OUTPUT MULTIPLIER EFFECTS IN SOUTHERN AFRICA

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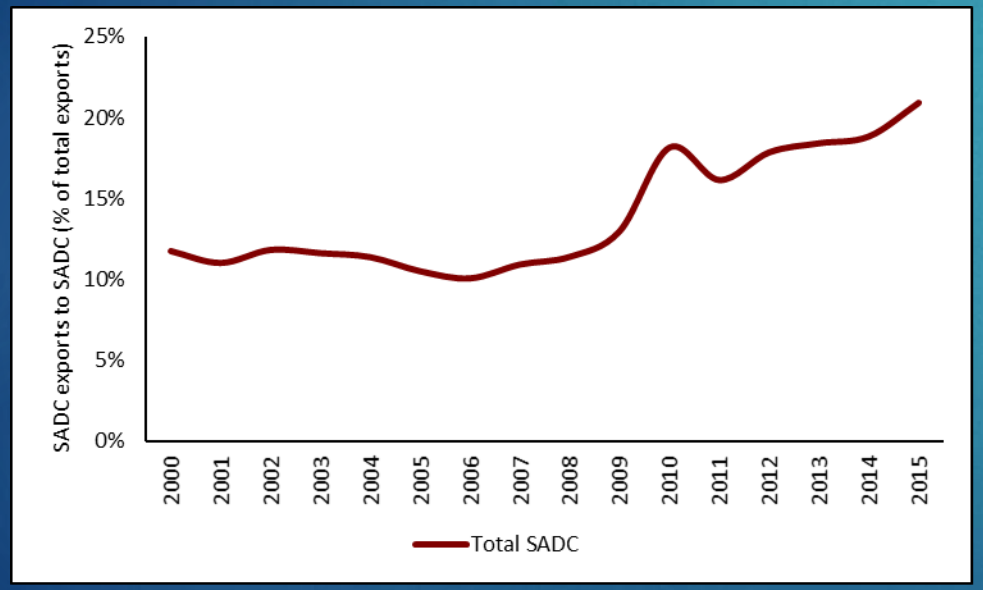
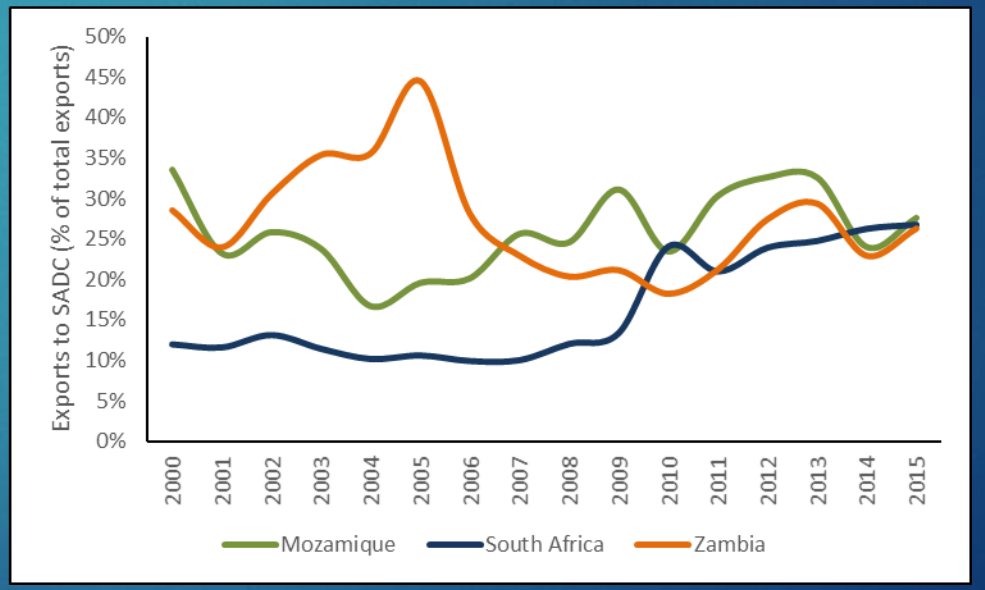
Introduction

- Stronger regional economic linkages present an opportunity to enhance growth, development, and cooperation in sub-Saharan Africa





Introduction

- Input-output analyses are often used to understand relationships between consuming and producing sectors. Increasing number of databases of multi-region input-output tables has increased ability to extend this understanding to global supply relationships.

- In this research we construct a multi-region social accounting matrix to analyse linkages and multipliers for commodity demand in South Africa, Zambia, and Mozambique.

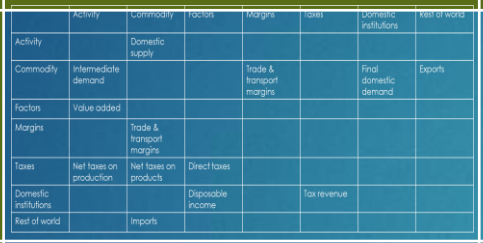
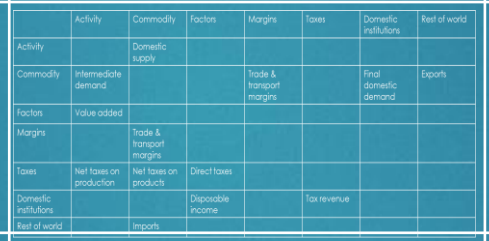
Data

- GTAP8 database used to build a multi-region social accounting matrix
  - 3 regions: South Africa, Zambia, Mozambique (rest of world exogenous)
  - 57 industries, commodities
  - GTAP country tables are balanced and harmonised
  - Detail on how different activities use different products
  - Detail on how product markets are composed (e.g. domestic production, imports by other regions)
  - Representation of regional economic accounting and transaction flows
- Need to construct a multi-region SAM
- Reorient series of single-region SAMs to a single, multi-region table

Data

	Activity	Commodity	Factors	Margins	Taxes	Domestic institutions	Rest of world
Activity		Domestic supply					
Commodity	Intermediate demand			Trade & transport margins		Final domestic demand	Exports
Factors	Value added						
Margins		Trade & transport margins					
Taxes	Net taxes on production	Net taxes on products	Direct taxes				
Domestic institutions			Disposable income		Tax revenue		
Rest of world		Imports					

Data

	South Africa	Zambia	Mozambique	Rest of world
South Africa				
Zambia				
Mozambique				
Rest of world				

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Activity		Domestic supply					
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Data

	South Africa	Zambia	Mozambique	Rest of world
South Africa		South Africa commodities used in Zambia	South Africa commodities used in Mozambique	Other exports from South Africa
Zambia	Zambia commodities used in South Africa		Zambia commodities used in Mozambique	Other exports from Zambia
Mozambique	Mozambique commodities used in South Africa	Mozambique commodities used in Zambia		Other exports from Mozambique
Rest of world	Other imports to South Africa	Other imports to Zambia	Other imports to Mozambique	

Deriving output multipliers

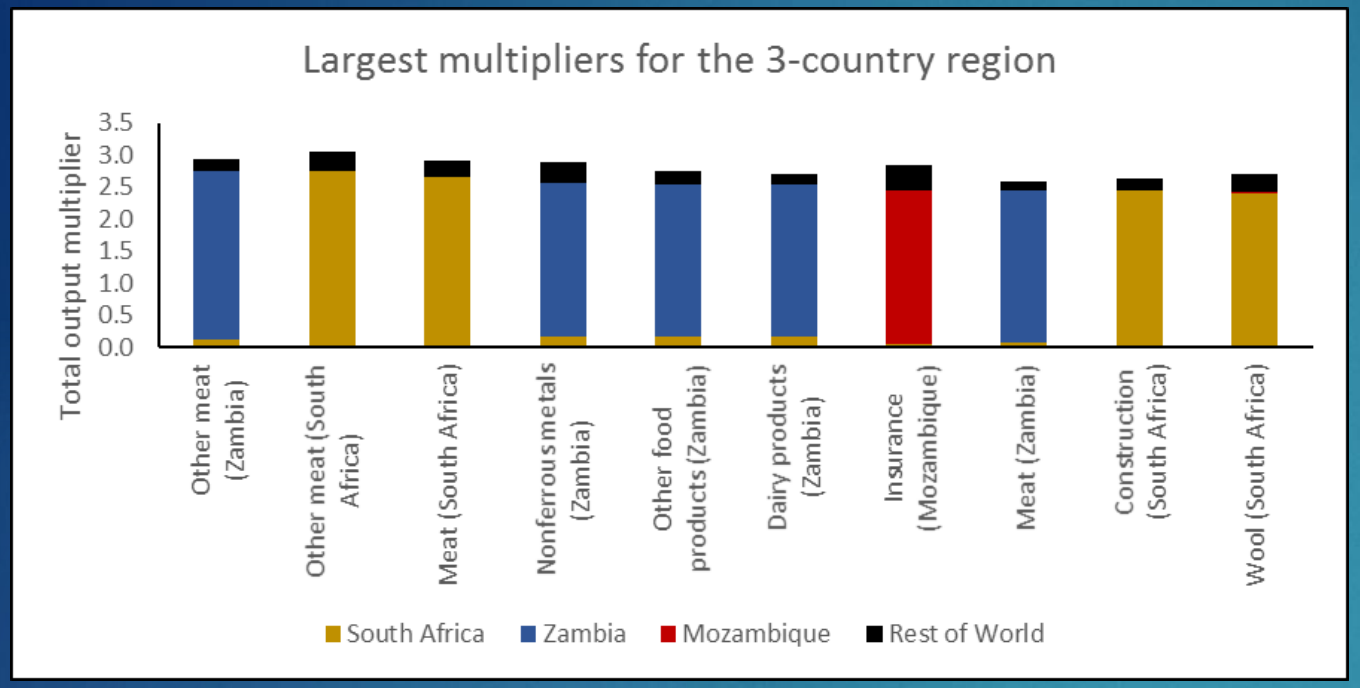
- For each commodity, output can be described by $X_i = \sum x_{ij} + F_i$
- Assuming fixed proportions $x_{ij} = a_{ij}X_j$, the system can be written as

$$\sum X_i = \sum\sum a_{ij}X_j + \sum F_i$$

- And reduced to matrix form as $X = A*X + Y$
- Solving for X yields $X = (I-A)^{-1}Y$
- Thus $\Delta X = (I-A)^{-1} \Delta Y$

- $(I-A)^{-1}$ is the Leontief inverse matrix, and shows the interdependence of different commodities and industries to satisfy a unit increase of exogenous demand for a particular good.
- Output multipliers are calculated as column totals of the Leontief inverse

Results

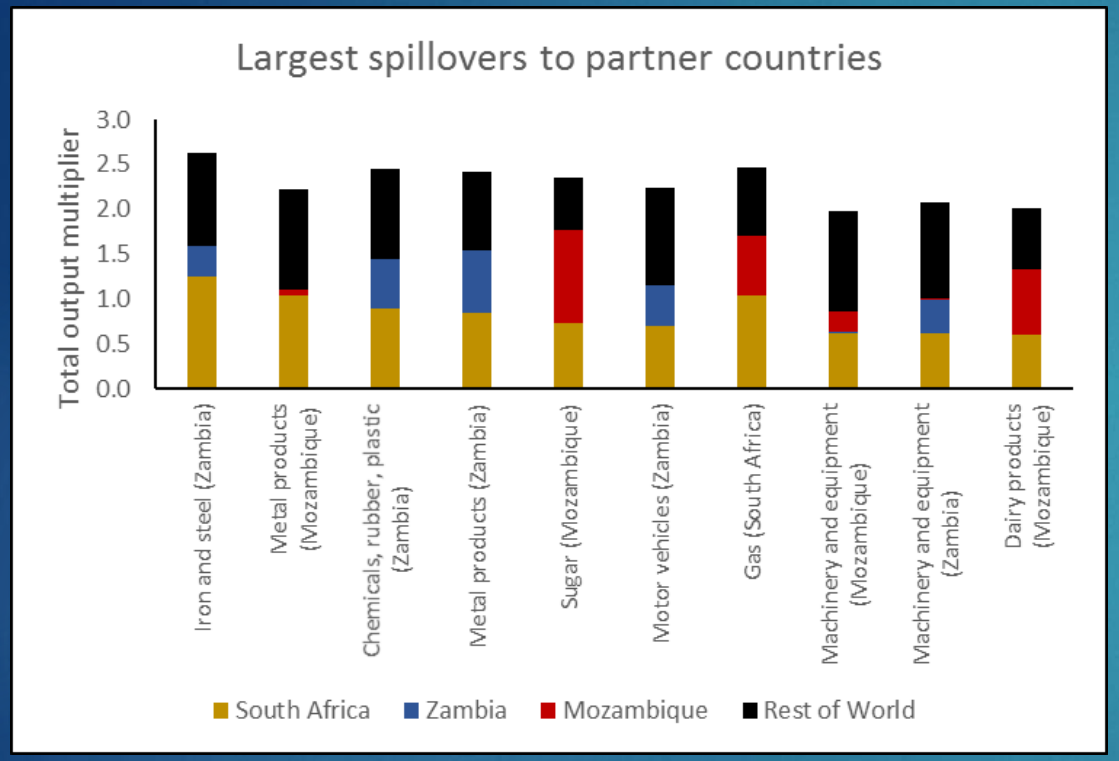


Industry	Country	Industry output share
Other meat	Zambia	0.85%
Other meat	South Africa	0.51%
Meat	South Africa	0.67%
Nonferrous metals	Zambia	11.12%
Other food	Zambia	7.68%
Dairy products	Zambia	0.64%
Insurance	Mozambique	0.92%
Meat	Zambia	0.63%
Construction	South Africa	4.67%
Wool	South Africa	0.08%

Highest mutlipliers tend to be in food products, but

- Fairly small industries in relation to the rest of the economy
- Regional spillovers very small: most of the multiplier effects are concentrated in the domestic economy

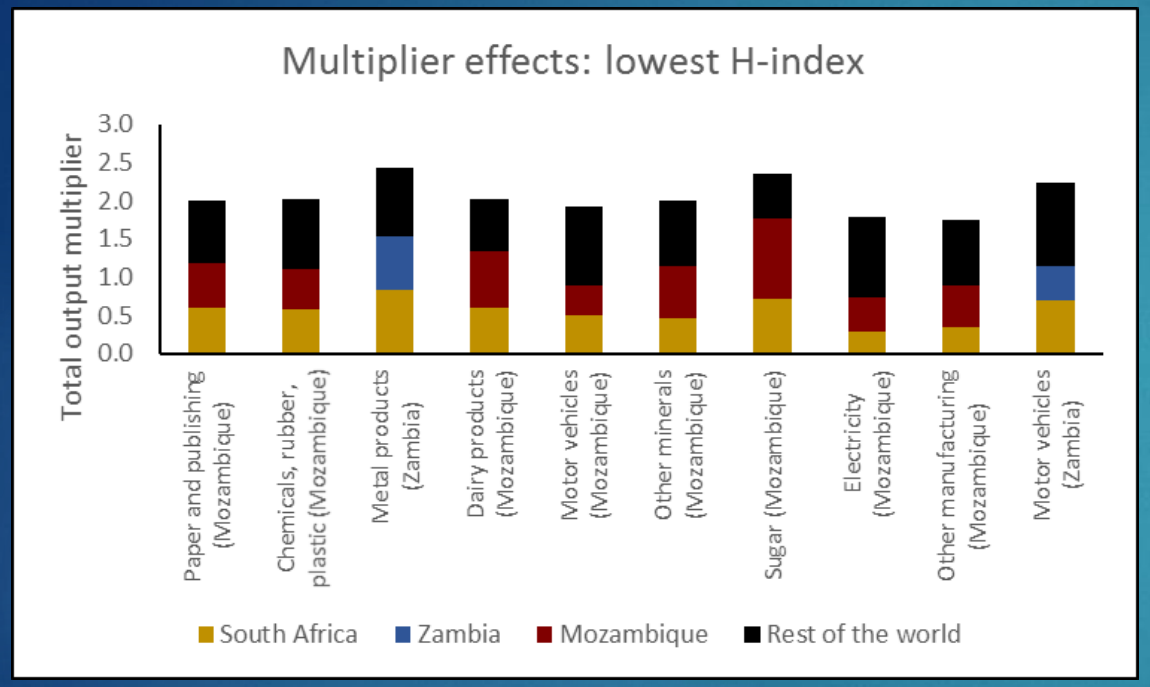
Results



- Regional spillovers tend to occur with South Africa
- Largely as South Africa is an important trade partner to Mozambique and Zambia, particularly of manufactured goods

- Hardly any spillovers between Zambia and Mozambique
  - Opportunities for further research as to why this is the case, and what opportunities exist for regional value chains

Results



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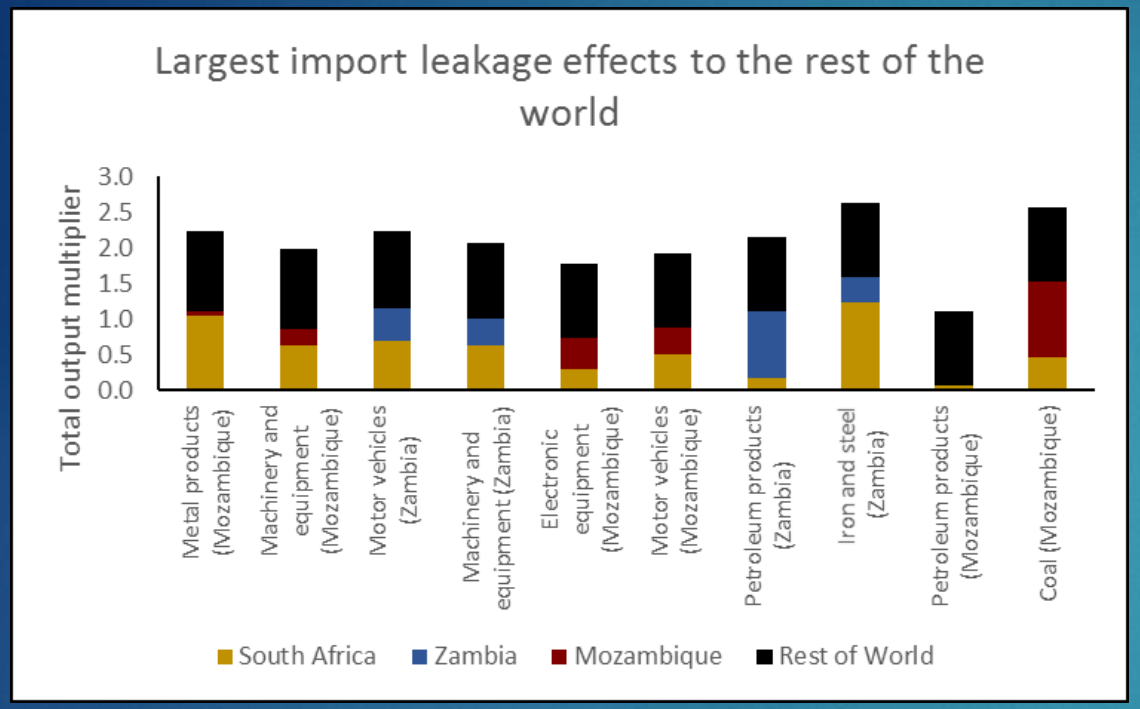
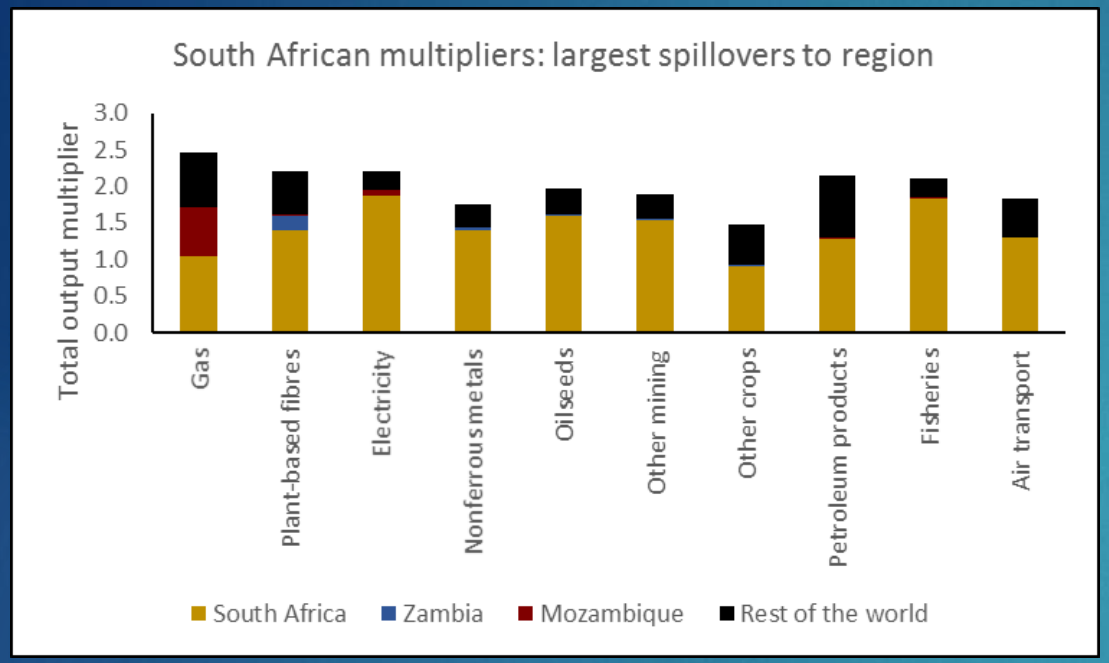


- For a number of commodities, the multipliers show very large import leakage effects to the rest of the world
- While a large degree does reflect direct imports from the rest of the world, also includes indirect impact (e.g. imports of machinery assembled in South Africa, but with parts imported from the rest of the world)
- In many instances, this coincides with fair degree of spillover to South Africa
- Appealing to want policy interventions to reduce import leakage, because it encourages more circulation within the region
- But very important to understand constraints that lead to high import leakage:
  - Competitiveness
  - Skills, natural, regulatory constraints

Results



South Africa has weak backward linkage to Zambia and Mozambique

- Potentially reflects weak competitiveness in those countries

Most imports from Mozambique relate to natural gas, fuels, and electricity, while from Zambia, imports concentrated in copper and related products.

Concluding remarks

- A multi-region database is useful for examining regional linkages
- Relative size is important: products with highest multipliers are typically in small sectors, so stimulating them may have large multiplier effect, but may appear small on aggregate
- The largest multipliers were also found in localised industries, with little spillover into other regions
- Where regional spillovers do occur, mostly between Zambia and South Africa, or Mozambique and South Africa
- Where there are large import leakage effects, need to determine what portion is direct and indirect. If direct, the issue may be of market share, and an opportunity to look at issues of competitiveness or constraints that may be holding back an increase in market share
- South Africa has weak backward linkages with Mozambique and Zambia – is this an issue of weak competitiveness, infrastructure, regulation?