Modelling local impacts of Megatrends

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Aims

- Dynamic, localised approach to small regional economies
- Built on local specialisations (rather than assuming them away)
- Enables realistic assessment of external changes under different scenarios
- Linking commercial flows with community characteristics

Full paper in the *Journal of Economic and Social Policy*

Extracts and commentary at www.kimhoughton.com

Megatrends

- Global demand – a familiar but relentless story driving the *Fantastic Five*
  - Food products
  - Tourism
  - Natural gas
  - Education
  - Wealth management
- Social licence/community & consumer expectations
- Climate variability – another drought?

Literature

- Can communities influence their destiny?
  - Localism (Hogan & Lockie) vs external drivers (Eversole)
  - Regional economic performance highly variable (Stimson)
  - Helping single industry towns (this conference)
- 'Evolutionary economic geography'
  - Path dependence, selection, adaptation, and resilience (Tonts)
  - Specialisation vs diversification (Beer & Clower; Trendle)
  - EU Smart Specialisation – entrepreneurial discovery to actively build on strengths

Modelling economic impacts

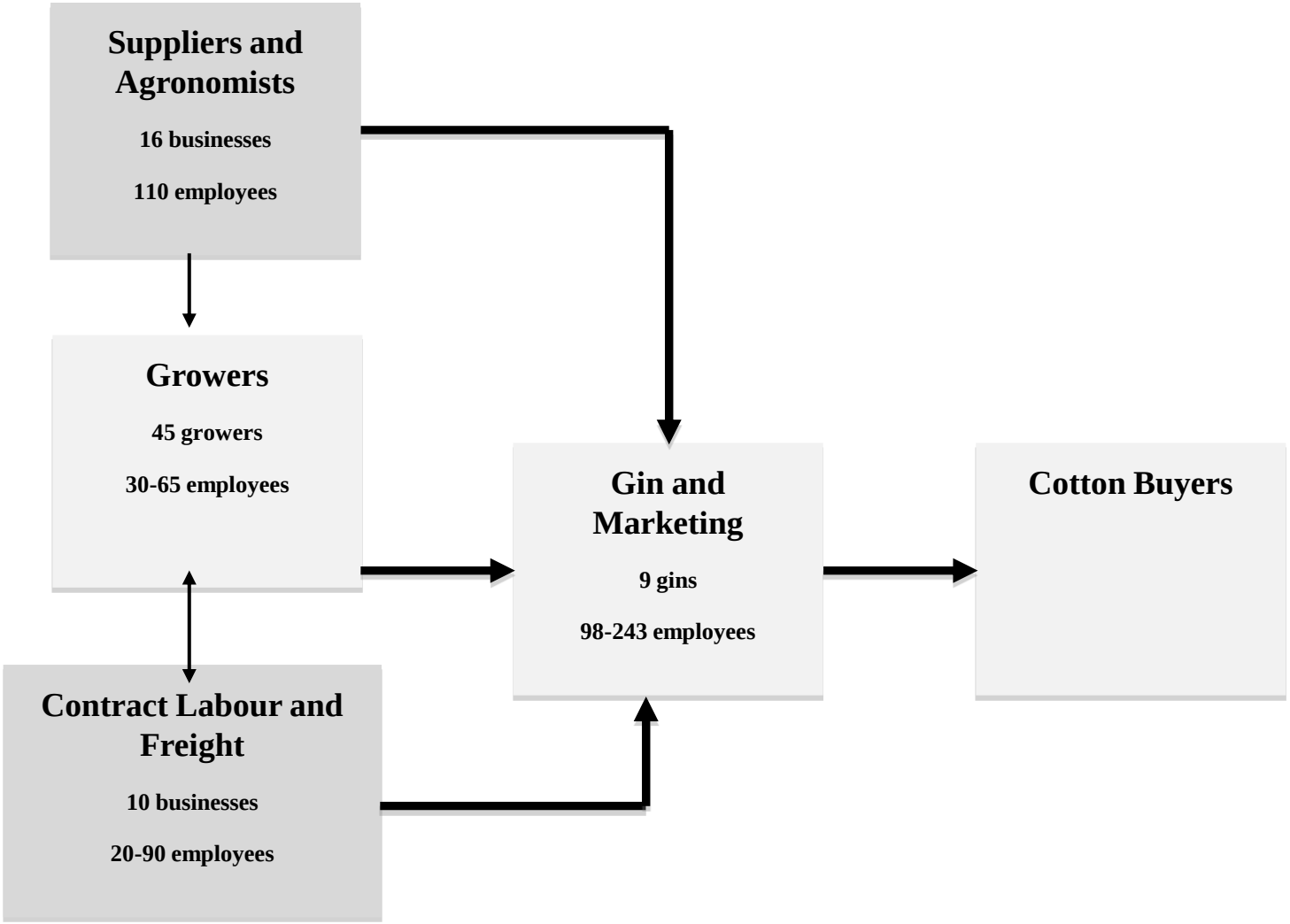
- Input-Output (I-O)
  - Strong nationally, weak regionally
  - Farm ‘production functions’ as inputs into IO, but limited data availability
  - Excludes price-reactions and assumes main ‘factors of production’ (land, labour and capital) are not constrained
  - Warkworth case
- Computable General Equilibrium (CGE)
  - Elasticity assumptions crucial
  - Limited ability for factor substitution
  - One equilibrium to another

Modelling local impacts

*"The relationship between water availability and economic activity is more or less a straight line." (*draft Basin Plan *p940)*

- But, flow-on effects of drought on communities was mixed
- No towns appear to have 'died' as a result of reduced water availability
- This research sought to identify and quantify the nature of the relationships along the rural supply chains, to better understand the linear and non-linear relationships between production and local economies

Gunnedah cotton supply chain



Contract Labour

- *Lauravon Contractors*

- *Tony Sims Contract Harvesting*

- *Kennedy Air Ag*

- *Scales Bros Contracting*

- *Farmers who contract services and machinery*

- *Namoi Spraying Service*

- *Middlebrook Air Operations*

- *Beattie Ag Spraying*

Gin and Marketing

- *Namoi Cotton* (6 gins in the area, 70 full time employees and up to 100 casuals in peak season)

- *Carroll Gin* (1 gin in the area, 9 full time employees and about 15 casual at peak, about $8 mil turnover)

- *Austcott* (2 gins in the area)

Cotton Growers

- *Approximately 45 growers in the Upper Namoi*

Suppliers and Agronomists

- *Pivot Irrigation and Pumping* (6 full time employees and 9 contractors, turnover of $2-10 mil)

- *Pursehouse Rural* (10 full time employees, turnover of $2-10 mil)

- *Cotton Growers Services*

- *Elders (also rural real estate)*

- *Landmark (Also rural real estate)*

- *Agronomic Business Solutions*

- *Hunt Ag Solutions*

- *Farm Welding Services*

- *DMI Engineering*

- *Gunnedah Light Engineering*

- *Goodwin Kenny Machinery*

- *Cornish's Machinery*

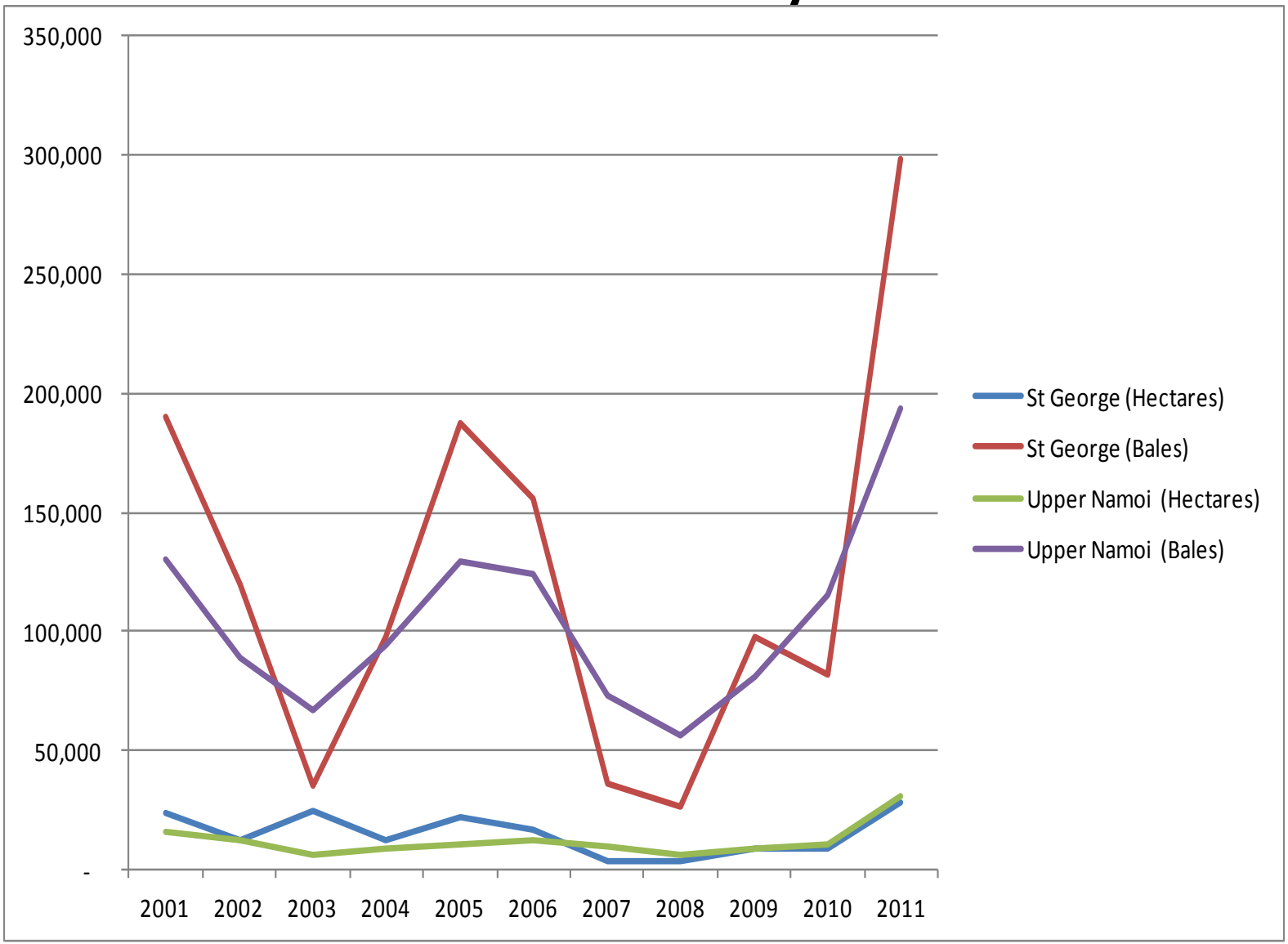
- *Gunnedah Farm Equipment*

- *Gunnedah Industries*

- *Guest I W Trailer Sales*

- *NFS Agribusiness*

Megatrends conflated with seasonal variability



Adaptation experiences (interviews)

- Maintain ‘permanent’ staff (eg rotate)
- Defer non-essential purchases
- Plant wherever possible

“During the drought we grew whatever cotton we had the water to grow.” (Cotton Famer St George)

“The biggest impact on the bottom line is cotton production . . . your first and foremost focus is to have production.”

“In a dry year we don’t replace any machinery at all.”

“There’s nothing worse than drought following a couple of dry years”.

Implications

- No simple, linear relationship between planting, harvest and local flow-on spending.
- Not accurate to predict flow-on spending by growers, or employment levels on farms or processing businesses, as a fixed proportion of areas under crop.
- Tipping point for grower and business adaptation between 25% and 50% reductions in water availability, with practices for both groups changing significantly across this boundary.

What can we do with this information?

1. Model the local supply chain impacts of specific adjustment scenarios
2. Compare impacts across economic drivers to quantify scale of structural adjustments required

Model concept

- Along actual supply chain
- History of drought response
- Boundaries on upper and lower activity levels
- Employment and turnover levels
- Model designed for predicting responses rather than crop yields!
- Three widely spaced scenarios

Employment impacts

	Hectares planted		Est farm emplt		Est rural supplies employment	
	St George	Upper Namoi	St George	Upper Namoi	St George	Upper Namoi
High planting	26,000	30,000	141	162	113	138
Medium planting	14,000	12,000	76	65	90	110
Low planting	4,000	6,000	28	42	68	83

1. Supply chain impacts

Cost impacts

	Est of local expenses (excl water)		Est costs per ha		Est profitability per ha		Est discretionary spend	
	St George	Upper Namoi	St George	Upper Namoi	St George	Upper Namoi	St George	Upper Namoi
High planting	$65,000,000	$75,000,000	$3,620	$3,620	$1,400	$1,400	$36,400,000	$42,000,000
Medium planting	$35,000,000	$30,000,000	$3,620	$3,620	$1,100	$1,100	$15,400,000	$13,200,000
Low planting	$12,000,000	$18,000,000	$4,550	$4,550	$700	$700	$2,800,000	$4,200,000

Lessons

- Farm-level decision-making important
- Farm-level cost of production/yields/profit drive immediate flow-on impacts
- Better information would help on:
  - Sources of inputs (at least local/regional split)
  - Accuracy of historical data on employment and activity levels
- Believability the real test
  - alongside methodological robustness

Other options and impacts Scottsdale

Five future growth scenarios considered

1. Growth in farming
2. Timber alternative industry
3. More residents working outside Scottsdale
4. Tourism/hospitality growth
5. Population growth (young families and older people)

2. Structural adjustments

Modelling on local attributes

Scenario	Outcomes
Agriculture expansion	Good prospects, limited flow-on
Forestry replacement	120 workers and $6m pa payroll
Highway upgrade	100 additional commuters $4.5m income pa
Tourism boost	Double visitor nights for $15m pa spend – limited employment flow-on
Population growth	250 more newcomers in next 5 yrs adds $4m pa income

Outcomes

- Believability
  - Pass the bulldust test
  - Reflects the recent lived experience
  - Accepts ‘uniqueness’
- Integration into scenarios
  - What happens if …. and
  - What most helps get us where we want to go
    - Population growth or stability, economic diversification or specialisation …