The Employment Intensity of Non-Agricultural Growth in Rwanda

Analysing the links between Growth, Employment, and Productivity in Rwanda

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By

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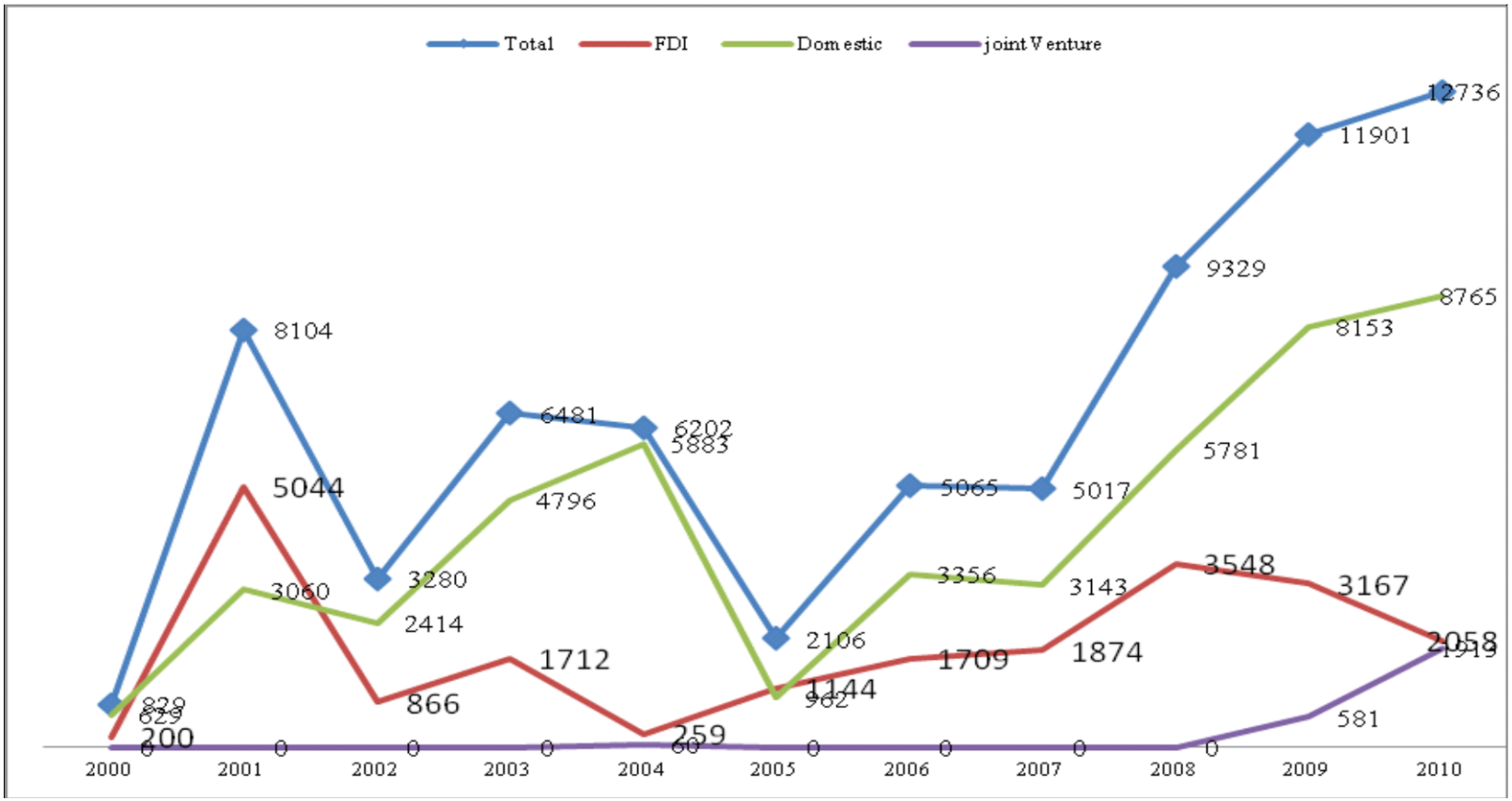
Background

- Concerns with "jobless growth" as major obstacle for the poor to benefit from the positive growth performance in LDCs
- The poor derive most of their income from work (as employees, as the self-employed, or in subsistence activities)
  - Impact of growth on poverty depends on the extent to which growth generates employment and good earning opportunities.
- If employment growth is achieved at the expense of wage reductions, it may have little impact on poverty
- The poor in LICs like Rwanda cannot afford to be unemployed.
  - Government policies should be more concerned with raising the income of the working poor, in addition to, reducing the unemployment rate

Employment creation trends in Rwanda over time

Figure1: Number of Jobs Created by Registered Investors 2000-2010



(Source: Data supplied by RDB)

The quality of Jobs created over time (Under employment in Rwanda)

- **Employment to population ratio**; Indicates the ability of an economy to absorb adults seeking employment: a ratio of over 80% p indicates abundance of low-quality jobs
  - **In Rwanda the economic activity rate is over 80 per cent. It has declined since 2000 from 86.7 per cent to 84.2 per cent in 2010/11**.
- **The proportion of employed people living below the poverty line** is a measure of the proportion of people who work for a poverty wage (unable to earn sufficient to bring themselves out of poverty).
  - **In 2005/6 fifty-five per cent of workers earned a poverty wage.**
- **Vulnerable employment:** . In 2010/11, 72.8 per cent of workers were in vulnerable employment, compared to 80.9 per cent in 2005/6 and 89.1 per cent in 2000.

Methodology

- Methodology determines the extent to which growth is associated with changes employment (quantity of jobs) or productivity (quality of jobs) by sector of the economy.
- Uses Shapley decompositions, a simple additive method that links changes in a particular component to changes in total per capita GDP, considering
  - the relative size of the sector or component,
  - the magnitude of the change.
- It helps understand how growth is linked to changes in employment, output per worker and population structure at the aggregate and sector level
- To draw profile of Rwanda's growth we disentangle the sources of output per worker growth into
  - Total Factor Productivity (TFP) growth,
  - Movements of employment from one sector to another,
  - changes in the capital-labor ratio.

The Model

- To understand how growth has translated into increases in productivity and employment at the aggregate & sector level , per capita GDP, *Y/N=y* can be expressed as:

$$\frac{Y}{N} = \frac{Y}{E}\frac{E}{A}\frac{A}{N} \quad \text{.....(1)}$$

Or $y = \omega^{*} e^{*} a$

where Y is total Value Added, E is total employment, A is the total population of working age and N is total population.

Thus ,Y/E=ω is total output per worker, E/A is the share of working age population (i.e. the labor force) employed and A/N is the labor force as a fraction of total population. *e*, employment rate.

- Given the additive nature of Shapely decompositions, the total change in per capita GDP will be the sum of the growth attributed to each of its components ω, *e*, and a. Thus if ω , *e* and *a* denote the fraction of growth linked to each component then the growth rate of an economy is expressed as

$$\frac{\Delta y}{y} = \bar{\omega}\frac{\Delta y}{y} + \bar{e}\frac{\Delta y}{y} + \bar{a}\frac{\Delta y}{y}$$

And total growth as;

$$\Delta y = \bar{\omega} * \Delta y + \bar{e} * \Delta y + \bar{a} * \Delta y$$

The Model Continued

- To understand the way in which sectors contributed to employment generation and to total per capita growth we further decompose employment (rate) growth (Δe) by sectors.
- Total growth in employment is expressed as the sum of employment generation in each sector.

$$\Delta e = \sum_{i=1}^{s} \Delta e_i$$

- where $\Delta e_{i=}\Delta\frac{E_i}{A}$ is the change in employment in sector *i* as a share of total working age population.
- This gives a measure of which sector contributed more to changes in the employment rate

Data sources

- To perform the decomposition we use data on Rwanda's GDP output for two periods i.e. 2006 and 2011from Rwanda National Accounts (NISR).
- Growth is measured by value added in order to perform sectoral decompositions
- Employment data per sector is from the 2005/6 and 2010/11 Rwanda national household surveys
  - Employment numbers refer to all the economy and not just to the formal sector or the urban economy.
- To decompose real growth, data on output is expressed in constant 2006 Rwandan Francs.
- World Bank's JOGGS decomposition tool used

Findings

Employment, Output, Productivity and Population 2006-2011

Table 1: Employment, Output, Productivity and Population. Rwanda 2006-2011

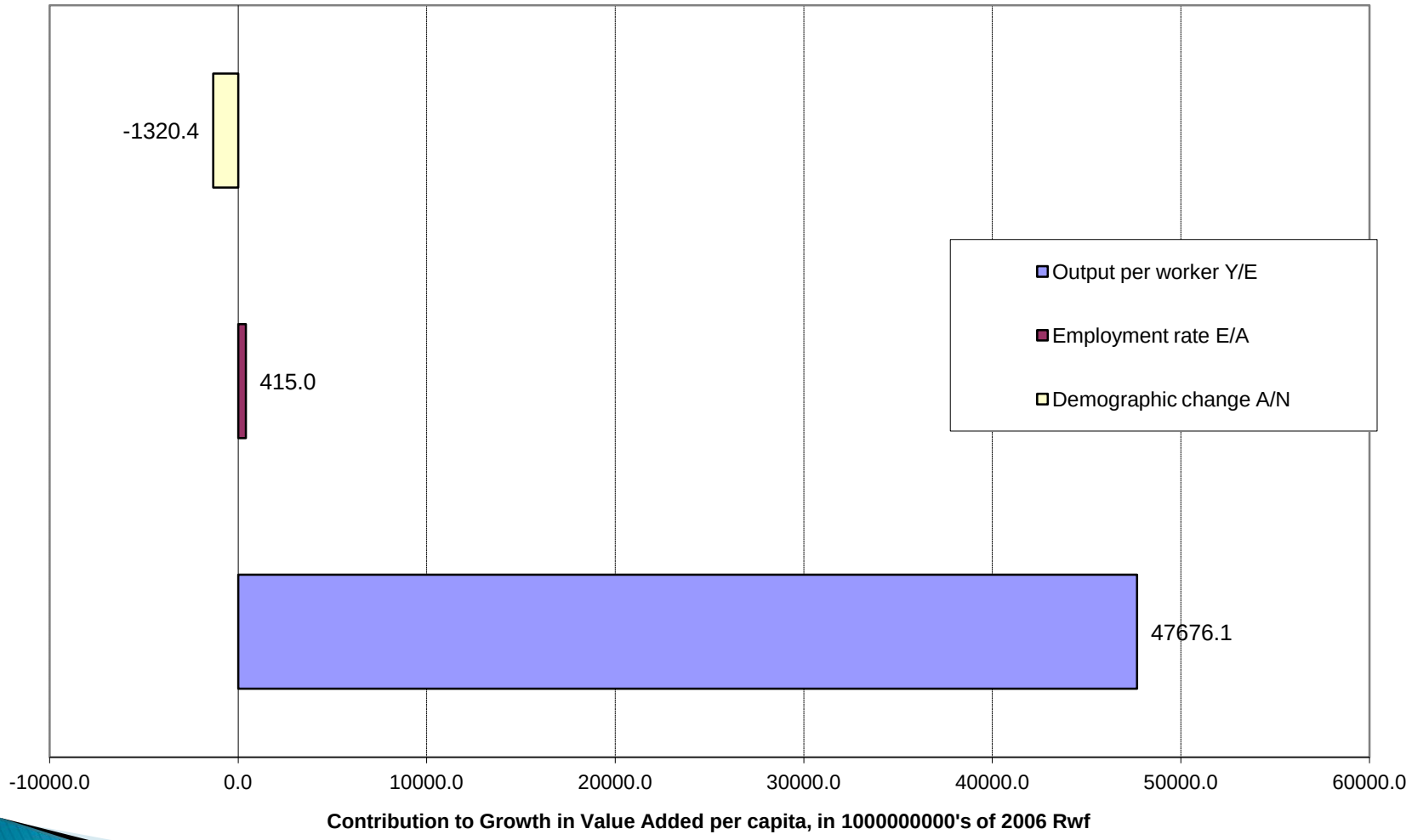
	2006	2011	% change
GDP (value added) (in 1000000000's)	1,548	2,306	49.0
Total population	9,441,406	10,942,950	15.9
Total population of working age	5,115,571	5,887,514	15.1
Total number of employed	4,301,000	4,961,000	15.3
GDP (value added) per capita	163,959	210,729	28.53
Output per worker	359,916	464,826	29.15
Employment rate	84.08	84.26	0.22
Share of population of working age	54.18	53.80	-0.38

Decomposition of Growth in per capita Value Added, Rwanda 2006-2011

Table 2: Decomposition of Growth in per capita Value Added, Rwanda 2006-2011		
	2006 Rwf	**Percent of total change in per capita value added growth**
Total Growth in per capita GDP (value added)	46,770.65	100
Growth linked to output per worker	**47,676.06**	**101.94**
Growth linked to changes employment rate	*415.03*	*0.89*
Growth linked to changes in the share of population of working Age	**-1,320.44**	**-2.82**

Aggregate Employment,Productivity and Demographic profile of Rwanda

Figure 1: Aggregate Employment, Productivity, and Demographic Profile of GrowthRwanda 2006-2011



Employment by Sectors of Economic Activity, Rwanda 2006-2011

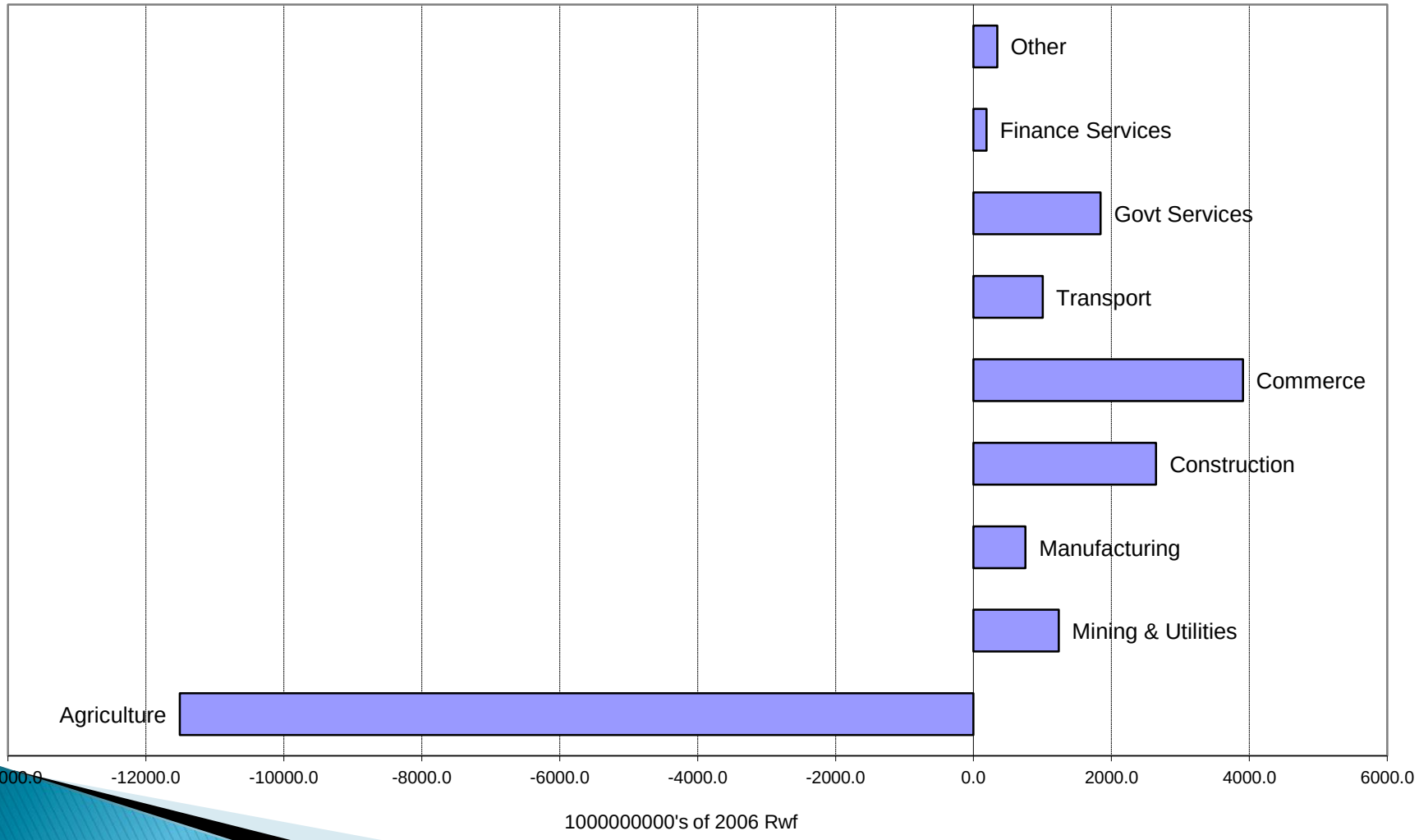
Employment by Sectors of Economic Activity, Rwanda 2006-2011						
	Total employment			Employment/pop. of working age		
	2006	2011	% change	2006	2011	% change
Agriculture	3,389,000	3,596,000	6.11	66.25	61.08	-7.80
Mining & Utilities	22,000	58,000	163.64	0.43	0.99	129.07
Manufacturing	80,000	112,000	40.00	1.56	1.90	21.64
Construction	66,000	146,000	121.21	1.29	2.48	92.21
Commerce	296,000	444,000	50.00	5.79	7.54	30.33
Transport	56,000	91,000	62.50	1.09	1.55	41.19
Govt Services	141,000	211,000	49.65	2.76	3.58	30.02
Finance Services	13,000	20,000	53.85	0.25	0.34	33.67
Other	238,000	283,000	18.91	4.65	4.81	3.32
Total	**4,301,000**	**4,961,000**	**15.35**	**84.08**	**84.26**	**0.22**

Employment by Sectors of Economic Activity over time

- Total employment in grew by 15.4%, but as a result of the simultaneous growth in the working age population, the employment rate grew by only 0.22%.
- Agriculture is still the dominant source of employment (with over 60% of the working age population).
  - However, the proportion of working adults in agriculture is reducing over time
  - Challenge is how to absorb surplus labour from agriculture
- Employment in manufacturing sector has increased by 22% over the 2006-2011 period .
    - **However, manufacturing still lags behind comparable sectors like commerce, transport and services all of which show increases of over 30%**
- From a low base, Mining and construction have registered rapid growth in employment in both absolute numbers and proportion of the working age population

Contribution of sectoral employment changes to growth in total per capita output.

Figure 3b: Contribution of Change in Employment-to-Population Ratio to Change in GDP (value added) per capita, by Sector
Rwanda 2006-2011

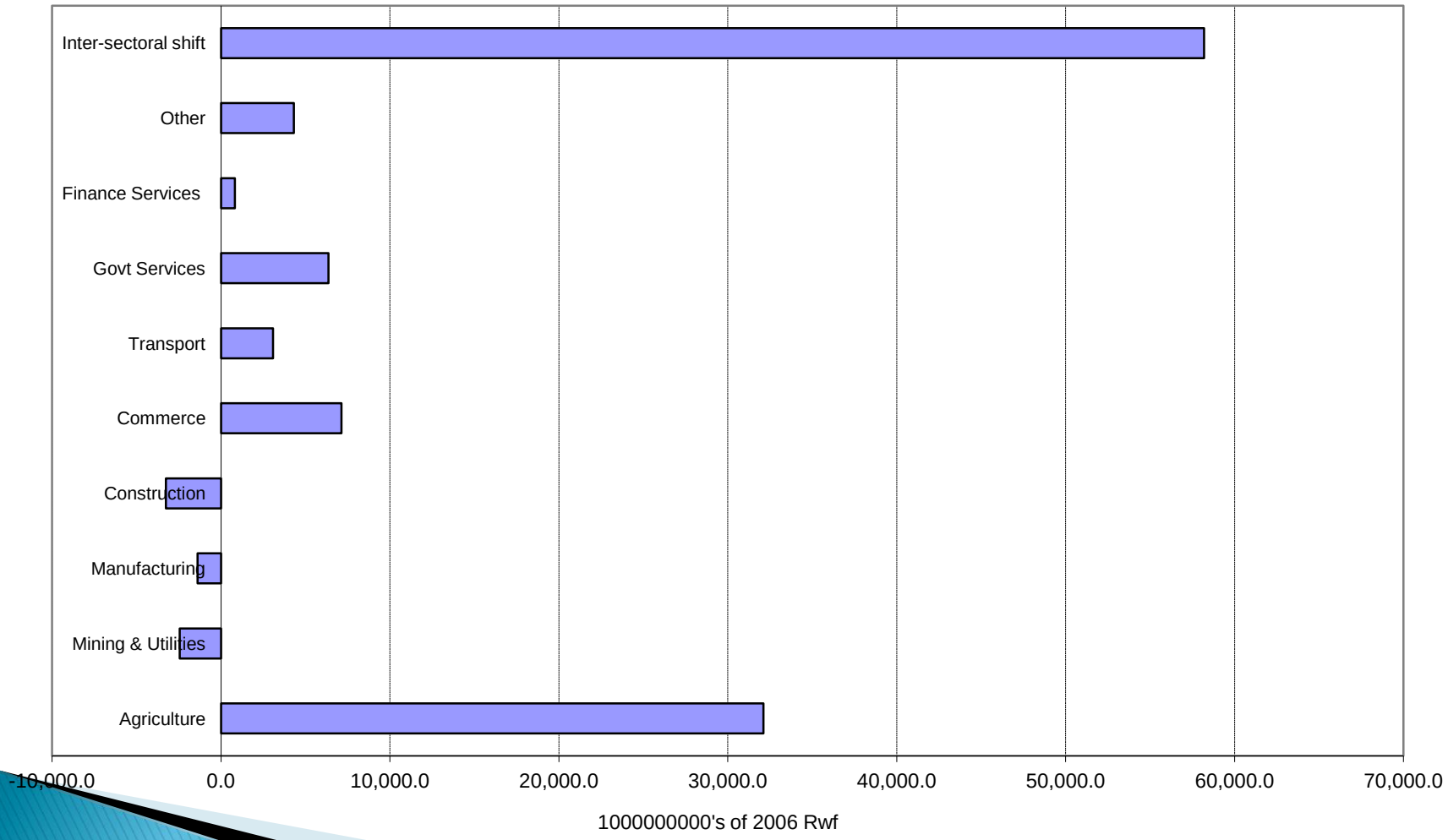


Labour Productivity Changes over time

Table 5: Changes in Output per Worker by Sectors. Rwanda 2006-2011			
	2006	**2011**	***% change***
Agriculture	194,748	237,208	21.80
Mining & Utilities	636,364	344,828	-45.81
Manufacturing	**612,500**	**544,643**	**-11.08**
Construction	1,590,909	1,445,205	-9.16
Commerce	648,649	738,739	13.89
Transport	2,089,286	2,285,714	9.40
Government Services	**1,319,149**	**1,488,152**	**12.81**
Finance Services	3,769,231	4,000,000	6.12
Other	739,496	816,254	10.38
Total output per worker	**359,916**	**464,826**	**29.15**
Monetary values are 2006 Rwf			

Decomposing Labour productivity into Within Sector Changes in Output per Worker and Inter-sectoral Shifts.

Figure 4a: Decomposition of Growth in Output per Worker: Inter-Sectoral Shifts and Within Sectoral Output Growth
Rwanda 2006-2011



Analysis

- Inter-sectoral shifts and agriculture had the largest contributions of 55.5% and 31% to the labour productivity growth in Rwanda

- Agriculture productivity growth is attributed the implementation of the Crop Intensification Program (CIP) which entailed land consolidation, increased fertilizer use and commercialization among Rwandan farmers

- Since inter-sectoral shifts had the largest positive contribution it implies that on average labor movements from lower than average productivity sectors to above average productivity sectors contributed the largest gains to labour productivity.

- Except agriculture whose share of working age population contracted, other sectors increased their employment shares.
  - An important share of growth in output per worker may have been due to movements of the labor force from agriculture into other sectors of the economy.

Decomposition of Inter-sectoral shifts in Rwanda 2005/6-2010/11

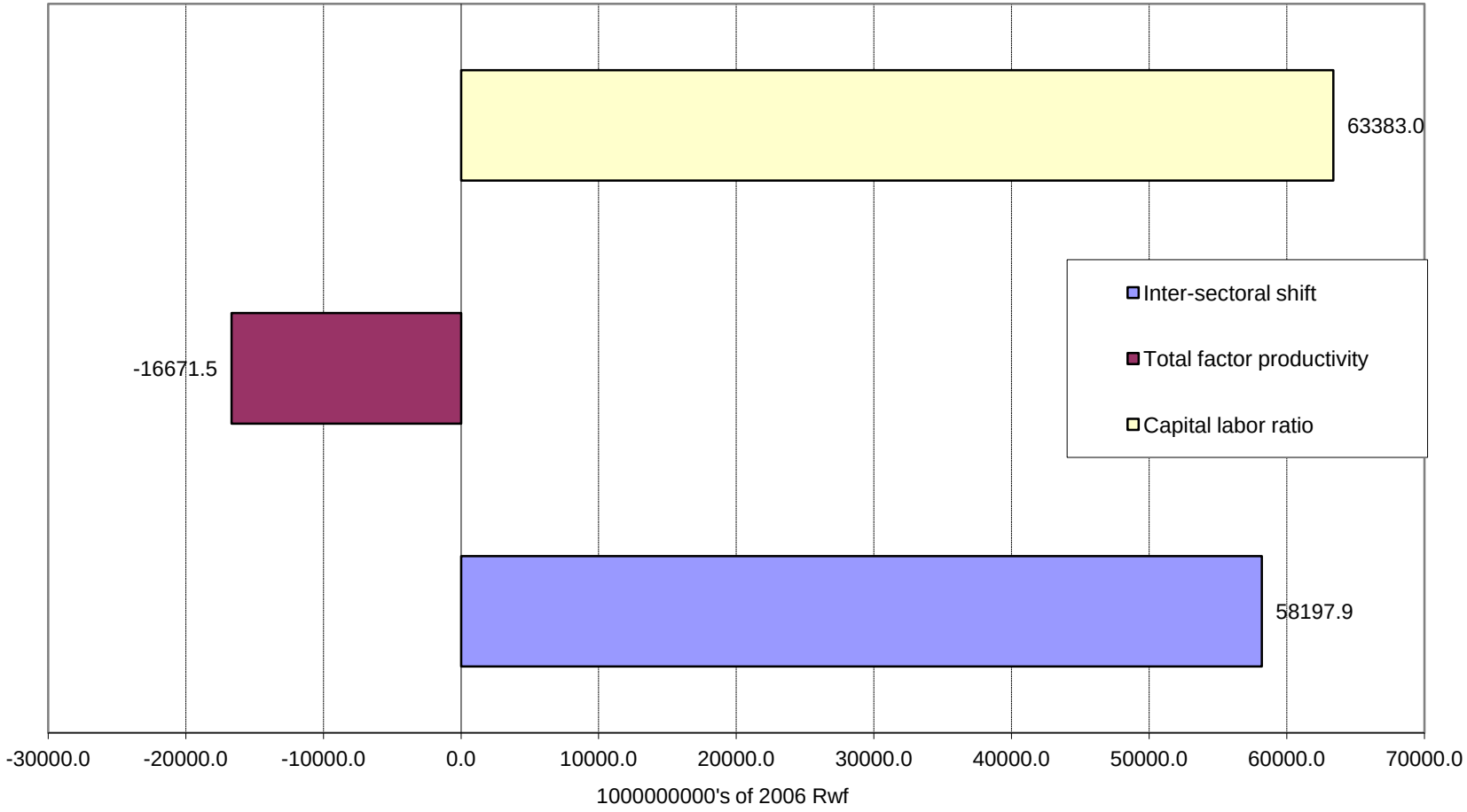
Decomposition of Inter-sectoral Shifts. Rwanda 2006-2011		
	Direction of Employment Share shift	**Contribution to Inter-sectoral Shifts (%)**
Sectoral contributions		
Agriculture	**-**	**21.29**
Mining & Utilities	+	0.88
Manufacturing	+	1.14
Construction	**+**	**26.76**
Commerce	+	9.99
Transport	**+**	**16.24**
Govt Services	**+**	**16.60**
Finance Services	+	6.02
Other	+	1.07
Total Contribution of inter-sectoral shifts		*100*

The sources of changes in total output per worker (net of inter-sectoral shifts) at the aggregate level

- Aggregate and sectoral changes in output per worker ($\Delta\omega$), capture changes in output per worker, but its interpretation is not so straight forward.
- Increases in output per worker can come from three different sources:
  - i) increases in capital labor ratio
  - ii) increases in Total Factor Productivity (TFP) and
  - iii) relocation of jobs between bad jobs sectors (low productivity) to good jobs sector (high productivity), which is the between-component of growth in output per worker or the labor relocation effects .
- We decompose within productivity changes (or productivity changes net of inter-sectoral shifts) into changes due to increases in the capital-labor ratio and the residual, which can be interpreted cautiously, as Total Factor Productivity (TFP) growth.

Sources of changes in total output per worker (net of inter-inter-sectoral shifts) at the aggregate leve

Figure 5: Decomposition of Changes in Output per worker
Rwanda 2006-2011



Conclusions

Summary of the growth decomposition in Rwanda (2005/6-2010/11)

Growth Decomposition. Percent Contribution to Total Growth in GDP (value added) per capita, Rwanda 2006-2011				
Sectoral contributions	**Contribution of within sector changes in output per worker (%)**	**Contribution of changes in Employment (%)**	**Contributions of Inter-sectoral Shifts (%)**	**Total (%)**
Agriculture	**31.21**	-24.61	**12.04**	**18.64**
Mining & Utilities	-2.38	2.64	0.50	0.76
Manufacturing	**-1.36**	**1.61**	**0.64**	**0.90**
Construction	-3.17	**5.66**	**15.13**	**17.62**
Commerce	**6.93**	**8.35**	5.65	**20.94**
Transport	2.99	2.15	9.18	14.32
Govt Services	6.18	3.94	9.39	19.51
Finance Services	0.79	0.41	3.40	4.60
Other	4.19	0.73	0.61	5.53
Subtotals	***45.39***	***0.89***	***56.55***	***102.82***
Demographic component	**-**	**-**		**-2.82**
Total				100.00
Total % change in value added per capita 2006-2011				**28.53**

Conclusions

- Growth was mainly driven by inter-sectoral shifts and productivity increases at 56.6 % and 45% respectively.
- Employment changes contributed a meagre 0.9% indicating nearly jobless growth.
- Agriculture contributed most to productivity increases at 31% while commerce and construction created the highest proportion of new jobs at 8% and 5.65 respectively.
- Contributions to Inter-sectoral shifts were highest in construction and agriculture at 15%and 12% respectively.
- Demographic component (population growth) has a negative impact on the observed output growth of 28% over the period.
- Rwandan manufacturing sector still lags behind in terms of employment creation and shows declining productivity over time. (This has Implications for Self reliance)