Motivations

- Cross-country growth regressions show a negative relationship between foreign aid/capital inflows and long-term growth (Rajan and Subramanian, *JDE* 94(1), 2011)
- Dani Rotrik (BPEA, 2008) shows that the overvalued exchange rate as a result of such foreign inflows is one fundamental reason for explaining the negative relationship between growth and inflows
- However, many African countries have quite impressive growth records in the recent 15-20 years when they have also increasingly received foreign aids and other types of foreign inflows (including remittances)
- Can recent growth in Africa sustain and avoid their historical paths – mountains, cliffs and plains instead of hills (Pritchett 2000)?
  - Will the relationship between growth transition and structural change in Africa differ, i.e., is it possible for growth to be persistent without structural change?
Why Rwanda?

- Rwanda has more than 8% of average annual growth rate in 1999-2012 and growth is not related to natural resource booming
  - The country is poor in natural resources, it has the highest population density in Africa (i.e., also poor in agricultural resource), and it is land-locked

- Rwanda’s growth is also broad-based, which has led to a rapid reduction in poverty
  - The national poverty rate has been lowered by 12 percentage points between 2005/06 and 2010/11

**Change in real income per adult equivalent by income quintile 2005/06-2010/11 (2005/06 = 1)**

Sources: Integrated Household Living Conditions Surveys 2005/06 (EICV2) and 2010/11 (EICV3)
Yes, Rwanda is a success country in Africa

Rwanda is looking into future

- The government of Rwanda aims a middle-income goal and targets double-digit growth rate in next 5-10 years

Can the growth sustain? What will lead the growth acceleration? What will be the challenges to the growth acceleration?

- This study is part of the growth diagnostic required by the government
Growth with Structural Change?

- Rapid growth is often accompanied by the structural change, which helps to sustain the future growth by creating new engines to growth
- Where did the rapid growth come from and has structural change occurred?

The Five Fast-Growing Subsectors of Rwandan Economy
(1999-2012)

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Construction</td>
<td>12.4</td>
<td>6.6</td>
<td>9.3</td>
</tr>
<tr>
<td>Hotels &amp; restaurants</td>
<td>16.9</td>
<td>1.1</td>
<td>1.9</td>
</tr>
<tr>
<td>Transport</td>
<td>14.7</td>
<td>5.2</td>
<td>7.9</td>
</tr>
<tr>
<td>Education</td>
<td>13.4</td>
<td>2.8</td>
<td>6.4</td>
</tr>
<tr>
<td>Other personal services</td>
<td>18.5</td>
<td>0.2</td>
<td>0.9</td>
</tr>
<tr>
<td>Total</td>
<td><strong>13.8</strong></td>
<td><strong>15.8</strong></td>
<td><strong>26.5</strong></td>
</tr>
</tbody>
</table>

- The five fast growing subsectors were 16% of GDP in 1999 and increased to 27% in 2012

Sources: National Account, MINECOFIN
Excluding the Five Fast-Growing Sectors, There Seems to Be Little Structural Change

Excluding the five fast-growing subsectors, the structure of the Rwandan economy has not changed between 1999 and 2012.

Sources: National Account, MINECOFIN
What Is the Driver of Growth?  
– Accelerated Investment, But Not Private Investment

- Both private and government consumption expenditures grew at a similar rate as GDP growth (in 1999-2012), but growth in investment is much more rapidly and has accelerated; its growth rate rising from less than 10% annually in 1999-2005 to more than 14% in 2006-2012
  - Ratio of investment to GDP rose from 14/100 to 22/100

Sources: National Account, MINECOFIN
What is the Financial Source of Growth? – Foreign Inflows to Finance Investment through Non-Private Channels

- The government’s recurrent spending equivalent to 70-90% of tax revenue – little left for investment
- Public investment dominates gross capital formation – accounting for 50-65% of capital formation
  - Private consumption equivalent to 93-98% of GDP excluding tax revenue – consumers spent most income on consumption
  - Remittance is about 2% of GDP – not an important source of private savings
- Foreign inflows to finance domestic investment mainly through non-private channels
  - Dominated by grants received the government – equivalent to about 50% of gross capital formation

Sources: National Account, Macro-framework Public Dataset and Balance of Payment, MINECOFIN
Challenges to Future Growth and Structural Change

- The real exchange rate appreciated with increases in capital inflows
  - Non-tradable sectors grow rapidly, most with low productivity – difficulty for structural change
- Unsustainability in capital deepening – heavily depending on non-private foreign inflows
- With high growth without structural change it will make structural change – measured by increased role of the manufacturing and other high productivity sectors, more difficult in the future
  - Rising wage rate in the formal sectors makes investment in labor-intensive manufacturing less attractive
  - Rapid urbanization leads to high expectations for urban jobs, many of which are actually low productivity informal activities – a mismatch between skills and needs

Sources: Macro-framework Public Dataset and Balance of Payment, MINECOFIN
Assessing Growth Transition and Structural Change – A General Equilibrium Model

- Applied Dani Rotrik’s simple endogenous growth model to a Rwandan dynamic CGE model with 18 sectors (12 tradables and 6 nontradables)
  - Linking productivity to
    - Changes in the real exchange rate (1% of depreciation in real exchange rate associated with 0.95% of increase in non-capital factors’ productivity)
    - Increases in public investments in infrastructure, education and agriculture (1% of growth in public investment associated with 0.25% of growth in non-capital factors’ productivity)
- Combined with the neoclassic source of growth – endogenous capital accumulation (to capture the investment-led growth)
  - Also with exogenous growth rate in labor and land (ag labor: 2.8%, other labor: 4.4%, land: 1.9%)
- Assessing growth and structural change under two different assumptions for foreign inflows
  - Scenario 1: Balanced growth – foreign aid and other non-private inflows grow proportionally to the level of GDP
  - Scenario 2: Business-as-Usual growth – foreign aid and other non private inflows follow their current growth paths (with annual growth rate of 20%)
Two Main Drivers to Growth in the Model

- The real exchange rate appreciated with foreign inflows growing at the current rate while it depreciated in the balanced growth.
- Fast growth in foreign inflows stimulates investment – growing at 15% initially, similar as that in 2006-2012.
  - However, investment growth slows down over time due to diminishing returns to capital investment.
- Under the balanced growth scenario, growth in investment is stable and comparable with growth in GDP.

Sources: Simulation results of 18-sector dynamic CGE model for Rwanda.
Growth Rates Differ in Short- and Longer- Runs

**GDP growth rate (%)**
- Foreign-financed investment leads to rapid growth in the short-run and growth slows down over time.
- More balanced foreign inflows leads to stable growth over time.

**TFP growth rate (%)**
- Long-run growth measured by growth in TFP differs significantly between two types of growth.

Sources: Simulation results of 18-sector dynamic CGE model for Rwanda
Structural Change in Growth Transition

**Shares of tradable and nontradable in GDP (%)**

- ** Tradable** share of GDP falls and **nontradable**’s rises with foreign-financed growth.

**Ratio of trade deficit to GDP (GDP=100)**

- Trade deficit as a ratio to GDP rises rapidly following the current growth patterns of foreign inflows.

Sources: Simulation results of 18-sector dynamic CGE model for Rwanda
Conclusions and Future Research

- For many economies in Africa the structural change has yet come along with their recent rapid growth
- The stylized facts drawn from Rwanda show that the main reason for lack of structural change during growth is the dependency on foreign aid
  - Foreign inflows can finance investment booming, which leads to rapid growth, but it also becomes a challenge to structural change
- The simulation analysis using a dynamic general equilibrium model displays the trade-off between growth and structural change
  - Rapid growth is possible without structural change in the short- to medium- run
  - However, this pattern of growth makes structural change more difficult in the future, which leads to possible slowdown in growth in the long-run
    - By assuming a higher TFP-to-investment elasticity, the sensitivity test shows that growth rate can be higher and growth can last longer, while structural change will still not occur
- Without giving up the growth opportunities created by foreign inflows, the governments have to pay more attention to creating a set of conditions necessary for structural change. The further research needs to address:
  - Will the Asian model work in Africa – whether labor-intensive manufacturing can become the driver of structural change when foreign inflows continue to finance investment in Africa?
  - Are there alternatives?
    - How about tradable services – will it be possible for a tradable service sector to lead structural change (and also job creation)?
    - How about agriculture – what will be the role of agriculture in the fast growing African economies?