Can Sustainable Poverty Reduction be Achieved with Little or no Economic Growth? The Case of Jamaica

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Abstract: Can poverty decline with little growth in real GDP? This paper examines the case of Jamaica, where the poverty headcount halved between 2003 and 2007 despite real per capita GDP growth of just 1.1 percent per year, by analyzing the factors contributing to the observed reduction in poverty using household and labor force surveys. It sets out by providing a sectoral, demographic, and spatial picture of the evolution of poverty and finds that poverty reduction has been broad based, benefitting both rural and urban areas. Nearly three quarters of the poverty reduction is attributed to growth in average household consumption, which outpaced GDP growth due to large remittance inflows, and one quarter to narrowing inequality. In turn, around half of the reduction of inequality is explained by narrowing returns to education and declining sectoral wage gaps.

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1 Introduction

Can substantial poverty reduction occur with little growth in real GDP? The literature on the links between growth and poverty concludes that growth is fundamental for poverty reduction (see, for example, Lopez, 2004; Dollar and Kraay, 2002). Yet, in the case of Jamaica, poverty halved from 21.0 percent of the population in 2003 to 9.9 percent in 2007 while real per capita GDP grew by just 1.1 percent per year.[1] This yields an elasticity of poverty reduction with respect to a change in mean income of -16, much higher than the values of such elasticities usually observed in the data.[2] Moreover, the substantial fall in the poverty headcount was accompanied by a narrowing of inequality, with most of the reduction in poverty occurring in initially poorer areas outside of the Kingston Metropolitan Area (KMA).

What explains this episode of poverty reduction without growth? This paper uses household and labor force data to evaluate the distributional aspects of growth in Jamaica and identify some of the main determinants of distributional change. First, the paper develops a poverty profile for Jamaica and traces the evolution of poverty from 2003 through 2007. Second, the paper investigates the extent to which the fall in poverty was due to rising consumption in the absence of growth vs. pro-poor changes in income distribution. Next, the paper examines the determinants and drivers of distributional change during this period by focusing on labor market outcomes - such as returns to education, experience, and sectoral premiums - and linking these outcomes to household consumption.

The paper finds that the 2003-07 reduction in poverty was geographically and economically broad-based and driven both by growth in average consumption and a reduction in inequality, with the latter underpinned by a combination of narrowing returns to education and declining sectoral wage gaps. Consumption per capita, supported by a rapid increase in international remittance inflows, grew much more rapidly than real GDP and contributed about 75 percent to the overall poverty reduction observed between 2003 and 2007, while the narrowing of inequality accounted for the rest. Households in the 2nd and 3rd deciles of the income distribution reaped the largest gains over the period.

The remainder of the paper is structured as follows: Section 2 discusses

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[1] However, poverty spiked to an estimated 17.6 percent of the population in 2010 (a third consecutive year of increases) due to the severe economic contraction following the global crisis.

[2] This elasticity is calculated as the percent change in the poverty headcount for a one percent change in real GDP per capita. Ravallion and Chen (1997) estimate the average growth elasticity of poverty for a sample of developing countries to be around -3. Recent (late 1990s to mid-2000s) poverty reduction episodes in India, China, Vietnam, and Mexico have yielded elasticities of -0.2, -0.5, -1.0, and -6.8, respectively. However, it should also be noted that the poverty elasticity of growth is larger in absolute value when the initial headcount ratio and initial inequality are lower (see Bourguignon, 2003).

the determinants of poverty reduction between 2003 and 2007, Section 3 explains the observed inequality trends in terms of labor market dynamics and their links to household welfare, and Section 4 offers concluding remarks. Although labor market dynamics *per se* are not the main focus of the paper, participation and earnings in the labor market feature prominently throughout the paper because they represent the main determinants of household consumption, particularly for poor households who have little other assets.

2 Evolution of Poverty and Inequality: 2003-2007

2.1 *Jamaican Poverty Dynamics in the Caribbean Context*

Due to limited data availability, little has been written about the evolution of poverty and inequality in the Caribbean. Poverty is estimated to be above 40 percent of the population in countries such as Haiti, Guyana, and the Dominican Republic (after the crisis). Common interlinked features of poverty in the Caribbean include high crime, drug trafficking, and youth unemployment. Sizable informal economies, where workers lack protection and stability, are often cited as another source of vulnerability for incomes of the poor.

Compared to neighboring countries, Jamaica has had relative success in reducing poverty over time and is presently classified by the World Bank as a country with 'high human development'. Poverty in Jamaica fell from 30.5 percent of the population in 1989 to an all-time low of 9.9 percent in 2007 (Figure 1). However, poverty has increased substantially since the onset of the global economic crisis, rising to 17.6 percent in 2010 due to three consecutive years of economic contraction and a spike in unemployment. Inequality, on the other hand, has remained relatively stable over the past two decades with the Gini coefficient varying between 0.38 and 0.40.

Figure 1 - Poverty in Central America and the Caribbean
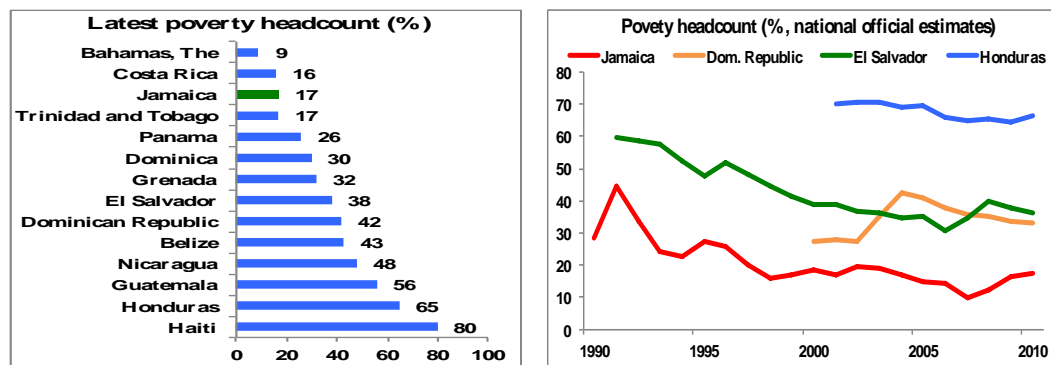
Source: World Bank

Interestingly, poverty has been declining in Jamaica with little to no aggregate growth. Despite relative political stability and relatively high levels of investment (around 25 percent of GDP), real GDP per capita was about the same in 2007 as in the early 1970s and real GDP growth has been close to zero since 1992. This anemic growth has been pervasive across the economy, with financial services and telecommunication being the only sectors growing by more than 4 percent a year in the last two decades. Some studies (e.g., IADB, 2006) argue that the reported GDP underestimates the real level of economic activity by as much as 40 percent due to a large and growing informal sector. Informal employment in Jamaica is estimated to be much higher than in many of its Caribbean neighbors (e.g., Trinidad & Tobago at close to 15 percent) and much closer to levels typically found in the rest of Latin America (Figure 2). However, even if the reported growth numbers are an under-estimate, growth driven by the expansion of the informal sector is not usually perceived as pro-poor.

Looking for the explanations of this low growth performance, World Bank (2011) identified the main constraints to growth as high levels of crime, low levels of human capital, and a distortive tax regime. High crime has channeled investment into relatively isolated sectors such as mining, all inclusive hotels and Export Free Zones, reinforcing an enclave model of development and encouraging emigration. Low levels of human capital have hindered the uptake of new technologies by Jamaican firms. Tax distortions have given rise to a highly complex system of incentives given out on a discretionary basis, which penalizes innovation and entrepreneurship and fosters corruption. In addition, frequent occurrences of natural disasters and erosion of preferential trade access to the US and Europe have further dampened Jamaica's growth prospects.

2.2   How Broad-Based Was the Reduction in Poverty?

What are some of the main features of the "growth-less" reduction in poverty in Jamaica in 2003-07? Table 1 presents the evolution of poverty and inequality in Jamaica during this period, as calculated by the authors from the successive rounds of the Jamaica Survey of Living Conditions (JSLC).[3] [4] As mentioned in the introduction, poverty fell from 21 percent of the population in 2003 to 9.9 percent in 2007. Extreme poverty - defined as the percentage of the population who is not able to afford the minimum adequate diet, as determined by the Jamaica Ministry of Health (MOH) - also fell from 6.6 percent in 2003 to 2.9 percent in 2007.[5] Furthermore, higher-

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[3] See the data section of the Annex for additional details.

[4] The paper is able to match the official poverty rates (as reported in PIOJ/STATIN, 2008) for all years except 2003; in that year, the paper's headcount index estimate of 21.0 percent differs substantially from the 19.1 percent reported by PIOJ/STATIN (2008).

[5] The minimum adequate diet is defined as consumption of at least 11,225 Kcals for a family of five: adult male, adult female, and one child within each of the age ranges of

Figure 2 - Share of Informal and Vulnerable Employment in Total Employment (Percent)
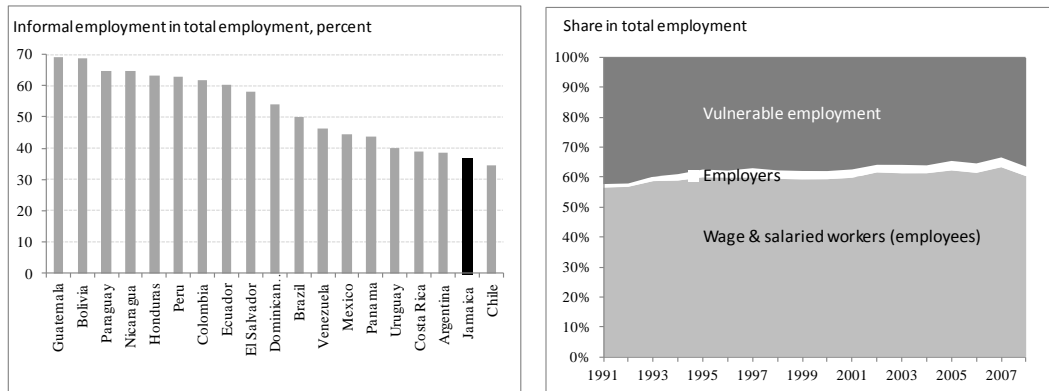
Note: Informal employment is defined as self-employed workers (with the exception of liberal professionals), unpaid family workers, domestic servants, and both employers and employees from small firms (with up to 5 or 10 employees). Vulnerable employment is defined as the self-employed plus unpaid family workers. Source: Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank) and STATIN.Source: Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank) and STATIN.

order measures of poverty, such as the poverty gap and the squared poverty gap, declined substantially over the same period, indicating that the depth of poverty fell along with its incidence.[6]

Poverty reduction was broad-based, benefitting most segments of the society. As shown in Table 1, both urban and rural poverty fell substantially (although urban poverty declined at a faster rate), and households headed by males and females shared the benefits of poverty reduction almost equally. Poverty also declined significantly among households with the primary earner working in agriculture and, from a spatial perspective, declined in every parish with the possible exception of Westmoreland.[7]

Broadening the focus to the entire income distribution, fortunes improved across the board between 2003 and 2007, but households in the lower deciles gained the most. This is shown graphically in Figure 3, which plots the incidence of growth (percentage increase in real consumption per capita) for each percentile of the distribution between 2003 and 2007 (the growth incidence curve (GIC) of Ravallion and Chen, 2003).[8] The horizontal line in the

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1-3, 10-14, and 15-18 years (PIOJ/STATIN, 2008).

[6] For example, the decline in the poverty gap indicates that the average distance from the poverty line has halved, while the fall in the squared poverty gap suggests that the fortunes of the poorest of the poor have also improved substantially.

[7] See Annex for a more detailed discussion of poverty by locality, gender, and sector of employment.

[8] As is the case for all GICs not derived from panel data, the distribution of welfare gains is anonymous in the sense that households comprising the bottom decile of the distribution in 2003 may not be the same households forming the bottom decile in 2007. However, even under anonymity the GIC is a useful tool for summarizing distributional changes, and integrating under the GIC up to the poverty line provides a measure of pro-poorness

Table 1 - Incidence of Poverty in Jamaica, 2003-07

	2003	2004	2005	2006	2007
Poverty and Inequality Indicators					
Extreme Poverty (P0)	6.6	5.7	4.3	3.3	2.9
Poverty (P0)	21.0	16.9	14.8	14.3	9.9
Poverty Gap (P1)	5.4	4.4	3.7	3.2	2.5
Poverty Gap Squared (P2)	2.0	1.7	1.4	1.2	1.0
Gini	38.3	39.0	38.9	37.9	36.8
Theil (GE(a), a=1)	28.5	27.9	28.7	26.6	23.8
Poverty Headcount Ratio by:					
Locality					
KMA	14.6	14.3	9.6	9.4	6.2
Urban	15.8	7.8	7.2	9.2	4.0
Rural	24.2	22.1	21.1	19.8	15.3
Parish					
Kingston	14.1	10.7	9.5	7.6	8.8
St Andrew	16.5	18.2	11.2	10.8	4.9
St Thomas	23.7	14.8	17.6	25.5	19.0
Portland	24.3	25.7	29.9	11.4	11.8
St Mary	33.5	24.5	13.3	16.8	14.9
St Ann	25.6	15.2	19.8	19.1	6.0
Trelawny	13.6	20.7	14.3	24.9	11.4
St James	13.5	10.4	13.7	7.4	10.4
Hanover	9.5	1.0	9.2	7.6	6.6
Westmoreland	17.8	14.8	8.5	12.8	25.3
St Elizabeth	45.6	25.5	25.0	18.2	10.4
Manchester	12.2	8.7	10.9	12.4	11.5
Clarendon	27.0	28.0	24.3	28.0	21.6
St Catherine	12.4	13.0	11.1	10.2	5.9
Household Head Gender					
Male	18.5	16.2	12.7	14.5	8.6
Female	23.6	17.5	16.9	14.1	11.1
Household Head Marital Status					
Married	18.1	16.6	14.7	15.8	9.7
Not Married	22.8	17.0	14.7	13.2	10.1
Household Primary Earner Characteristics					
Gender					
Male	21.3	17.0	12.5	15.5	10.1
Female	20.5	16.7	15.1	12.3	8.3
Sector					
Agriculture	37.3	28.7	27.5	33.6	22.6
Mining	0.0	0.0	0.0	0.0	0.0
Manufacturing	15.9	22.4	11.7	10.1	0.0
Construction	14.0	18.5	6.3	9.7	6.5
Trade, Hotels, Restaurants	16.5	15.7	11.6	15.1	6.7
Other Services	14.5	10.5	10.4	6.4	5.9
Industry Not Classified	21.8	15.9	20.1	14.4	13.9

Source: Authors calculations using JSLC data.

Figure 3 - Growth Incidence Curve, 2003-2007

Source: Authors' estimates with JSLC 2003, 2007.
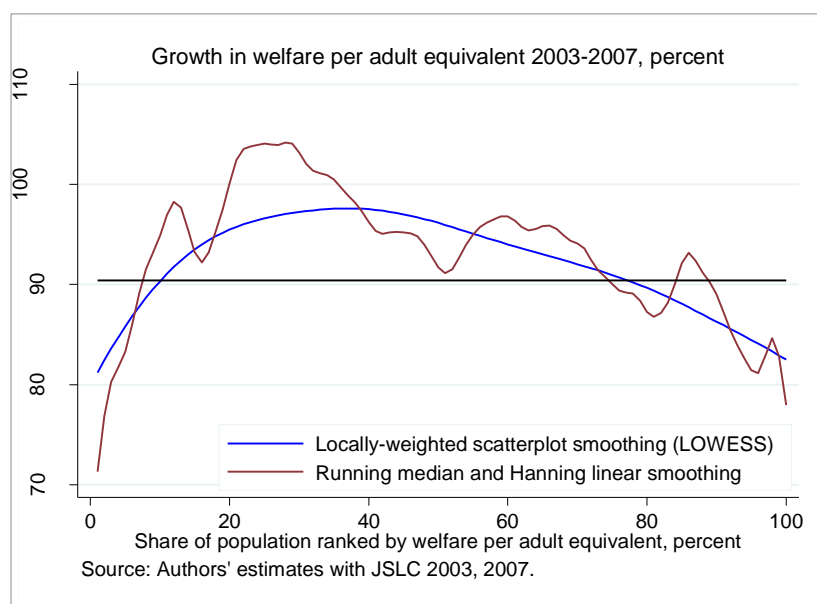
figure represents the average change in per capita consumption; therefore the deciles 2-8 for which the GIC is above this line gained more than the average. Even though the poorest decile of the Jamaican population fared worse than the average, these households still recorded substantial nominal gains of 70-80 percent. Moreover, the second decile - which was still poor in 2003 - gained more than the average, which helped accelerate poverty reduction over the period.

Consistent with the initially poorer parts of the distribution gaining more than the average, inequality declined with the Gini coefficient falling from 38.3 in 2003 to 36.8 in 2007. Already in 2003, Jamaica was the least unequal country in Latin America (Figure 4, left panel). However, inequality continued to decline between 2003 and 2007. The right panel of Figure 4 plots the Lorenz curves for the distribution of consumption per capita in each of the two years and shows that although the two curves are not very different from each other (in fact one does not expect large differences with a 1.5 percentage point change in the Gini), the Lorenz curve of 2007 lies nowhere below the Lorenz of 2003, suggesting at least weak Lorenz dominance of the 2007 distribution over the one of 2003.[9] In other words, inequality decreased (or at least did not increase) throughout the income range.[10]

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of growth (Ravallion and Chen, 2003).

[9] Because mean income has also grown over the same period, the generalized Lorenz curve (Shorrocks, 1983; Kakwani, 1984) of 2007 also weakly dominates the generalized Lorenz of 2003, therefore implying second-order stochastic dominance.

[10] We do not assert strict Lorenz dominance here because it we do not explicitly test the null hypothesis that the Lorenz curve of 2007 is nowhere below the Lorenz curve of 2003.

Figure 4 - Inequality in Jamaica and the Rest of Latin America
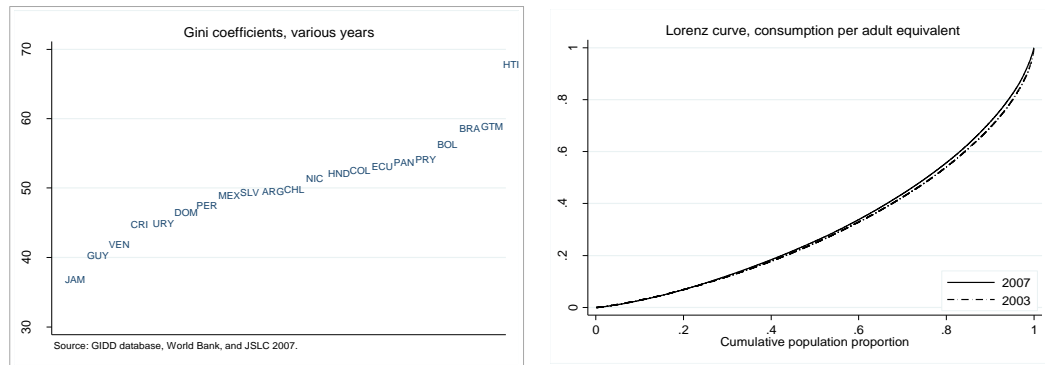
2.3 Macroeconomic Drivers of Poverty Reduction

In the absence of broad-based economic growth, what factors could be responsible for a substantial decrease in poverty like the 2003-07 episode in Jamaica? A standard technique which has been utilized in the literature to analyze the contribution of various factors to a given reduction in poverty is a decomposition of the observed change in poverty into "growth" (change in the survey mean only, with no distributional change) and "inequality" (no change in survey income, distributional change only) components.[11]

The results of the exercise are shown in Table 2. The second row shows the poverty headcount that would have been observed in 2007 if growth in mean consumption between 2003 and 2007 were the only driver of poverty reduction. The fact that this simulated headcount of 12.4 percent is above the actual headcount of 9.9 percent indicates that a decrease in inequality, in addition to growth, was an important component of poverty reduction. Similarly, the third row of Table 2 shows the poverty headcount that would have been observed if the mean remained unchanged and only the distribution improved.[12] Thus, the results of the exercise show that neither the "growth" nor the "inequality" component by themselves would have been sufficient to generate the observed reduction in poverty.

Why do our results show that most of the reduction in poverty was due to the "growth" component, when hardly any growth in real GDP per capita took place? One answer is that the survey measures consumption rather

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[11] The table shows the results of a non-parametric decomposition, which has the advantages of simplicity and no need to assume a functional representation of the Lorenz curve. The disadvantages vis-à-vis a parametric decomposition (e.g., Datt and Ravallion, 1992) include lack of a clear identification of the residual component (interaction between growth and inequality changes).

[12] The contributions of two components do not sum up to 100 percent due to the presence of an interaction term (because all decompositions are path-dependent). However, in this case the interaction term is quite small.

Table 2 - Growth-Inequality Decomposition of Poverty Changes 2003-07

	2003	2007	Contribution from each component, %
Poverty headcount (% of population)	21.0	9.9	
Simulated poverty, only mean cons. growth		12.4	78
Simulated poverty, only distributional change	17.9		28

Source: Authors' calculations with JSLC 2003, 2007.

than income, and the two could have behaved very differently over the period in question. Indeed, consumption grew considerably faster than GDP between 2003 and 2007: according to the national accounts data, nominal GDP per capita increased by 64 percent while per capita consumption rose by a much larger 87 percent.[13]

Figure 5 - Remittances in Jamaica
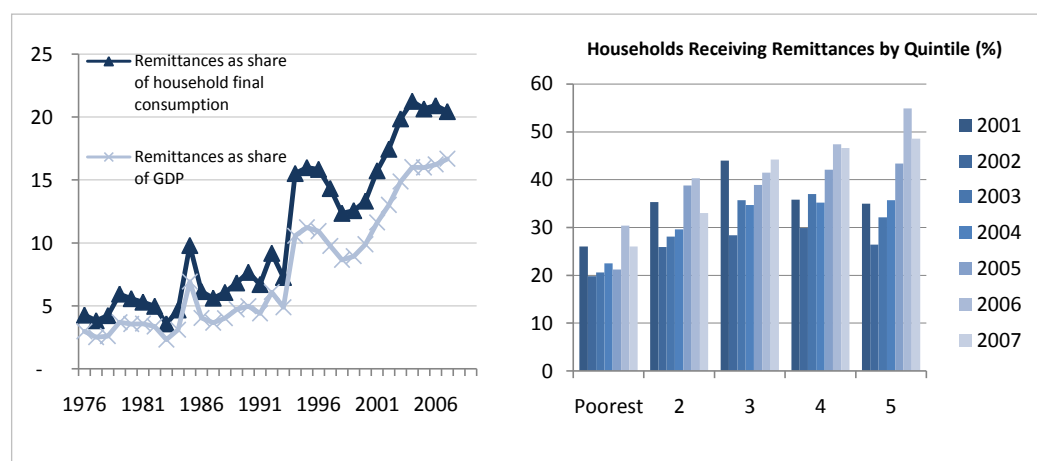
Source: World Development Indicators.

There are several potential reasons for the large difference between the growth in GDP and consumption. World Bank (2004) has argued that GDP growth could be substantially underestimated, while World Bank (2007) highlights the role of remittances, inflation deceleration, and relative price shifts which favor the poor. In particular, international remittances grew very rapidly between 2003 and 2007, increasing from 17 to over 20 percent of household consumption (left panel of Figure 5) and becoming a leading source of foreign exchange for the country, second only to tourism. Although much of the growth in remittances accrued to the richer households, a large and growing number of households in the poorest quintile also report receiving remittances (right panel of Figure 5).

A large literature exists on the links between remittances and poverty reduction (see, for example, Fajnzylber and López, 2008). Remittances can

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[13] Over the same period, mean consumption per adult equivalent in the JSLC increased by a nearly identical 86.7 percent - almost surprising given the often large disparities between national accounts and micro/survey data (see, for example, Deaton, 1997).

Figure 6 - Poverty Under Different Poverty Line Assumptions
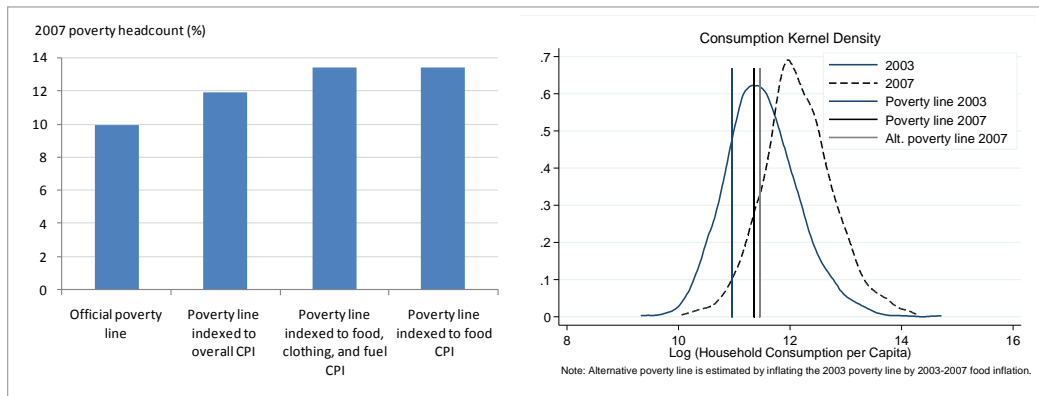
Source: Authors calculations with JSLC data.

help reduce poverty and inequality in recipient countries by contributing to higher investment and growth and reducing volatility in foreign exchange inflows as their stable and slightly countercyclical nature helps insure against external and macroeconomic shocks. At the micro level, they allow poor recipient households to increase their savings, spend more on consumer durables, and improve children's health and educational outcomes. At least some of these links, particularly on the micro level, are present in Jamaica as well. For example, according to the 2006 Survey of Living Conditions, households in Jamaica largely use remittances for daily expenses, followed by spending on education and health. This dependence on remittances for routine expenditure likely explains a part of the nearly 8 percentage point spike in poverty in the aftermath of the global crisis (2008-10), when remittance inflows contracted by close to 5 percent.

Another substantial part of the decline in poverty is explained by a slower rate of growth in the cost of the consumption basket of the poor relative to the average price basket. In the JSLC, the cost of the consumption basket of the poor is measured by three poverty lines - KMA, other urban, and rural - which reflect the differences in cost of living across these three localities. Between 2003 and 2007, all three poverty lines grew by 49 percent. Over the same period, according to Bank of Jamaica (BoJ) statistics, overall inflation was 57 percent while the prices of food and non-alcoholic beverages rose by 65 percent.[14] Because the poverty line grew slower than aggregate inflation, the consumption basket of the poor became cheaper in relative terms and therefore contributed to poverty reduction.

As shown in the left panel of Figure 6, poverty in 2007 could have been 11.9 percent (instead of 9.9 percent) if the poverty line were indexed to the overall CPI, and as high as 13.4 percent if the poverty line were indexed

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[14] Although STATIN does not report inflation by categories of consumption goods, the overall inflation reported by STATIN over the same period is virtually the same: 56.62 percent vs. 56.77 percent as reported by BoJ.

to the food CPI. The right panel of Figure 6 illustrates the same point by plotting the income distributions of 2003 and 2007 along with the respective poverty lines, as well as a hypothetical poverty line of 2007 obtained by indexing the poverty line to the food CPI. Although the differences between the two poverty lines are not very large, the density (number of persons) of the distribution around the poverty line is substantial, which explains the sensitivity of the poverty headcount to changes in the poverty line.

An additional factor which has likely played a role in the reduction of inequality in Jamaica during 2003-07 and therefore contributed to poverty reduction is the implementation of a conditional cash transfer (CCT) Programme of Advancement through Health and Education (PATH). The 2002 consolidation of several social protection programs, including food stamps, into a proxy-means tested CCT improved pro-poor targeting and extended rural coverage. For example, upon implementation over half of PATH beneficiaries were in the poorest quintile, compared to one-third under the food stamp program it replaced. Impact analysis of the PATH program has shown increases in educational attainments, reduced child labor, improved health outcomes, and reduced poverty (World Bank, 2007). The program has been expanded substantially since the onset of the global crisis, with coverage increasing from about 8 percent of the population in 2005 to around 14 percent in 2011. Nonetheless, benefit levels remain relatively small (a minimum monthly payment of J$400 is about 1 percent of per capita GDP) and program leakages are sizeable (the two poorest quintiles represent about three-quarters of PATH beneficiaries).

Given the large literature on financial development and poverty and the relative dynamism of the financial services sector in Jamaica, it is tempting to draw some links between the two. Normally, improved access to a better functioning financial system can help relieve poverty by facilitating savings, the ability to borrow to smooth consumption and/or invest, and the ability to receive money from government cash transfers and/or remittances. Theory also points to financial market imperfections in shaping inequality and the intergenerational persistence of human capital accumulation (and hence opportunities), determining who can become entrepreneurs (based on initial wealth), and discrimination (in the sense of a constant group of individuals with access to credit). Levine (2008) stresses that financial development disproportionately benefits the poor by relaxing credit constraints for consumption, investment, or spending on education or health.

Limited research has been done on financial development in Jamaica. A recent growth diagnostic study did not rank credit constraints among the top impediments to growth in Jamaica (World Bank, 2011).[15] However,

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[15] A recent report by the Planning Institute of Jamaica (PIOJ, 2011) also did not name financial development or credit constraints as major impediments to growth in Jamaica. On the other hand, Holmes (2010) makes a case that credit constraints (as proxied by non-performing loans) have had an adverse effect on consumer spending in Jamaica.

looking at financial development indicators (Figure 7), we find that Jamaica scores below average compared to neighbor countries in terms of financial depth (measured by domestic credit provision by the banking sector relative to GDP and number of commercial bank branches per capita) and credit attractiveness (i.e., lending interest rate). These suggest that access to finance is both scarce and expensive, which is likely to be even more binding for the poor. Moreover, another way in which the poor could be directly affected by financial underdevelopment is in terms of their ability to receive international remittances. In fact, costs of sending remittances to Jamaica exceed comparable costs in neighboring countries: it costs around US$14 to send US$200 from the USA to Jamaica, compared to US$12 to the Dominican Republic or US$10 to Central America.[16]

Figure 7 - Financial Development Indicators in Jamaica and Neighboring Countries
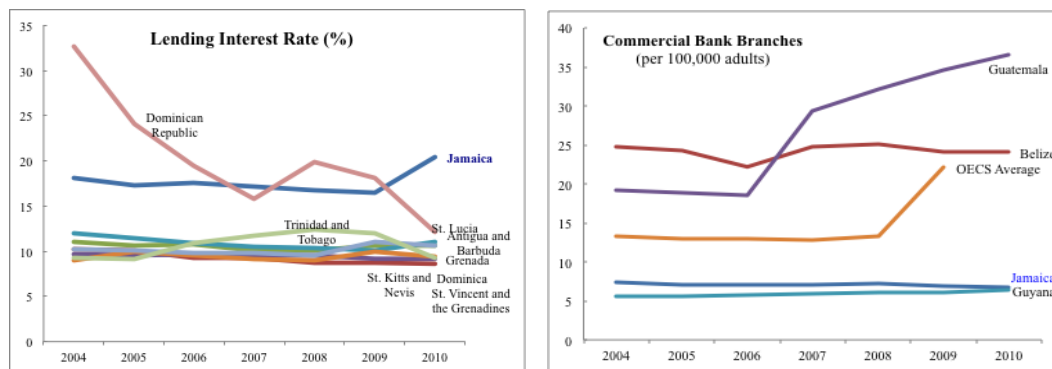
Source: WDI.

In summary, this section has pointed to a number of macroeconomic channels which could drive poverty reduction in the absence of GDP growth and has illustrated them using examples from the 2003-07 period in Jamaica. The first and most important of these channels is foreign inflows-supported expansion in consumption. Jamaica has experienced high rates of skilled emigration over a long period, and the growth in remittance inflows can be viewed as a dividend on Jamaica's export of human capital.[17] Another important channel has been a pro-poor shift in relative prices, with inflation at the poverty line lower than at the mean of the distribution. Finally, pro-poor policies adopted during the period – such as the consolidation of benefit programs – have also likely played an important role.

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[16] Based on 2011 third quarter data from the World Bank *Remittance Prices Worldwide* (http://remittanceprices.worldbank.org).

[17] While the long-term sustainability of increasing dependence on remittances may be questioned, other countries have relied on such strategies at least as a transitional tool (e.g., Philippines, see Taylor, 1999) and potential long-run adverse effects could be minimized by channeling remittances into more productive uses.

3 Determinants of Distributional Change

No discussion of poverty-inequality dynamics is complete without an analysis of labor market developments, since labor is usually the main source of income for the poor. There are a number of factors affecting labor market dynamics in Jamaica, including powerful labor unions, a complex fiscal incentive structure favoring capital-intensive projects, quality challenges in the education system, low access to job training, and high rates of skilled emigration. While all of these factors are important, a large literature on poverty-inequality decompositions has demonstrated that focusing on the characteristics measured by labor and household surveys can normally capture and explain a substantial part of the overall dynamics (see, for example, Bourguignon et al., 2004).

This section carries out such an analysis by identifying the drivers of distributional change in Jamaica between 2003 and 2007. First, it examines the determinants of individual labor earnings and labor force participation and their evolution between 2003 and 2007. Second, it links these labor market variables to the determinants of household consumption. Finally, it links the observed distributional change - as summarized by the GIC of Figure 3 and the Lorenz curve of Figure 4 in the previous section - to the evolution of returns to education and sectoral wage premiums.

The analysis in this section relies primarily on individual- and household-level characteristics captured by the labor force and household surveys. Following the tradition in the literature, estimation is therefore carried out using Mincer-type (Mincer, 1974) equations which model wages as a function of human capital proxied by variables such as schooling and work experience. Despite criticisms of the model's ability to accurately estimate returns to schooling (see, for example, Heckman et al., 2005), it remains prominent in applications to poverty and inequality analysis (e.g., Bourguignon and Pereira da Silva, 2003; Bourguignon et al., 2008) due to its simple analytical structure and the availability of required data in nearly every labor/household survey.

3.1 Wages

Table 3 shows the results of estimating the determinants of (log) real labor earnings of Jamaican workers, indicating that although returns to education increased between 2003 and 2004, they fell every year thereafter.[18] Educational attainment is measured by dummy variables that indicate the highest equivalent educational certificate that could be attained with the

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[18] The real wage is calculated by deflating the nominal hourly wage from the LFS with the change in the poverty line (from the JSLC) relative to 2003, therefore allowing for comparison of results between years. The poverty line is just one choice of deflator, and the results are robust to using other deflators such as the CPI. We choose to use the poverty line to avoid combining data from multiple sources.

Table 3 - Determinants of Individual Real Labor Earnings, 2003-2007

	2003	2004	2005	2006	2007
Individual characteristics					
Completed primary cycle	0.0286	0.252***	0.224***	0.151	-0.0617
Completed O-level cycle	0.0838	0.310***	0.349***	0.218**	0.00486
Completed A-level cycle	0.544***	0.581***	0.642***	0.458***	0.373***
Has tertiary degree	1.122***	1.593***	1.582***	1.340***	1.302***
Years of experience	0.0274***	0.0161***	0.0145***	0.0163***	0.0219***
Years of experience squared	-0.000371***	-0.000158***	-0.000142**	-0.000201***	-0.000275***
Female	-0.200***	-0.180***	-0.159***	-0.145***	-0.167***
Sector of employment					
Agriculture, forestry, or fishing	-0.563***	-0.363***	-0.310***	-0.381***	-0.403***
Mining	0.360**	0.730***	0.646***	0.477***	0.605***
Manufacturing	-0.181***	0.0246	-0.0455	-0.00902	0.0456
Construction and utilities	0.0656	0.0787**	0.216***	0.171***	0.153***
Trade, hotels, restaurants	-0.268***	-0.0971***	-0.225***	-0.145***	-0.112***
Area characteristics					
Urban other than KMA	-0.231***	-0.236***	-0.246***	-0.257***	-0.129***
Rural	-0.158***	-0.271***	-0.297***	-0.281***	-0.194***
Intercept	4.105***	4.035***	4.008***	4.083***	4.090***
Observations	2,701	3,584	3,171	3,457	3,078
R^2	0.177	0.316	0.343	0.351	0.338

$***p < 0.01, **p < 0.05, *p < 0.1$

Note: Dependent variable is expressed in natural logarithms. Real labor earnings (wages) for every year after 2003 are calculated by deflating the observed (nominal) labor earnings by the rate of annual growth in the poverty line. Observations are weighted by sample weights and regression estimated with robust standard errors. Educational dummies correspond to the individual completing the requisite number of years for a specified certificate, rather than the actual attainment of the certificate.

observed years of schooling, but not necessarily the actual attainment of this certificate.[19] This gives the dummies the interpretation of the return of completing each level of schooling relative to receiving no schooling at all.[20] Within each year, the educational dummies show increasing returns to progressively higher levels of educational attainment. However, across years, the evolution of the coefficients points to declining returns to education in every year after 2004 (Figure 8). This means that, for example, in 2007, a person who has completed the requisite number of years for an A-cycle could expect to earn less, in real terms, than a similarly qualified person of the same gender working in the same sector and same locality in 2004.

The observed pattern in returns to education is robust to adding controls for the determinants of labor market participation. To the extent that individuals may only participate in the labor market if the wage offered exceeds their reservation wage, the observed distribution of wage determi-

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[19] For example, if an individual completed 10 years of schooling, one year in excess of the years normally taken to complete an O-level certificate, the O-level dummy for this individual would be 1 and all the other educational dummies 0. Note that this approach does not take into account variations in quality of the education achieved, or the fact that test scores of Jamaican students tend to be low and lag behind regional averages (World Bank, 2011). However, information available in the survey does not allow for the construction of a more discerning measure of human capital.

[20] Because only the dependent variable is expressed in logs, the value of the dummy coefficient cannot be interpreted as a semi-elasticity. Instead, the relevant semi-elasticity should be calculated as $e^{\beta} - 1$

nants (such as education, experience, etc.) is a non-random sample of the underlying population. Therefore, the OLS coefficient estimates of Table 3 will be biased if the same characteristics that determine real wages also determine the likelihood of labor market participation. Moreover, to the extent that there exists a set of statistically significant determinants of labor market participation, failure to take this selection process into account will result in omitted variable bias (a violation of the assumption of zero conditional mean of the error term). Heckman's (1974) solution to this problem - known as the Heckit procedure - is to estimate a system of equations where the first stage (selection) is a probit determining the likelihood of labor market participation and the second stage (outcome) is the desired Mincer equation. The Heckit estimates of real wage dynamics are shown in Table 4.

In Table 4, the first column for each year, ln(wage), shows the selection-corrected estimates of the real wage determinants, while the second column, P(wage), shows the determinants of labor market participation, which include the full set of variables in the outcome equation as well as a set of identification variables which explain participation but not earnings.[21][22] The $tan(\rho)$ row of the table shows the results of hypothesis testing on, ρ the coefficient of correlation between the error terms in the selection and outcome equations. The statistically significant value of ρ in each year indicates that the selection bias is present and OLS estimates are likely to be biased. This can be observed, for example, by comparing the educational dummy coefficients in each year between Table 3 and Table 4: the estimated coefficients are lower in the latter case because education is a significant determinant of labor market participation and more educated individuals are more likely to be employed and earn a wage. However, it also obvious from comparing the results of Table 3 and Table 4 that the declining trend of returns to education is confirmed regardless of whether controls for selection are added to the equation;

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[21] Although theoretically the exclusion restriction can be satisfied simply by the non-linearity of the inverse Mill's ratio (IMR) in the outcome equation and therefore no additional identification variables are required, in practice the IMR tends to be quite linear across most of its range and the inclusion of identification variables improves the performance of the estimator.

[22] Note that the Heckit model does not include the sector dummies which were present in the OLS estimates. This is because the sector of employment is not observed for the unemployed or those out of the labor force; since this variable cannot be included in the selection equation, it cannot be a part of the outcome equation.

Table 4 - Determinants of Individual Real Labor Earnings with Selection Controls, 2003-2007

	2003		2004		2005		2006		2007	
	ln(wage)	P(wage)	ln(wage)	P(wage)	ln(wage)	P(wage)	ln(wage)	P(wage)	ln(wage)	P(wage)
Household characteristics										
Number of persons aged 0-13	-0.172	-0.0109		-0.0174		-0.0651		-0.014		-0.152**
(Number of persons aged 0-13)*female	-0.11	-0.0434		0.0468		0.0809		0.0348		0.144*
Number of persons aged over 65	0.0888	-0.0742**		-0.124***		-0.167***		-0.159***		-0.118***
(Number of persons aged over 60)*female	0.479**	-0.0782		-0.014		-0.281**		-0.0717		-0.0516
Partner is working		0.454***		0.336***		0.238***		0.402***		0.461***
(Partner is working)*female		-0.519***		-0.498***		-0.364***		-0.478***		-0.529***
Individual characteristics										
Completed primary cycle		0.339***	0.329***	-0.268***	0.278***	0.138	0.192*	0.0629	0.0392	-0.206
Completed O-level cycle		0.440***	0.357***	-0.122	0.409***	0.272**	0.236**	0.281**	0.0912	-0.0167
Completed A-level cycle		0.891***	0.547***	0.222*	0.634***	0.685***	0.394***	0.662***	0.327***	0.451***
Has tertiary degree		1.196***	1.341***	1.133***	1.450***	1.735***	1.107***	1.565***	1.027***	1.328***
Years of experience	-0.0445***	0.113***	-0.0192***	0.112***	-0.00287	0.105***	-0.0121***	0.112***	-0.0140***	0.110***
Years of experience squared	0.000811***	-0.00183***	0.000447***	-0.00186***	0.000157	-0.00168***	0.000279***	-0.00183***	0.000348***	-0.00186***
Female	0.151***	-0.459***	0.0238	-0.569***	-0.0958*	-0.495***	-0.0132	-0.521***	-0.00749	-0.515***
Area characteristics										
Urban other than KMA	-0.219***	-0.06	-0.266***	0.151***	-0.263***	0.168***	-0.290***	0.190***	-0.161***	0.125***
Rural	-0.267***	0.0775*	-0.333***	0.164***	-0.325***	0.185***	-0.308***	0.154***	-0.234***	0.103***
Constant	5.765***	-1.805***	4.718***	-1.043***	4.370***	-1.580***	4.662***	-1.511***	4.799***	-1.238***
tan(p)		-1.194***		-0.859***		-0.458***		-0.726***		-0.836***
Observations	8,338	8,338	9,028	9,028	8,891	8,891	8,909	8,909	8,303	8,303

$***p < 0.01$, $**p < 0.05$, $*p < 0.1$

Note: Model is estimated with a Heckman maximum likelihood estimator with robust standard errors. First stage (selection) results are reported in the P(wage) column, second stage (outcome) results are reported in the ln(wage) column. Observations are weighted by sample weights. Real labor earnings (wages) for every year after 2003 are calculated by deflating the observed (nominal) labor earnings by the rate of annual growth in the poverty line from JSCL. Educational dummies correspond to the individual completing the requisite number of years for a specified certificate, rather than the actual attainment of the certificate.

in other words, the pattern depicted in Figure 8 is robust to various specifications of the real wage model.

Figure 8 - Returns to Education, 2003-2007
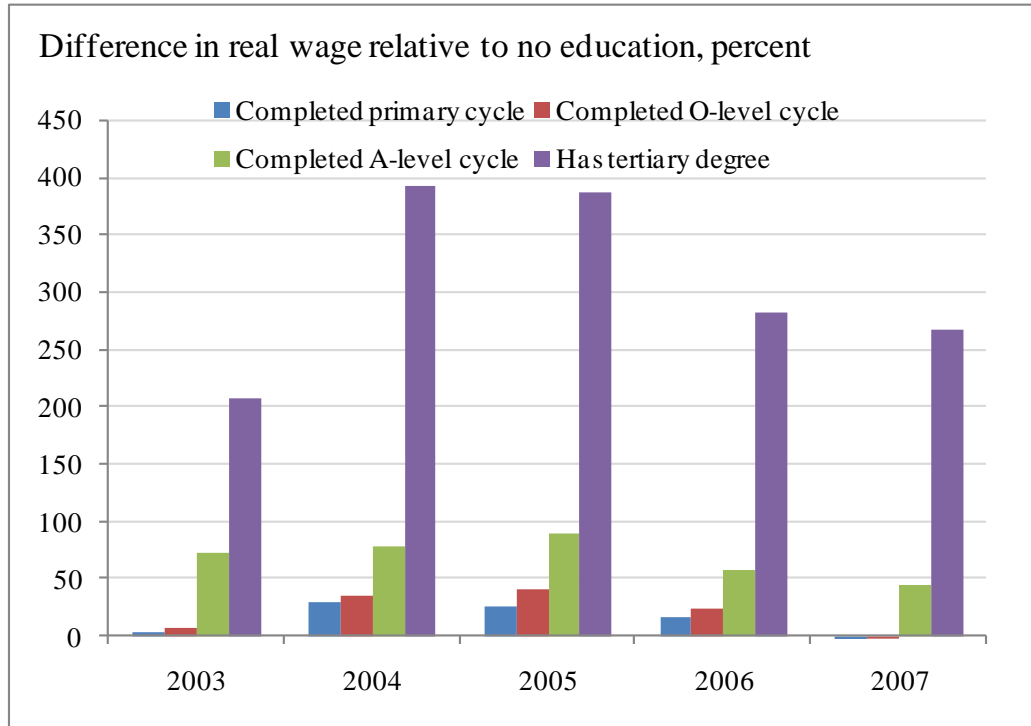
Note: The educational premiums shown are semi-elasticities calculated from a Mincer equation without selection controls (Table 3).

Other determinants of the real wage, such as experience and gender, do not exhibit an obvious trend between 2003 and 2007. The OLS estimates of Table 3 show concave returns to experience and a negative wage premium for female workers, both fairly standard results in the Mincer equation. The Heckit estimates of Table 4, however, are very different: the female wage premium is insignificant for most years and the returns to education become convex. These results could be due to the exit of skilled and high-earning women from the labor force and the concave relationship between experience and the likelihood of labor market participation: higher-paid workers may be able to retire (exit) earlier than lower-paid workers, driving down the observed wage for older workers. These results may also be linked to the increase in reservation wages of Jamaicans due to increased remittance inflows (documented in Kim, 2007), which could encourage older workers and women from families with migrants (who tend to be better-educated and higher-earning on average) to exit the labor force. However, and regardless of whether one goes with the simple estimates of Table 3 or the Heckit estimates of Table 4, unlike with education, there is no clear pattern in the evolution of returns to experience or gender.

3.2 Contribution of Labor Market Indicators to the Reduction in Iinequality

To what extent have the observed wage dynamics affected the distribution of household consumption and have contributed to the observed decrease in inequality? Table 5 shows the estimated relationship between the log of real household consumption per adult equivalent and a set of explanatory variables pertaining to the primary earner, the household overall, and a set of locality dummies for the years 2003 to 2007.[23] Similar to the results obtained from the analysis of the earnings data, education and the sector of employment of the primary earner are strong determinants of household consumption. On the other hand, the primary earner's experience does not appear to significantly affect consumption controlling for the factors above. In each year, the returns to reaching a particular level of education become progressively higher the more advanced the equivalent certificate. Other coefficients, including sector of employment, household size, home ownership, and locality (rural/urban) effects are statistically significant and carry the expected signs.

Consistent with the evidence in the labor force data, the importance of education of the primary earner in explaining the variation in household consumption has been declining over time. In addition to the diminishing returns to tertiary education - discussed in the earlier paragraphs - part of the explanation may also lie in the rising role of remittances in household budgets and the consequent decline in the importance of the primary earner wages for household consumption (see the discussion in Section 2 and also World Bank, 2007). In addition, the differences by sector of employment of the primary earner have also narrowed somewhat.

This combination of the education and sectoral dynamics explains a significant portion of the observed decline in inequality between 2003 and 2007. Returning to the central question of this section - to what extent the observed labor market dynamics explain the decline in inequality - Table 6 contains the results of a simple empirical exercise to understand the determinants of fall in the Gini coefficient between 2003 and 2007. The first row of the table reports the same Gini coefficients as Table 1 for ease of reference. The second row of the table recalculates the Gini using only the households for which the information required to estimate the consumption regressions of Table 5 was available. In some cases, such as 2003 and 2005, the within-sample and overall Gini coefficients are nearly identical; in others, such as 2006 and 2007, the difference amounts to several Gini points. The third row of the table shows the Gini coefficient calculated on predicted, rather than observed, consumption. In other words, the distribution of household consumption underlying the Gini coefficient reported in this row was obtained

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[23] For years 2004-2007, observed household consumption has been deflated by the rate of growth in the poverty line to obtain the real consumption per adult equivalent.

by using, for each household, the predicted (or expected) value of household consumption as given by the household's endowments and the estimated returns to these endowments (coefficients in Table 5). Not surprisingly, using the "average" estimated coefficients yields predicted inequality that is substantially below the observed inequality.

Table 5 - Determinants of Household Consumption per Adult Equivalent, 2003-2007

	2003	2004	2005	2006	2007
Primary earner characteristics					
Completed primary cycle	0.206*	0.278***	0.0634	0.116	0.216***
Completed O-level cycle	0.399***	0.407***	0.174**	0.181**	0.291***
Completed A-level cycle	0.668***	0.587***	0.447***	0.340***	0.498***
Has tertiary degree	1.008***	0.946***	0.974***	0.987***	0.846***
Years of experience	0.0136**	0.00404	0.0100*	0.00185	0.00155
Years of experience squared	-0.0000796	0.0000296	-0.000118	0.0000152	-0.000017
Primary earner sector of employment					
Agriculture, forestry, or fishing	-0.272***	-0.331***	-0.187***	-0.301***	-0.250***
Mining	0.0438	0.225*	0.219	0.331**	0.354***
Manufacturing	0.0741	-0.200***	-0.153***	-0.106**	-0.00609
Construction and utilities	-0.189***	-0.161***	-0.116**	-0.0157	-0.0744
Trade, hotels, restaurants	0.00116	-0.0788*	-0.0701	-0.129***	0.0294
Household characteristics					
Head is male	0.0457	0.0398	0.0206	0.0494	0.111***
Household size	-0.110***	-0.125***	-0.116***	-0.118***	-0.103***
Under-14 dependency ratio	-0.118	0.000481	-0.06	0.0808	-0.037
Over-65 dependency ratio	-0.504***	-0.151	0.0459	-0.14	-0.033
Owns a house	0.161***	0.0207	0.0994***	0.0745**	0.0633*
Area characteristics					
Urban other than KMA	-0.0677	0.0173	-0.112**	-0.0765*	-0.0754*
Rural	-0.257***	-0.159***	-0.302***	-0.189***	-0.286***
Intercept	11.40***	11.62***	11.90***	11.89***	11.85***
Observations	753	1,375	1,501	1,332	1,418
R^2	0.377	0.338	0.339	0.293	0.31

$***p < 0.01, **p < 0.05, *p < 0.1$

Note: Dependent variable is log of household consumption per capita. For each year after 2003, observed consumption is deflated by the rate of annual growth in the poverty line. Observations are weighted by sample weights and regression estimated with robust standard errors. Educational dummies correspond to the individual completing the requisite number of years for a specified certificate, rather than the actual attainment of the certificate.

The last three rows of Table 6 show what inequality in each year could be if the returns to education and sectors remained the same in each year as they were in 2003. For example, in 2007 the regression model yields an expected Gini of 20.23, more than 5 points below the predicted Gini of 25.53 in 2003. If the returns to education had not declined over this period, the 2007 predicted Gini would instead have been 21.79 (fourth row of Table 6). This suggests that the observed fall in returns to education contributed to as much as a two-Gini-point decline in inequality. Combining the effects of the educational and sectoral variables explains about half of the decline in inequality between 2003 and 2007, with the rest attributable to other variables and changes in household endowments.

Table 6 - Observed and Simulated Inequality, 2003-2007

	2003	2004	2005	2006	2007
Observed Gini	38.89	39.04	38.60	37.87	36.78
Observed Gini, within sample	38.85	35.11	38.16	32.37	32.26
Predicted Gini	25.53	21.78	23.96	19.36	20.23
Predicted Gini - 2003 education	25.53	23.14	23.36	21.19	21.79
Predicted Gini - 2003 sectors	25.53	21.39	24.84	19.40	20.64
Predicted Gini - 2003 education & sectors	25.53	22.68	24.27	21.23	22.20

Source: Authors calculations using JSLC data.

4   Conclusions

Between 2003 and 2007, real GDP per capita in Jamaica grew by just one percentage point per year. Yet, poverty fell dramatically from 21 to 10 percent of the population during the same period. Moreover, the reduction in poverty was broad-based: the extreme poor benefitted at least as much as those living below the moderate poverty line, both urban and rural poverty fell substantially, and households headed by males and females shared the benefits of poverty reduction almost equally.

What explains this episode of poverty reduction with hardly any growth in GDP? This paper finds that the decline in poverty was driven by a combination of growth in mean consumption, pro-poor changes in relative prices, and a reduction in inequality. Mean consumption growth substantially outpaced the increases in GDP due in great part to large and growing inflows of international remittances, while the decline in inequality was underpinned by a narrowing in the education and sector wage premiums.

What lessons can be learned from this episode? First, the paper's results show that poverty reduction can certainly occur in an environment of little to no GDP growth, but such declines in poverty could be fragile. More than three quarters of the reduction in poverty in Jamaica was accounted for by the growth in average consumption which was largely supported by external inflows. The reliance on external inflows is likely to subject poverty to a substantial degree of volatility, as illustrated by a nearly 8 percentage points spike in poverty in 2008-10 as remittances fell and unemployment rose during the global economic crisis. A related point is that a remittance-based poverty reduction strategy may also not be sustainable in the long run as the exit of workers who send remittances starves the economy of the necessary human capital. Jamaica has one of the highest skilled emigration rates in the world (estimated at 85 percent by Docquier and Rapoport, 2004), giving rise to substantial "brain-drain" which has severely limited productivity growth.

Second, the decline in inequality - while helping to reduce poverty in the short term - appears to have occurred in part due to a narrowing of the sectoral and educational wage premiums. This could signal an improvement in the functioning of the labor market, as inter-sectoral wage premiums are normally interpreted as indicative of labor market rigidities, while a de-

cline in returns to higher education (relative to those with little or no formal education) could mean an increase in the supply of skilled workers. The latter is particularly relevant for Jamaica, which - due largely to very high "brain-drain" - has historically experienced skills shortages and has one of the highest rates of return to schooling (see Bils and Klenow, 2000; World Bank, 2011).[24] On the other hand, to the extent that the decline in returns to progressively higher levels of schooling may have been caused by falling demand, this could have adverse long-term effects on productivity growth and human capital accumulation as lower returns to education raise the opportunity cost of staying in school and may affect the incentives to pursue advanced studies. Further empirical work on estimating supply and demand for skilled labor in Jamaica could shed more light on this issue and yield important policy lessons for other countries with high rates of skilled emigration.

Overall, this paper's analysis of the determinants of the reduction in poverty observed during 2003-07 in Jamaica shows that poverty can decline rapidly even when growth is essentially flat, but that such declines are likely to be fragile and unlikely to be sustainable over the long term. A sustained reduction in poverty, either in Jamaica or in most of its Caribbean neighbors, is unlikely to occur without an acceleration in growth. In turn, the extent to which any acceleration in growth is pro-poor will depend importantly on a number of factors discussed in this paper - shifts in relative prices and labor market developments - as well as others which were not considered but could also have an important impact, such as vulnerability to flooding and natural disasters, crime, and availability of infrastructure and health and education services.

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[24] World Bank (2011) estimates that returns to tertiary education in Jamaica are 63 percent higher than the average for Latin America.

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Appendix

A1 Data

This paper's analysis is based on the 2003-2007 rounds of the Jamaica Labor Force Survey (LFS) and the Jamaica Survey of Living Conditions (JSLC). The JSLC is a comprehensive household survey, which has been conducted in yearly rounds since 1988 as a subset of the Jamaica Labor Force Survey (LFS). The LFS is conducted four times a year - in January, April, July, and October - and covers approximately 1.0-1.3 percent of the Jamaican population. The sample size for the JSLC is one-third of the households in the LFS, or 0.33 percent of all households in Jamaica, and interviews are carried out face-to-face between May and August of each year.

Consistent with the approach adopted by the local statistical authorities, this paper calculates the FGT poverty measures (including the poverty headcount P0, poverty gap P1, and squared poverty gap P2) and all inequality indicators using adult equivalence scales. Adult equivalence scales allow for calculation of poverty and distributional statistics while recognizing that caloric intake requirements (and consequently, the income required to purchase the minimum adequate bundle of calories, i.e., to meet the poverty line) vary by age and gender. Therefore, a family with a large number of women and children may require less income to buy the minimum food basket than a household made up primarily of adult males.

A number of the results in this paper rely on combined data from the LFS and the JSLC. Because the JSLC is a subset of the LFS, the two surveys can be combined to extend the coverage of consumption surveys. This was required in several cases; for example, the 2003 and 2005 SLCs were missing data on education so for these years the JSLC was merged with the education data from the LFS. However, in the 2003 case, close to half of the households in the SLC could not be identified in the LFS, resulting in a substantially lower number of observations. This illustrates the challenges in combining the surveys, since the merging of the two datasets is imperfect due to differences in non-response rates across the two surveys and the fact that dwellings, rather than households, form the secondary sampling units. Thus, any time a household moves and another household takes up residence in the same dwelling between April and May-August, the matching process will fail. These practical challenges reduce the size of the sample available for analysis and necessarily add caveats to the empirical conclusions because the loss of households in the merging process may introduce an unknown bias into the final sample design.

Poverty by Locality, Gender, and Sector

The poverty decline has been broad-based across urban and rural areas. As shown in Table 1, poverty declined substantially in all three main localities: the Kingston Metropolitan Area (KMA), other cities, and rural areas. Although urban areas excluding KMA registered the greatest percentage decline in poverty, these areas account for less than a quarter of all the poor in Jamaica. Thus, the primary driving force behind the decline in aggregate poverty has been the reduction in the poverty headcount in the rural areas of Jamaica, which had a high initial concentration of the poor (Figure A1). This is consistent with the evidence on higher-order measures of poverty presented in the previous paragraph, since the rural poor tend to be worse off than the urban poor (even after taking into account the lower poverty line in rural areas). The relatively larger improvement in the consumption of initially poorer parts of the population also explains some of the reduction in inequality discussed earlier in this section and is consistent with the GIC in Figure 3.

Figure A1 - Poverty Trends in Kingston, Urban, and Rural Areas, 2003-07

Poverty headcount by locality (population-weighted)
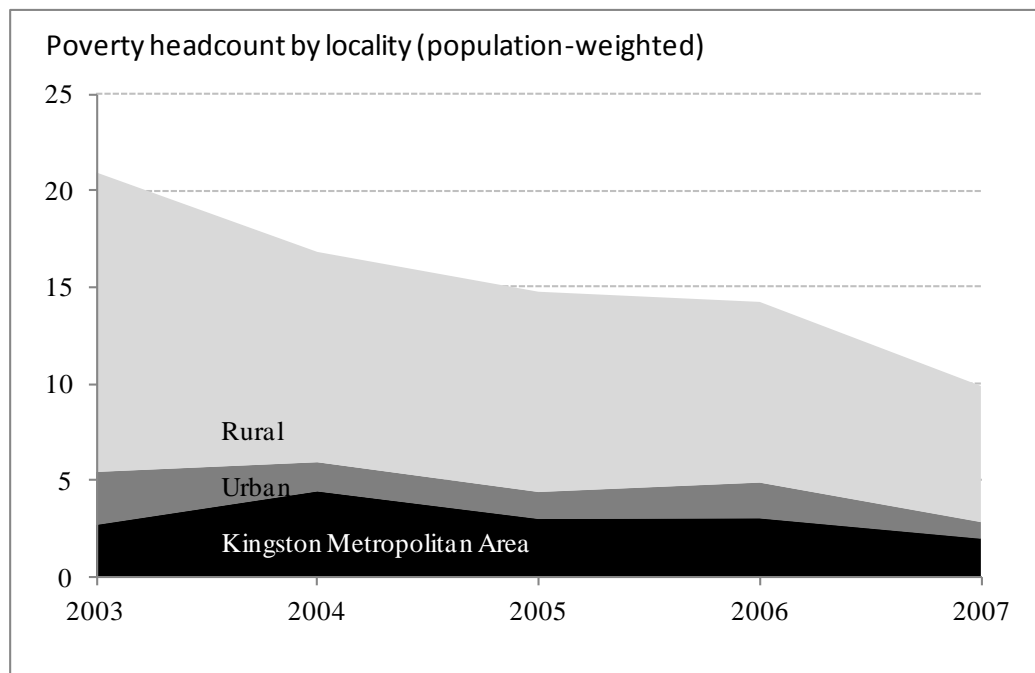
At the parish level, poverty declined everywhere with the possible exception of Westmoreland. However, poverty rates by parish, shown in Table 1, must be interpreted with caution because the JSLC is not necessarily representative at the parish level. According to PIOJ/STATIN (2008), the JSLC sample was representative at the parish level only in 1998 and 2002, when the sample size was broadened to one percent of all house-

holds in Jamaica. However, as long as there is no consistent bias in the sampling methodology towards/against some of the parishes, it is still possible to evaluate within-parish trends over time. With this caveat, it is clear that poverty declined substantially in the three parishes comprising the Kingston Metropolitan Area: Kingston, St. Andrew, and St. Catherine. Similarly, poverty in parishes with large numbers of rural dwellers - such as Portland, St. Mary, and St. Elizabeth - has fallen rapidly, consistent with the evidence in the previous paragraph.

In order to provide a visual representation of the evolution and concentration of poverty by parish, Figure A2 and Figure A3 plot the parish-level poverty headcount and the share of the total number of the poor, respectively, on a map of Jamaica. The evolution of poverty in Figure A2 suggests that poverty reduction in the north-east of Jamaica (and in St. Elizabeth) has been more rapid than in other parts of the island. On the other hand, Clarendon continues to be one of the poorest parishes in Jamaica; ignoring the 2007 jump in poverty in Westmoreland, Clarendon was the parish with the highest incidence of poverty in 2006-07. The geographic concentration of poverty in Jamaica, documented in Figure A3, appears to have increased over time, with a growing density of the poor in Clarendon and, to a lesser extent, Manchester.

Moving on to differences by gender, the poverty headcount is higher for households with a female head because these households are larger and have more children. In 2003, the poverty headcount among female-headed households was nearly four percentage points higher than the headcount for male-headed households.[25] As both types of households experienced nearly identical rates of poverty reduction between 2003 and 2007, the gap between the two groups remained the same in relative terms. In order to understand the relationship between household size, gender of the head, and poverty, Table A1 summarizes the relevant characteristics of households headed by males and females in 2003 and 2007. The first ten rows of the table show that, even though female-headed households are over-represented among poor households in Jamaica, the difference in the household's likelihood to be poor does not significantly vary by gender. In other words, without controlling for any other determinant of household consumption, there is no bias in poverty with regard to the gender of the household head: households headed by males or females are equally likely to be poor. Instead, what accounts for the higher headcount among female-headed households is their larger size. The last six rows of Table A1 show that female-headed households are on average larger than male-headed households; the difference is due to these households having more children. This difference is even larger for poor female-headed households,

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[25] The discussion in this paragraph refers to the head of the household as identified by survey respondents ("declared head"), rather than the primary earner in the household ("economic head").

who on average have nearly two more children than a poor household headed by a male.[26]

Poverty among households with the primary earner working in agriculture fell substantially, but at a slower rate than for households with primary earners in other sectors. The headcount among households with the primary earner in agriculture declined from 37.3 percent in 2003 to 22.6 in 2007 (with a brief spike in 2006). However, poverty among households with primary earners in service sectors fell at a rate that was one-third faster. The slower rate of poverty reduction among agricultural households is correlated with two (inter-related) developments. First, although most of the aggregate reduction in poverty between 2003 and 2007 occurred in rural areas - where most agricultural households reside - the rate at which poverty fell was faster in urban areas and KMA.[27] Second, the size of the agricultural sector - measured by the share of households with the primary earner in agriculture - has been steadily declining from 23 percent in 2003 to 19 percent in 2007.[28] Normally, it is the richer households - those with greater physical and human capital assets - who are more likely to exit the agricultural sector and the households who do not shift into non-agricultural occupations tend be worse off on average. Consequently, the consumption of agricultural households increased at a slower rate than households with primary earners in other sectors.

Table A1 - Household Characteristics by Gender of the Head

	2003	2007
Composition of all households (%)		
Head is male	56.30	53.82
Head is female	43.70	46.18
Composition of poor households (%)		
Head is male	54.00	51.03
Head is female	46.00	48.97
Likelihood of the household being poor (%)		
Head is male	22.96	7.18
Head is female	25.20	8.04
p-value	0.25	0.48
Household size by gender of the head, all households		
Head is male	3.19	2.97
Head is female	3.82	3.68
Household size by gender of the head, poor households		
Head is male	3.66	3.56
Head is female	4.58	5.10

Source: Authors' calculations with JSLC 2003, 2007.

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[26] Poor households in general tend to be larger than non-poor households, with fewer working-age members and more children and elderly.

[27] This is due to the fact that most initial poor are rural poor (and, by extension, households deriving most of their income from agriculture).

[28] In 2007, the share of agricultural households increased from the previous year, when it was estimated at 16 percent.

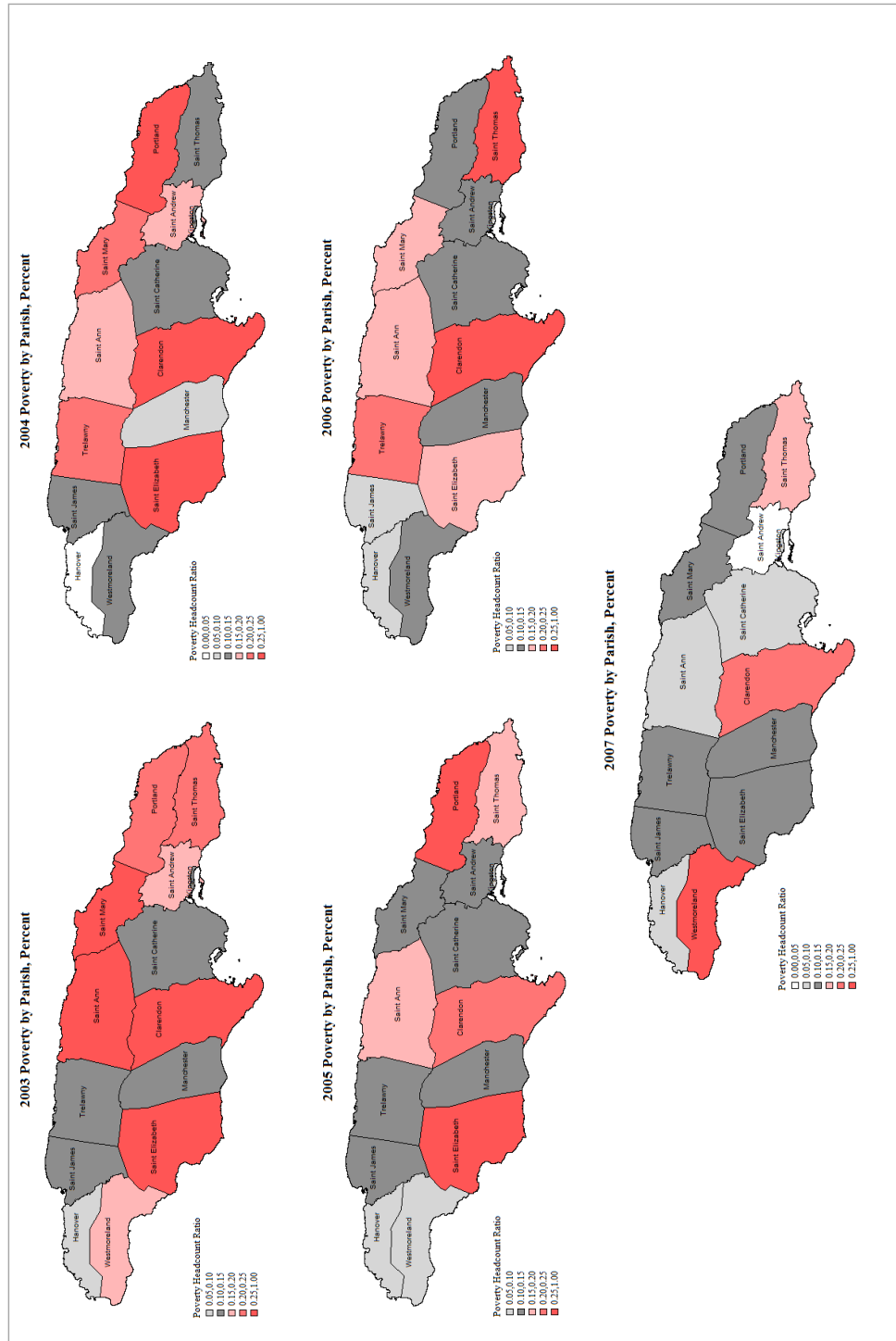*Figure A2 - Poverty Headcount by Parish, 2003-07*

Figure A3 - Contribution of Each Parish to the Number of Total Poor in Jamaica, 2003-07 (Percent)
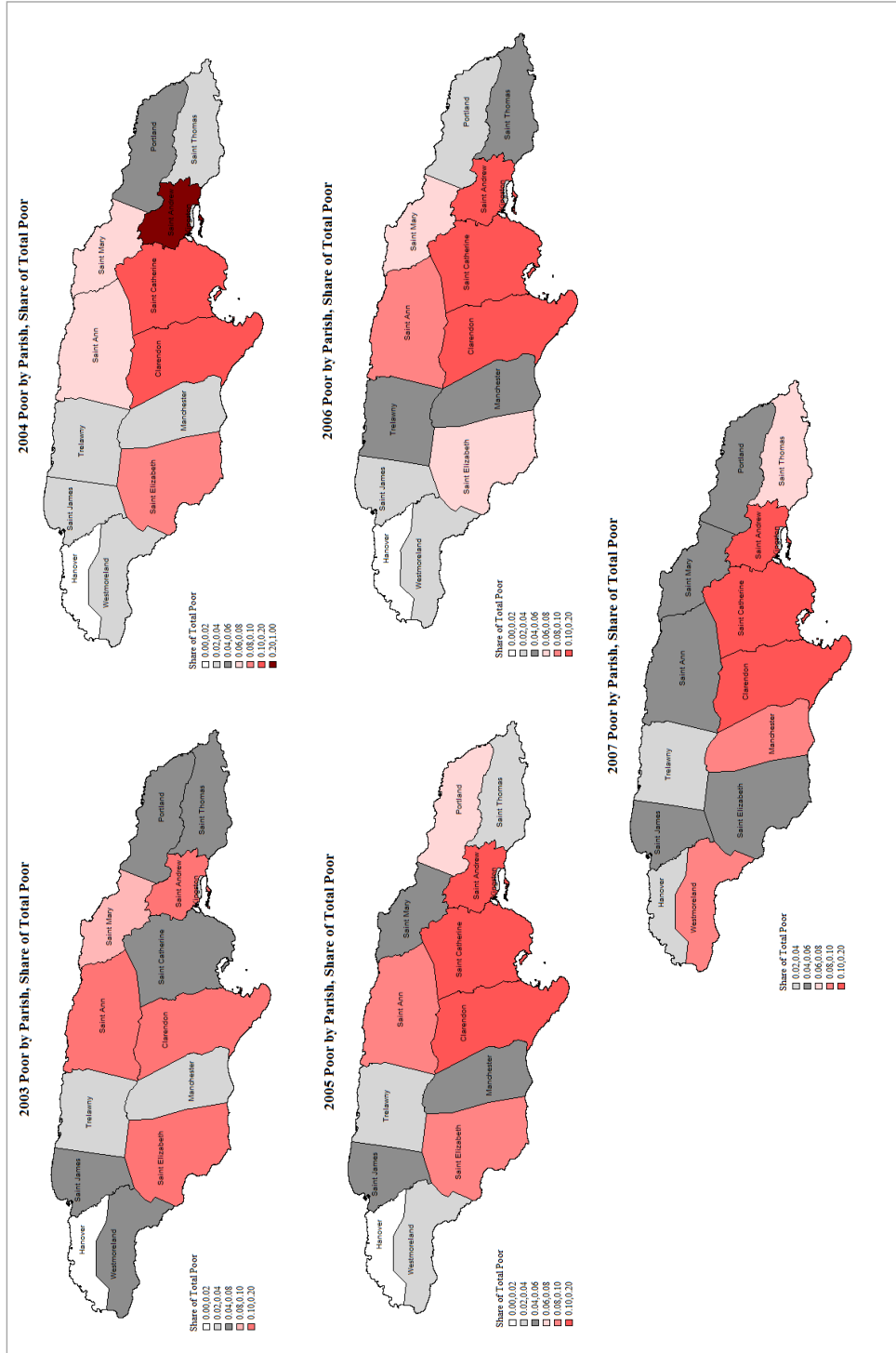
Table A2 - Household Consumption per Adult Equivalent, 2003-07 (J$)

	2003	2004	2005	2006	2007	Cumulative % change, 2003 - 2007
Jamaica	**116,618**	**135,090**	**163,909**	**183,771**	**217,713**	**86.7**
Consumption per capita by:						
Locality						
KMA	167,800	174,250	218,007	236,021	288,766	72.1
Urban	133,268	153,100	175,117	192,820	235,650	76.8
Rural	89,399	103,325	125,182	144,279	160,319	79.3
Parish						
Kingston	112,894	172,146	200,897	222,303	192,722	70.7
St Andrew	160,004	166,108	212,168	238,969	275,447	72.2
St Thomas	102,814	113,250	128,197	148,061	181,159	76.2
Portland	91,879	95,371	124,702	141,778	178,977	94.8
St Mary	75,937	93,139	123,770	150,893	188,651	148.4
St Ann	85,408	122,630	145,020	161,269	202,507	137.1
Trelawny	86,340	105,856	112,573	136,806	191,553	121.9
St James	141,857	153,911	156,544	180,599	251,696	77.4
Hanover	121,510	122,392	142,372	134,191	154,044	26.8
Westmoreland	88,158	102,335	142,802	175,179	158,151	79.4
St Elizabeth	71,259	107,112	141,350	160,024	149,634	110.0
Manchester	108,775	124,304	159,761	157,006	170,277	56.5
Clarendon	91,490	96,625	118,501	138,678	151,453	65.5
St Catherine	154,972	161,463	187,128	198,989	271,365	75.1
Household Head Characteristics						
Gender						
Male	123,981	138,836	177,797	196,323	227,064	83.1
Female	108,693	131,637	150,445	172,029	208,905	92.2
Marital Status						
Married	125,194	133,150	178,161	198,845	225,363	80.0
Not Married	111,301	135,786	155,587	175,071	213,851	92.1
Household Primary Earner Characteristics						
Gender						
Male	112,942	127,837	167,005	179,179	210,103	86.0
Female	119,807	144,531	163,858	184,858	231,261	93.0
Sector						
Agriculture	73,572	83,424	113,774	115,074	134,844	83.3
Mining	103,982	175,469	211,443	267,147	326,752	214.2
Manufacture	141,978	119,973	150,490	174,919	216,013	52.1
Electricity, Gas and Water	125,533	106,964	241,346	328,972	311,676	148.3
Construction	99,598	116,983	143,027	198,627	192,227	93.0
Trade, Hotels, Restaurants	116,685	134,558	160,383	164,669	223,945	91.9
Transport & Communications	165,678	166,289	170,574	191,639	273,798	65.3
Financing	190,721	209,108	259,105	267,974	324,604	70.2
Community, Other Services	128,931	163,485	198,578	217,337	250,556	94.3
Industry Not Classified	122,747	139,459	156,867	195,149	211,504	72.3

Source: Authors' calculations using JSLC data.