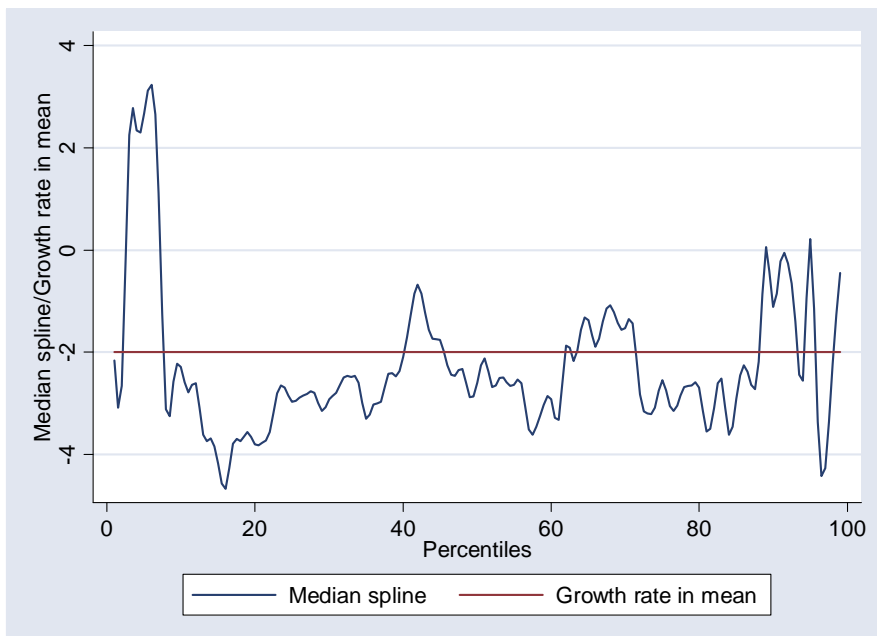


Figure 19 : Growth Incidence Curve, Governorate of Tozeur (1990-1995)

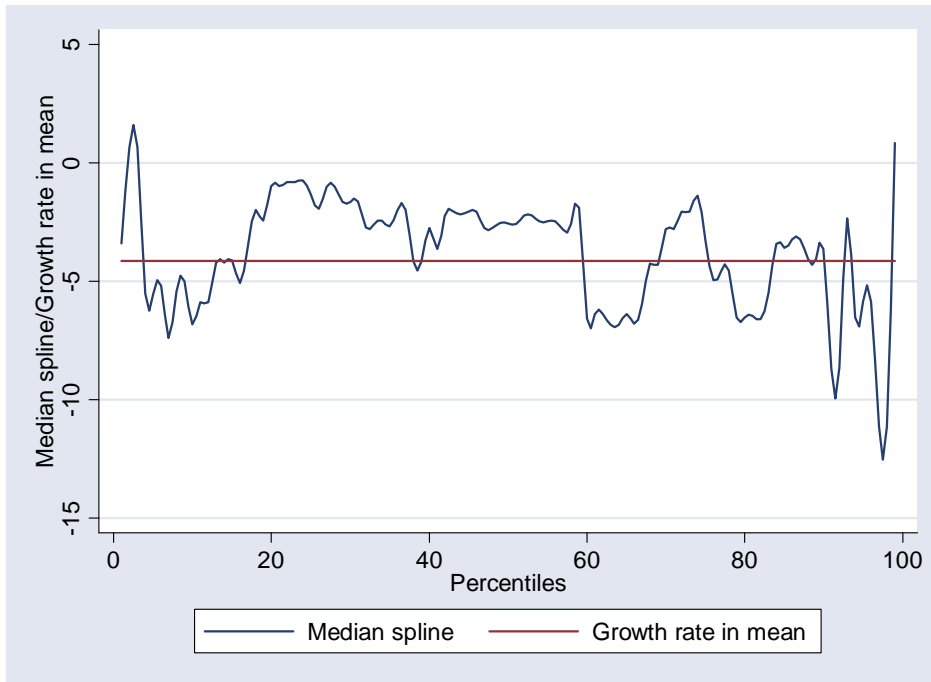


Figure 20 : Growth Incidence Curve, Governorate of Kébili (1990-1995)

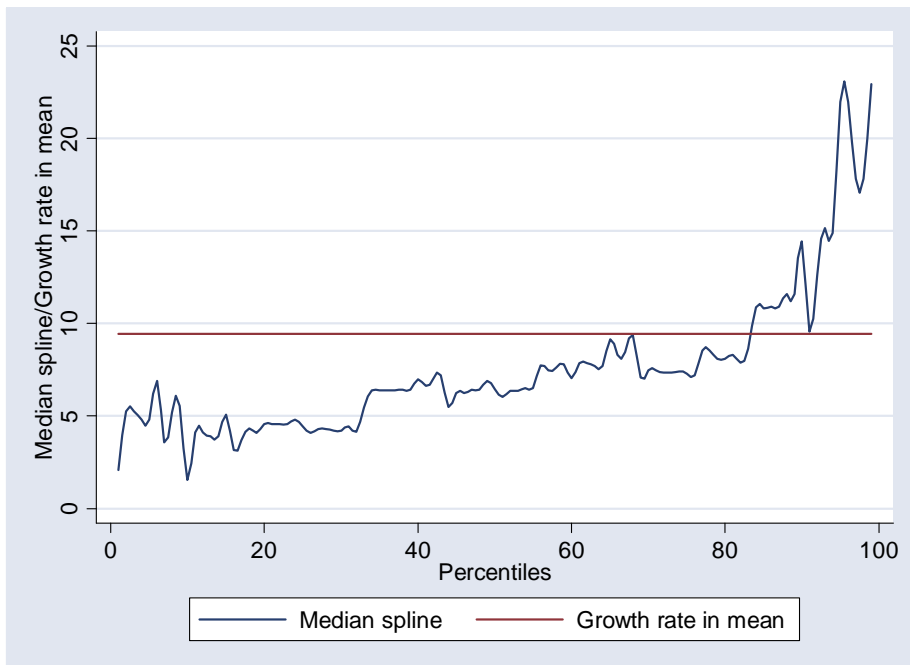


Figure 21 : Growth Incidence Curve, governorate of Gabès (1990-1995)

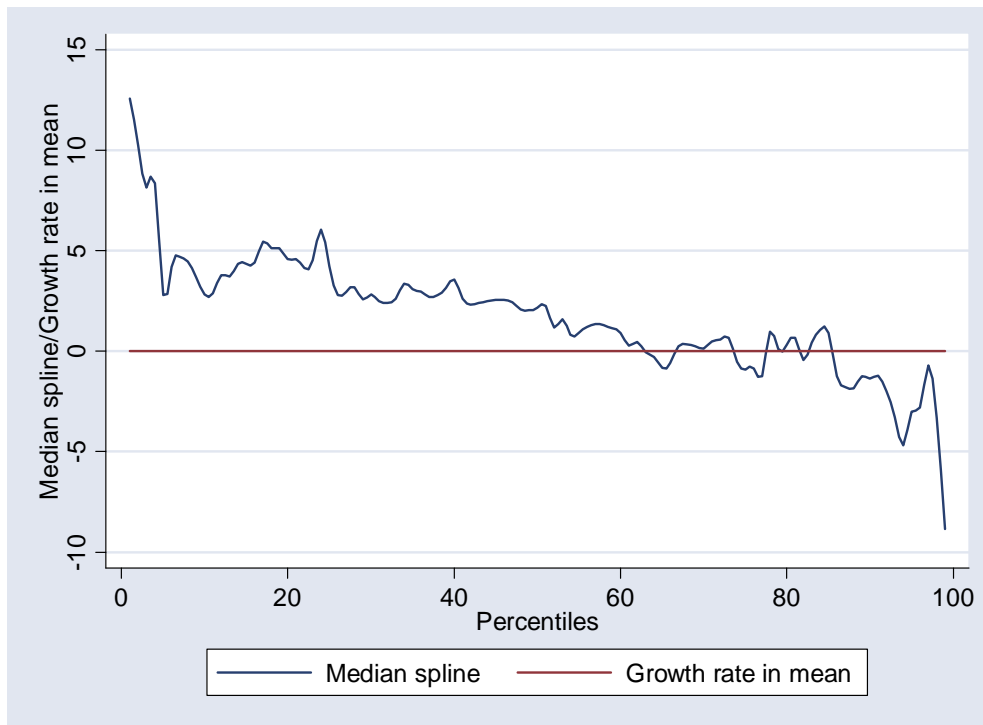


Figure 22 : Growth Incidence Curve, Governorate of Médenine (1990-1995)

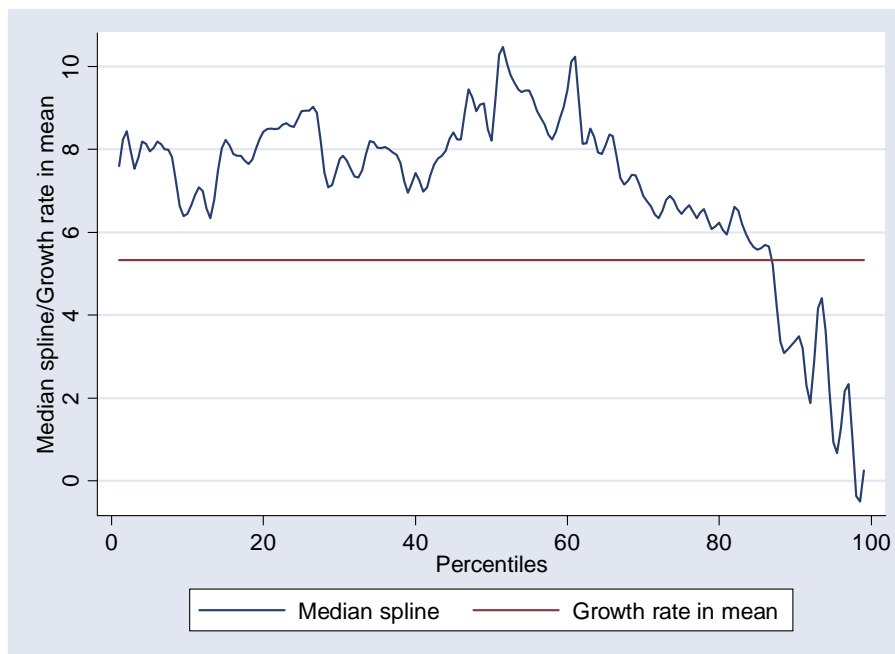
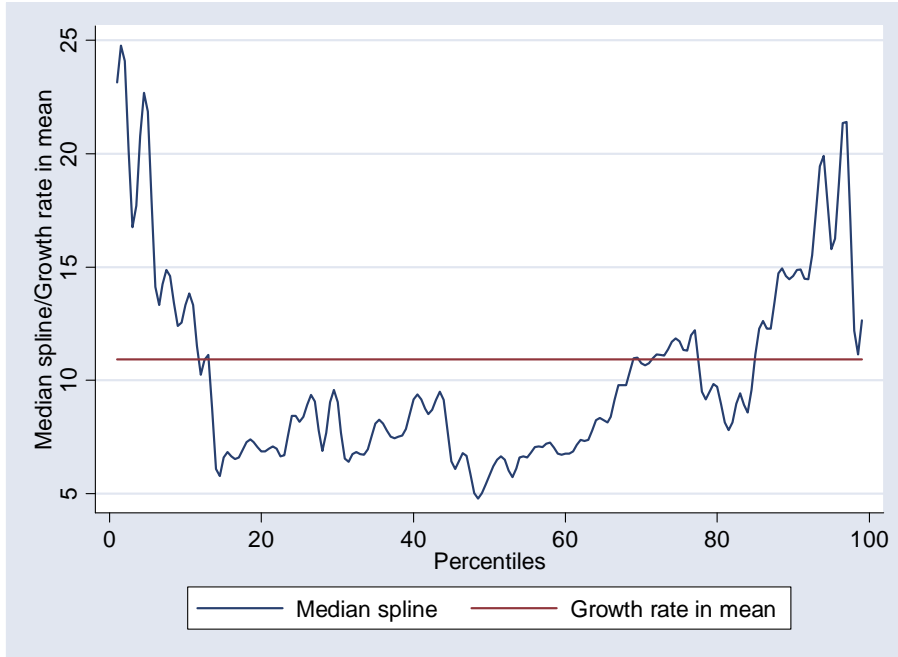


Figure 23 : Growth Incidence Curve, Governorate of Tataouine (1990-1995)



Appendix (2): The Social Growth Incidence Curves (SGICs)

Figure 24: Social Growth Incidence Curve, 1990-1995 (education level of young population)

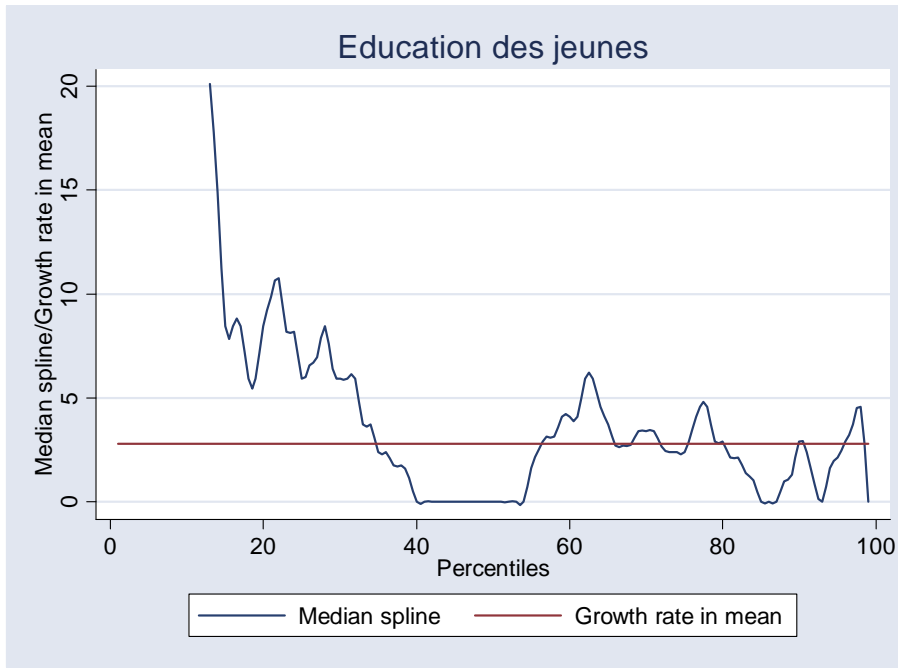


Figure 25: Social Growth Incidence Curve, 1990-1995 (education for young population in the urban sector)

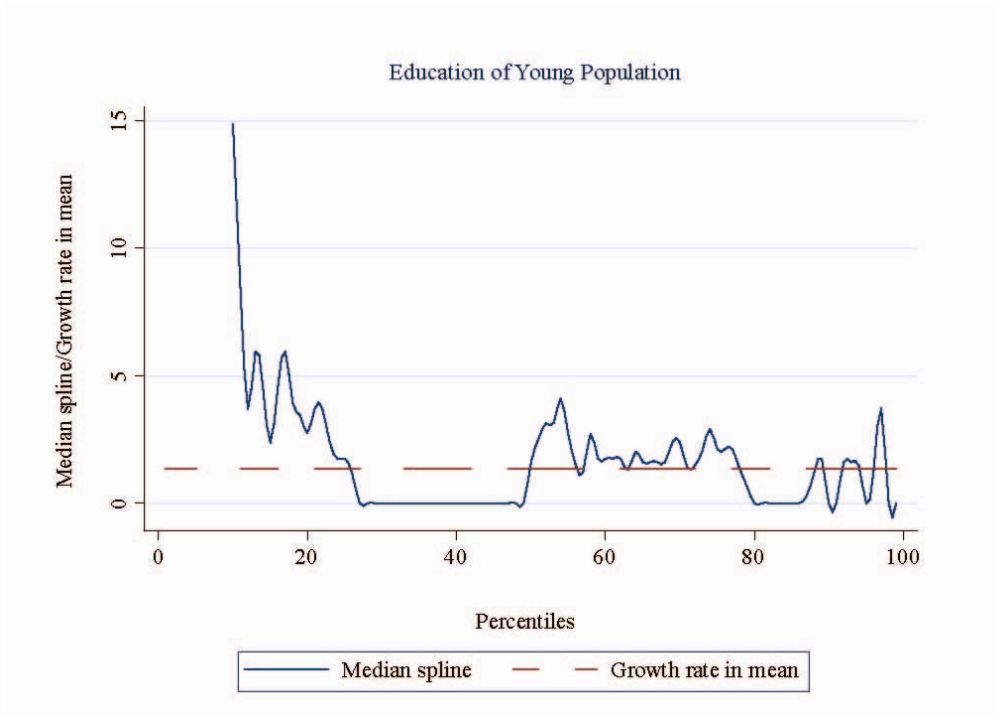


Figure 26: Social Growth Incidence Curve, 1990-1995 (education level of young population in the rural sector)

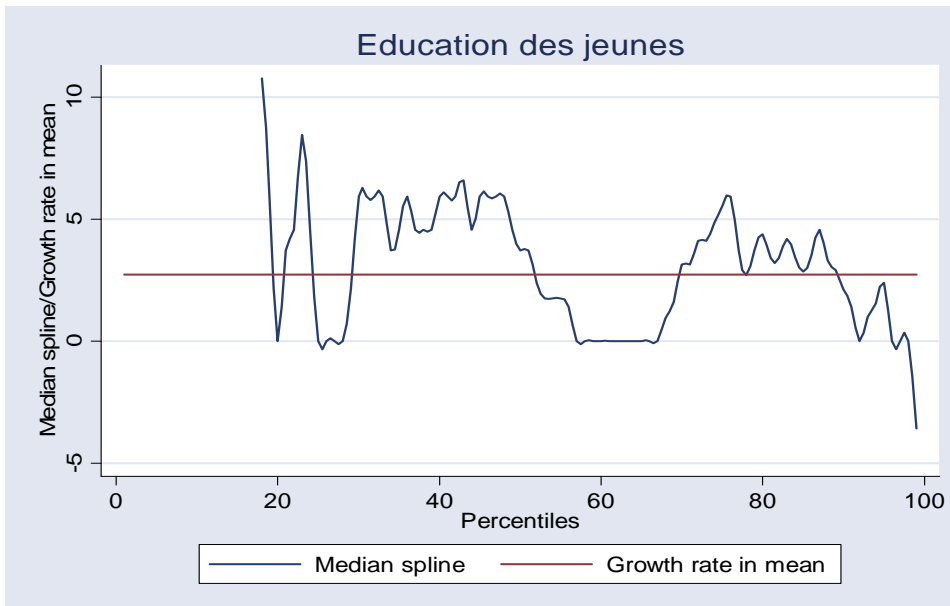


Figure 27: Social Growth Incidence Curve, 1990-1995 (education level of adult population)

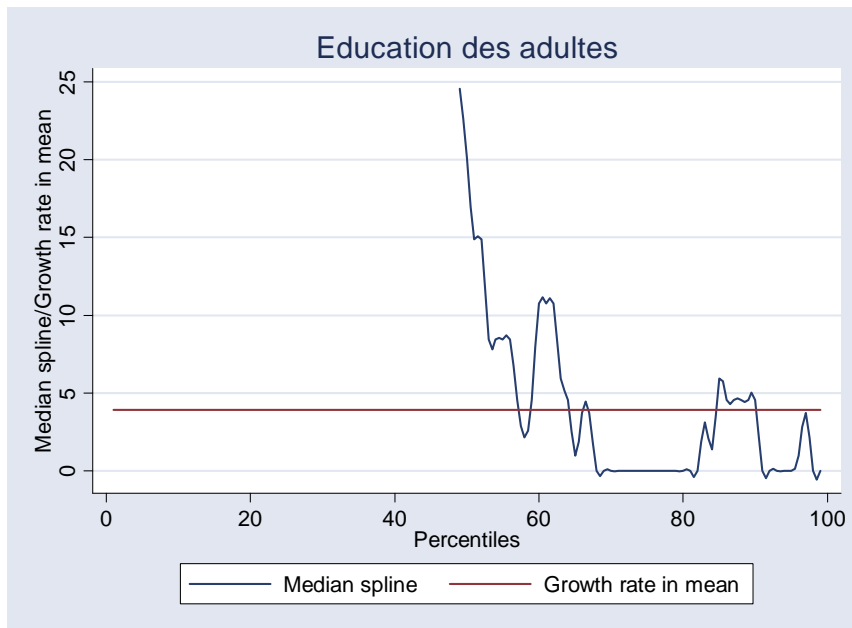


Figure 28: Social Growth Incidence Curve, 1990-1995 (education level of adult population in the urban sector)

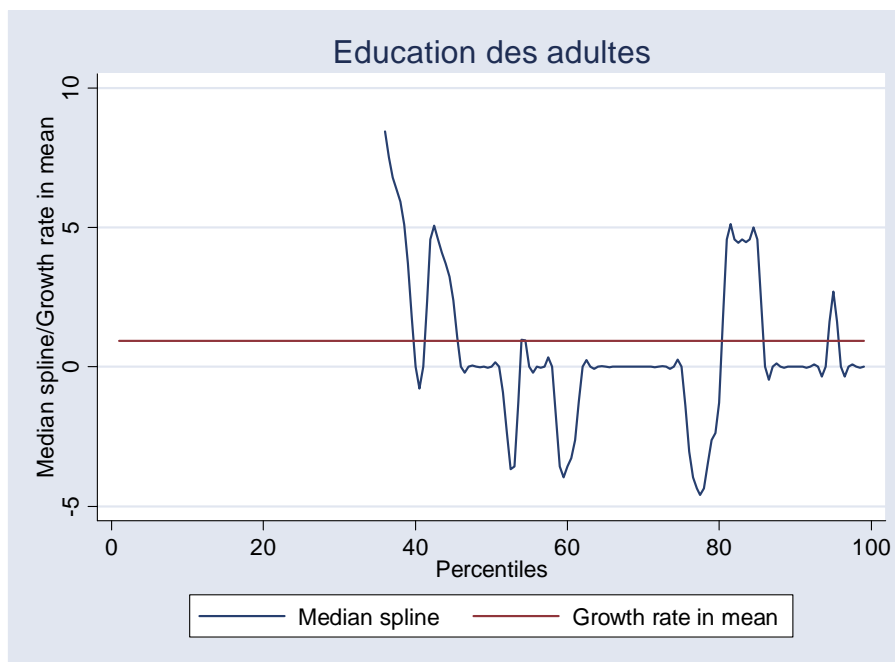


Figure 29: Social Growth Incidence Curve, 1990-1995 (education level of adult population in the rural sector)

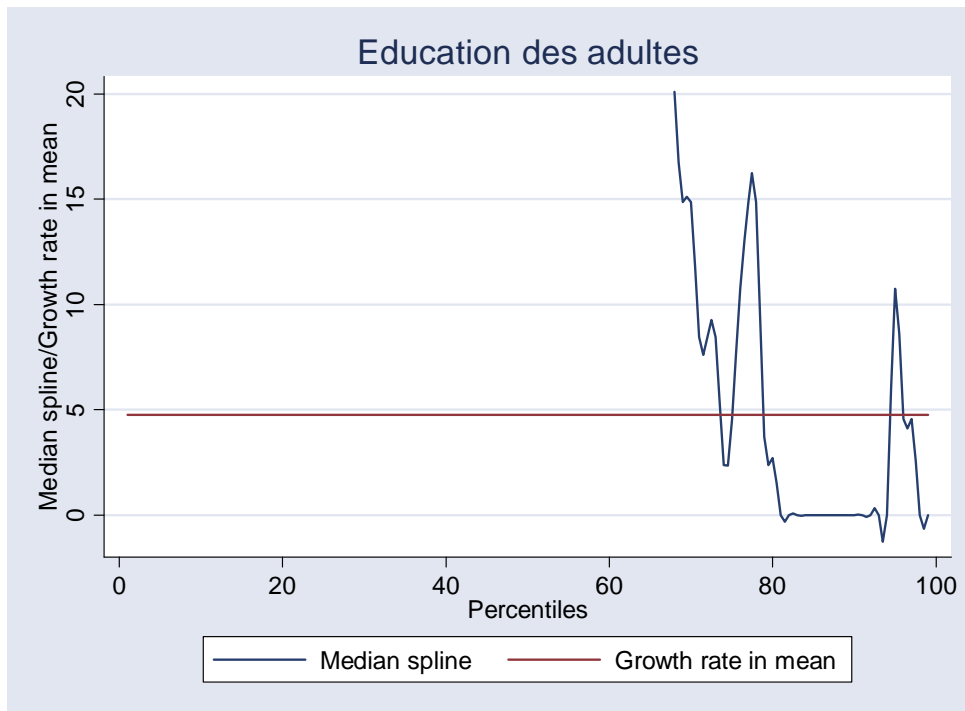


Figure 30 : Social Growth Incidence Curve (education for the young population in Tunisia)

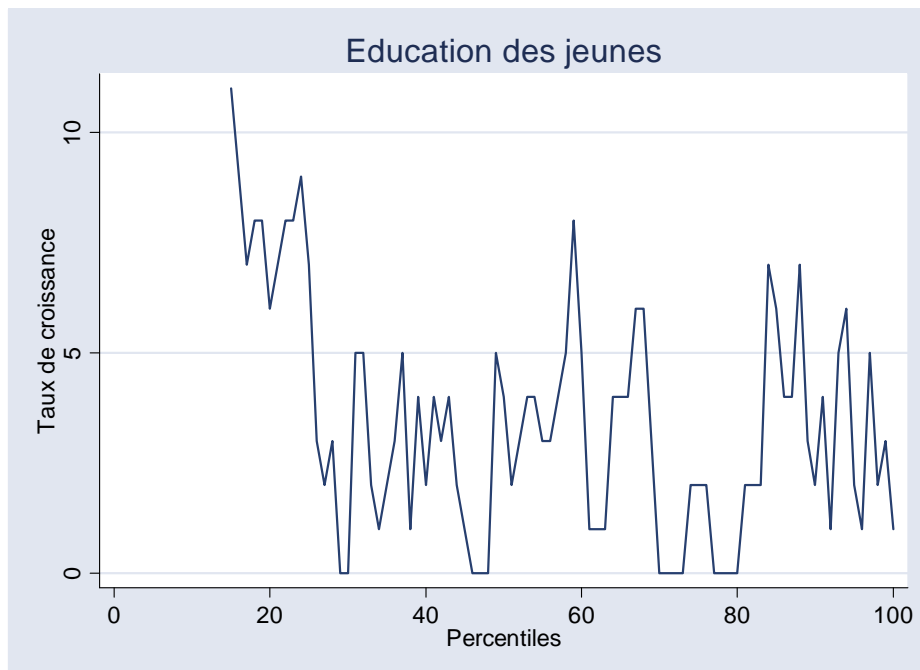


Figure 31 : Social Growth Incidence Curve (education for the young population in the urban sector)

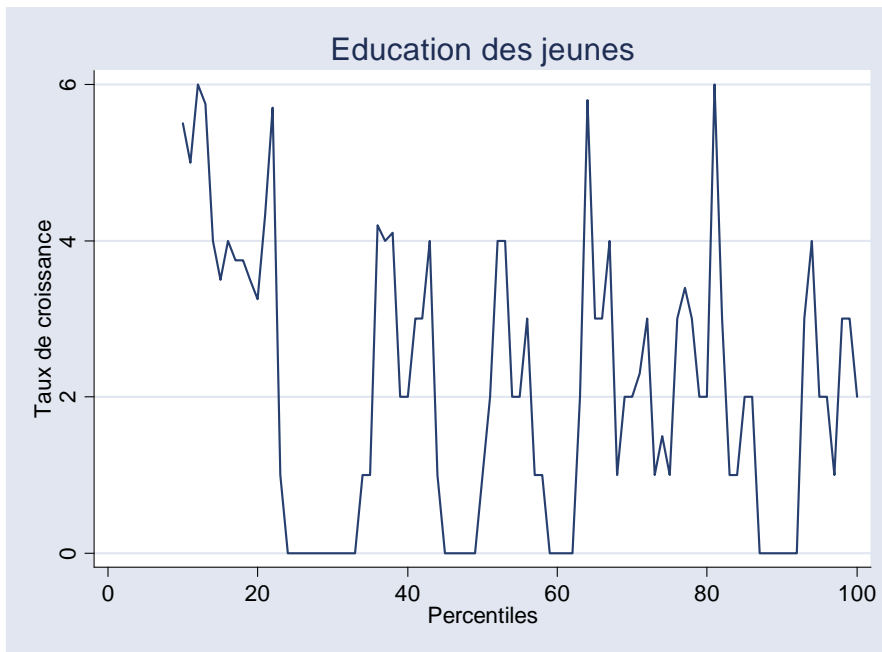


Figure 32 : Social Growth Incidence Curve (education for the young population in the rural sector)

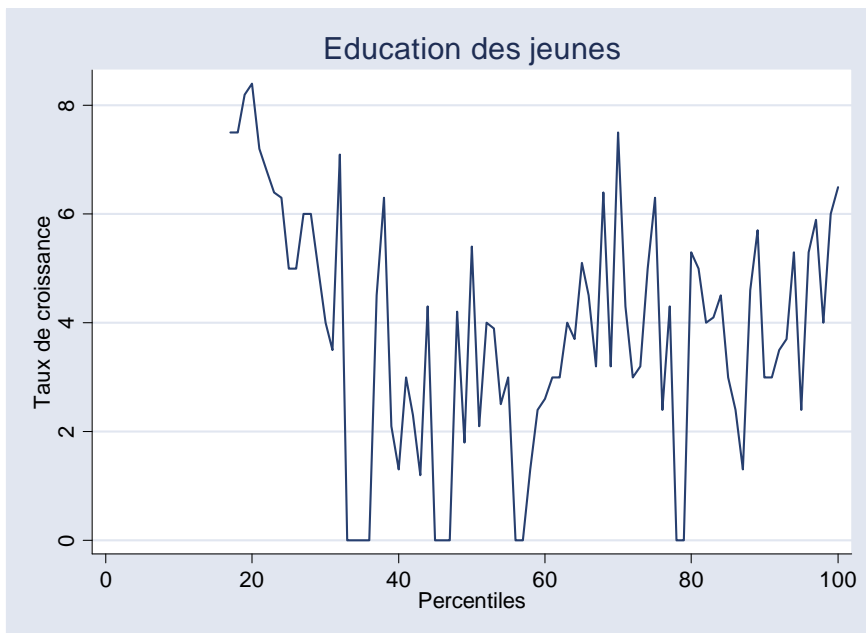


Figure 33 : Social Growth Incidence Curve (education for adults in the total population)

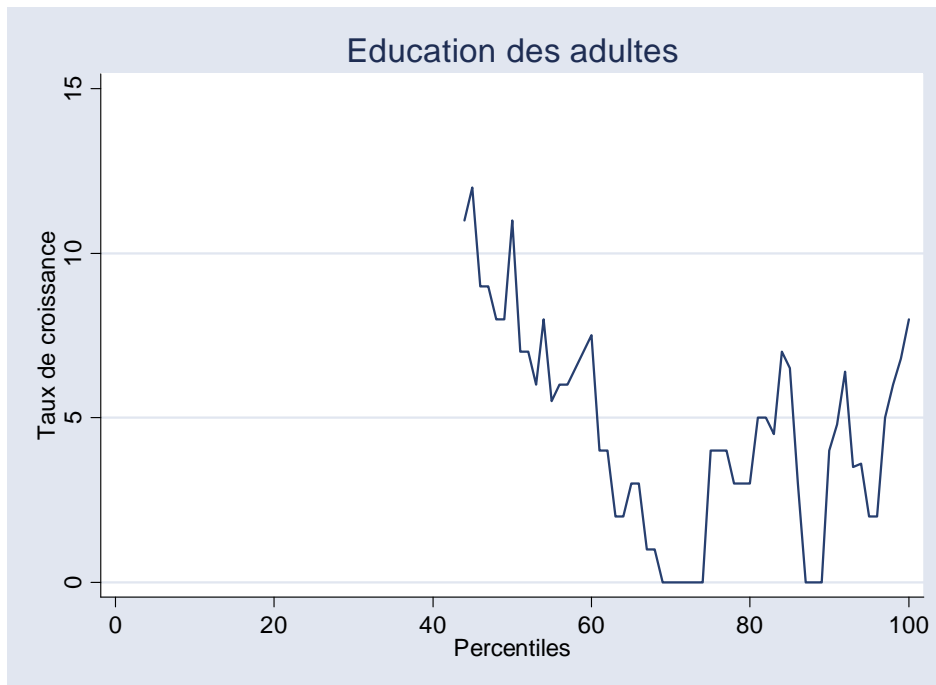


Figure 34 : Social Growth Incidence Curve (education for adults in the urban sector)

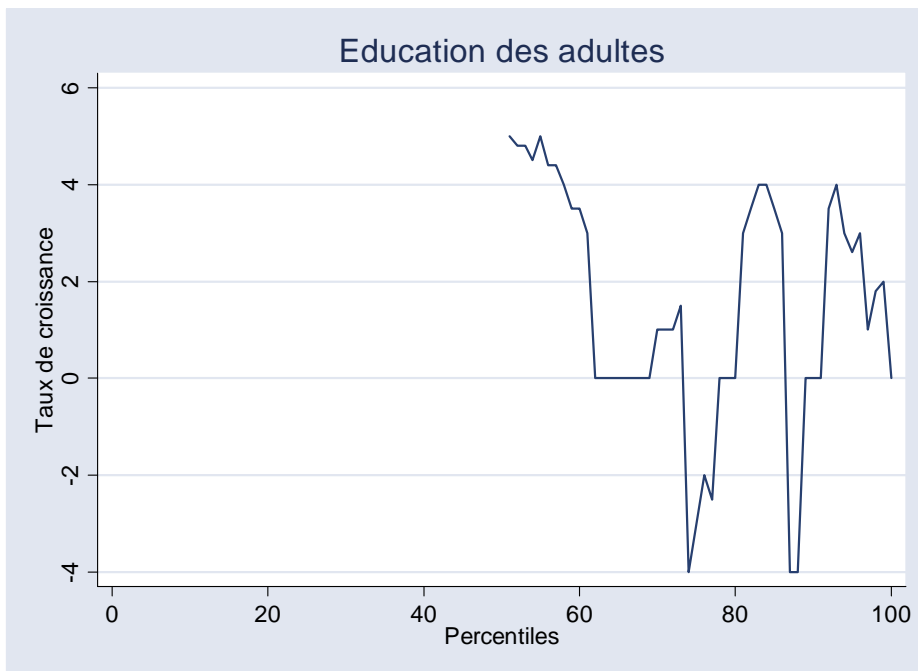
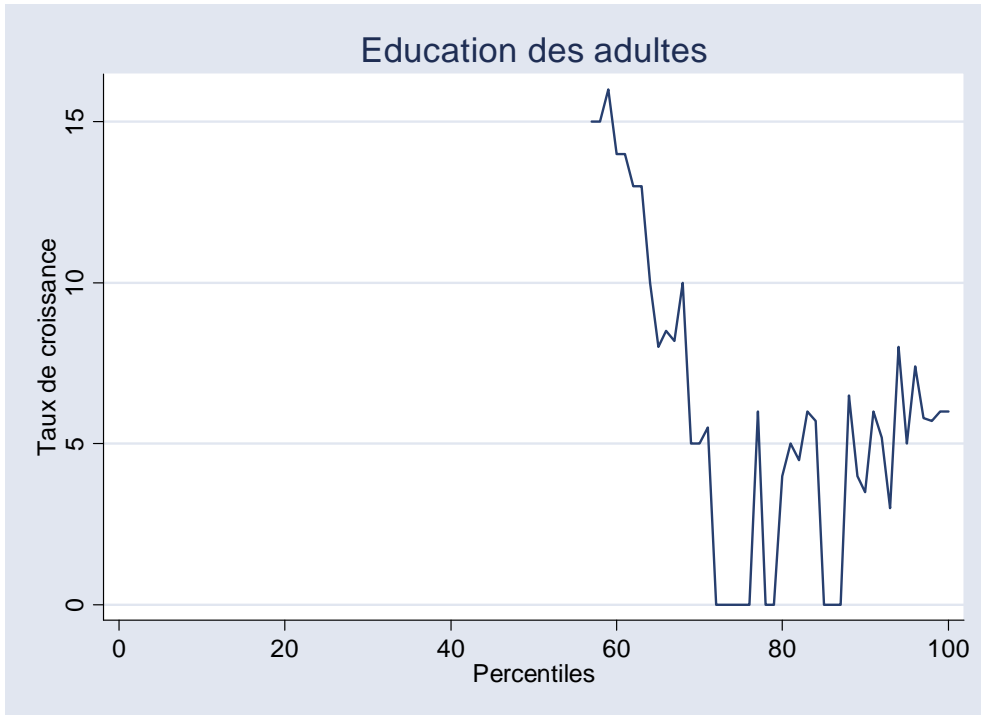


Figure 35 : Social Growth Incidence Curve (education for adults in the rural sector)



Appendix (3) : Poverty and Convergence

Figure 36 : Non-conditional Convergence : PPGR 20

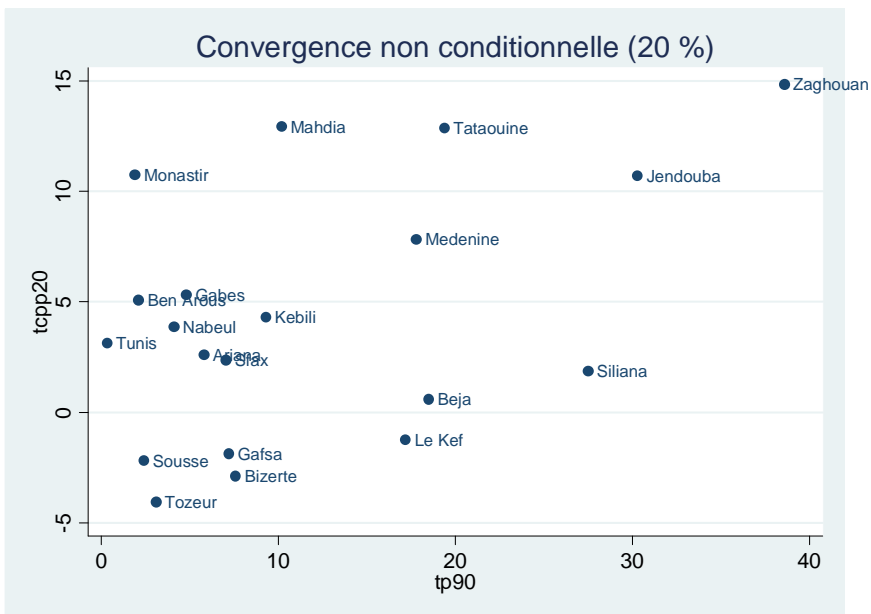
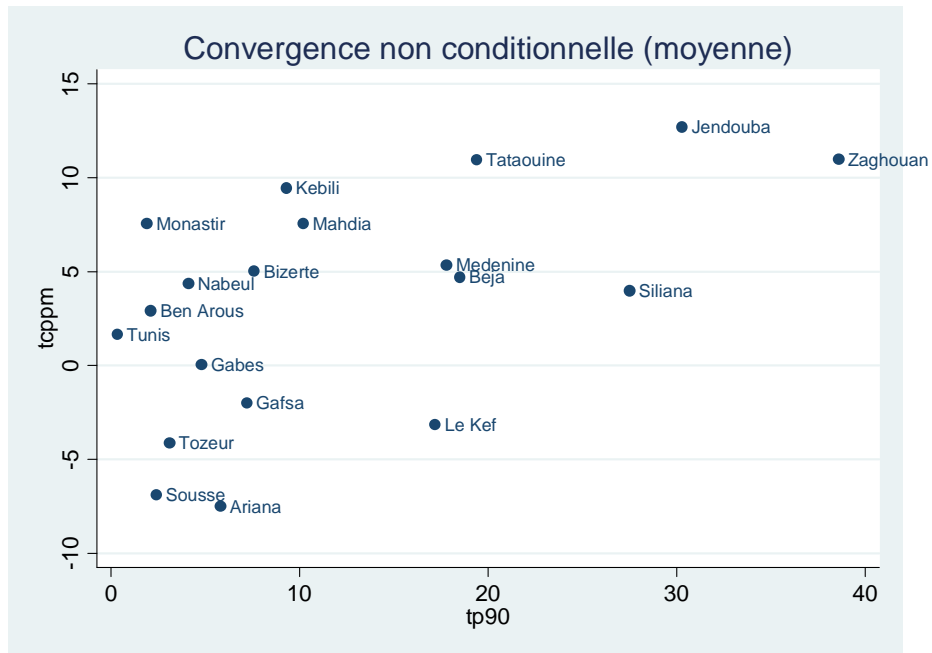
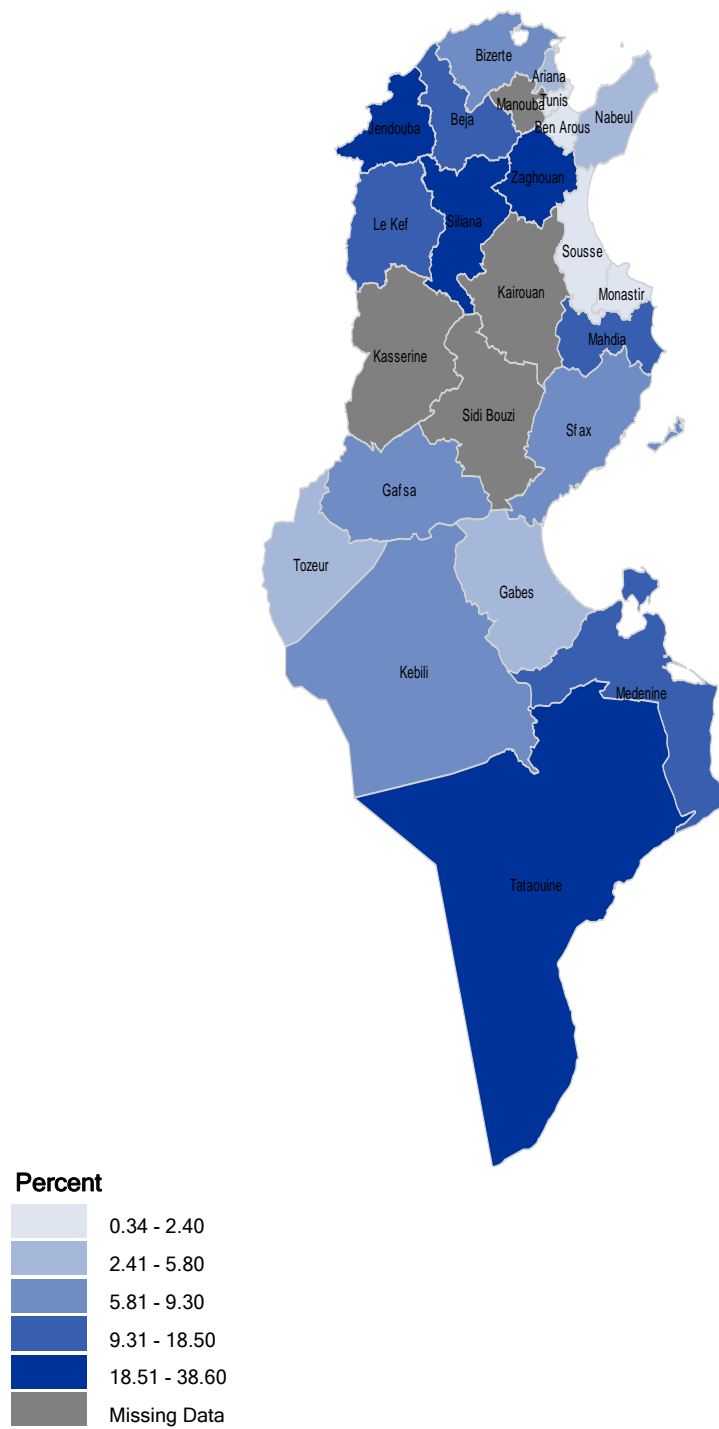


Figure 37 : Non-conditional Convergence : APPGR

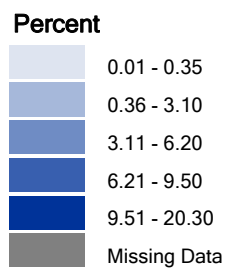
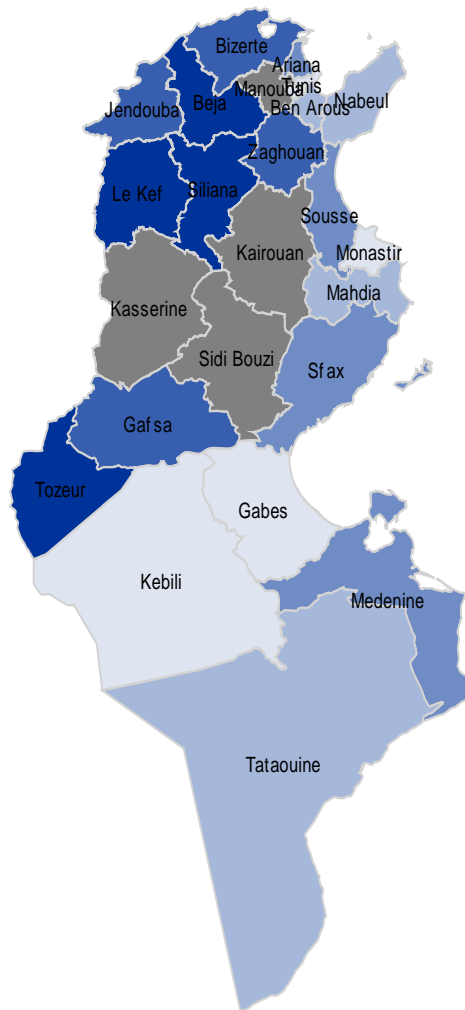


Appendix (4): Maps

Map 1 : Poverty Rate (1990) in (%)



Map 2 : The Poverty Rate in 1995 (%)



Appendix (5): Tables

Table 1: Pro-poor Growth Rates

Percentiles	The Whole Country	Urban	Rural
10	3,62	1,29	3,71
15	3,50	1,19	3,9
20	3,42	1,12	3,95
25	3,33	1,12	3,94
30	3,28	1,16	4
100	0,70	-0,68	3,67

Source: Author's estimations.

Table 2: Regional Pro-poor Growth Rates

Governorates	Until 20% of the Population	The Average Pro-poor Growth Rate
Tunis	3,13	1,65
Ariana	2,59	-7,51
Ben Arous	5,07	2,91
Nabeul	3,85	4,36
Zagouhan	14,83	10,98
Bizerte	-2,89	5,01
Béja	0,60	4,71
Jendouba	10,69	12,70
El Kef	-1,26	-3,15
Siliana	1,86	3,99
Sousse	-2,19	-6,9
Monastir	10,75	7,56
Mahdia	12,92	7,55
Sfax	2,36	-2,48
Gafsa	-1,88	-1,99
Tozeur	-4,06	-4,14
Kébili	4,29	9,44
Gabès	5,3	0,03
Médenine	7,83	5,32
Tataouine	12,86	10,93

Source: Author's estimations.

Table 3: Poverty Variation Decomposition between 1990 and 1995

	The Whole Country	Urban area	Rural area
Poverty rate variation	-0,041	-0,009	-0,07
Growth	-0,009	0,003	-0,067
Redistribution	-0,037	-0,013	-0,01
Residue	0,004	0,002	-0,007

Source: Author's estimations based on Datt-Ravallion (1992).

Table 4: Decomposition of Changes in the Headcount Index at a Regional Level, 1990-1995

Governorates	Poverty Rate Variation	Growth	Redistribution	Residue
Tunis	0,001	-0,003	0,001	0,003
Ariana	-0,026	0,131	-0,052	-0,105
Ben Arous	-0,011	-0,021	0,029	-0,019
Nabeul	-0,026	-0,024	0,021	-0,023
Zagouhan	-0,303	-0,295	-0,122	0,115
Bizerte	0,019	-0,042	0,092	-0,032
Béja	-0,056	-0,104	0,042	0,006
Jendouba	-0,235	-0,250	0,053	-0,038
El Kef	0,015	0,034	-0,021	0,001
Siliana	-0,071	-0,113	-0,006	0,048
Sousse	0,030	0,073	-0,004	-0,039
Monastir	-0,019	-0,010	-0,005	-0,005
Mahdia	-0,094	-0,056	-0,075	0,038
Sfax	-0,008	0,033	-0,039	-0,002
Gafsa	0,017	0,000	-0,019	0,036
Tozeur	0,076	0,031	-0,013	0,058
Kébili	-0,058	-0,094	0,085	-0,049
Gabès	-0,039	0,000	-0,039	0,000
Médenine	-0,143	-0,107	-0,045	0,009
Tataouine	-0,163	-0,139	0,091	-0,115

Source: Author's estimations based on Datt-Ravallion (1992).

Table 5: Distribution of the Population for Each Percentile and Education Level of Household Heads (2000)

Percentiles	No Education	Primary	Secondary	Higher	Total
1	56.0	39.0	5.0	0.0	100
2	46.4	46.8	6.6	0.2	100
3	45.6	42.1	11.7	0.6	100
4	43.2	44.1	12.3	0.4	100
5	36.5	45.3	17.3	0.9	100
6	37.3	42.2	18.1	2.3	100
7	30.4	39.0	26.9	3.8	100
8	30.2	34.0	30.6	5.2	100
9	24.7	31.9	35.0	8.4	100
10	16.4	23.3	36.0	24.3	100
Average	36.7	38.8	19.9	4.6	100
% of poor	61.5	33.7	4.8	0.0	100

Source: Institut National de la Statistique (INS) and World Bank.

Table 6: Non-conditional Convergence in Poverty

Equations	(1) (PPGR20)	(2) (APPGR)
Constant	1.468 (0.89)*	-0.289 (-0.16)
$PR_{i,1990}$	0.243 (2.43)	0.302 (3.53)
R squared	0.21	0.30

Notes: * t statistics between brackets

Table 7: The Poverty Rate (PR) for Each Area (in %)

Year	1990	1995
Urban Sector	3,8	2,86
Rural Sector	14,6	13,6

Source: Author's estimations.

Table 8: The Poverty Rate for Each Governorate (PR_i)

	1990	1995
Tunis	0.34	0.04
Ariana	5.8	3.2
Ben arous	2.1	1
Nabeul	4.1	1.5
Zaghouan	38.6	8.3
Bizerte	7.6	9.5
Béja	18.5	13.11
Jendouba	30.3	7.5
Le kef	17.2	18.7
Siliana	27.5	20.3
Sousse	2.4	5.4
Monastir	1.9	0.009
Mahdia	10.2	0.92
Sfax	7.04	6.2
Gafsa	7.2	8.9
Tozeur	3.1	10.7
Kébili	9.3	0.35
Gabès	4.8	0.09
Médenine	17.8	4.4
Tataouine	19.4	3.1

Source: Author's estimations.

Table 9: Non-conditional Convergence in Poverty

Equations	(1) (PPGR20)	(2) (APPGR)
Constant	1.468 (0.89)*	-0.289 (-0.16)
$PR_{i,1990}$	0.243 (2.43)	0.302 (3.53)
R squared	0.21	0.30

Notes: * *t* statistics between brackets

Table 10: Determinants of Pro-poor Growth Rates

Equations	(1)	(2)	(3)	(4)
Constant	-3.17 (-1.52)	-7.20 (-2.38)**	-7.80 (-2.70)***	-7.68 (-2.61)**
Initial poverty rate (PR90)	0.38 (4.45)***	0.64 (5.24)***	0.84 (5.89)***	0.87 (6.55)***
Dummy region	4.66 (2.46)*	3.55 (1.72)***	4.68 (2.47)**	4.79 (2.47)**
Initial schooling rate 6-14 (ts 90)		0.80 (2.27)**	0.33 (0.86)	0.26 (0.66)
Power connection rate (PCR)			0.46 (4.12)***	0.42 (3.72)***
Drinking water connection rate able (DWCR)				0.09 (1.83)*
R ²	0.55	0.55	0.72	0.74
Observations	19	19	19	19

Notes: *, ** and *** means that the coefficient is significant at 10%, 5% et 1% respectively. t-Statistics between brackets. The dependant variable is the pro-poor growth rate of 20 % poor population.