Macroeconomic Development, Rural Exodus, and Uneven Industrialization

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Motivation

• Economic development shifts employment away from agriculture and generates a cycle of industrialization and de-industrialization

This process is uneven across space → Industrialization typically begins in a few regions within a country (Northeast in US; Basque Country, Catalonia in Spain; Guangdong, Jiangsu, Shanghai in China)

• The initially agrarian regions may follow different paths
  a) They may catch up and industrialize – Agrarian workers move to industry in the same region
  b) They may experience a rural exodus and fail to industrialize – Agrarian workers help industrialization elsewhere

Or anything in between: India (1987-2011), Brazil (1980-2010)
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  b) Examine their aggregate implications
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• Main object of study: economic development in Spain (1940-2000)
  • Good spatial data for the whole development process
    1) Fast economic growth
    2) Structural change (reallocation of employment across sectors)
    3) Rural exodus (reallocation of employment across space)
    4) Industrialization failure in many regions
    5) Hump-shaped evolution of spatial inequality (Kuznets-Williamson curve)
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• Model of structural change w/ internal migration and internal trade
  – Time changing: productivities, trade costs, migration costs
  – Recovered to fit the data
The Spanish development experience

Main facts

(a) Real GDP per capita

- Data
- 1850-1935 trend: 0.95%
- 1950-2000 trend: 3.88%

(b) Sectoral employment shares

- Agriculture
- Industry
- Services
The Spanish development experience

*Rural exodus*

![Graph showing the relationship between the agriculture share of employment and the change in log employment from 1940 to 2000. The equation is β = -2.07, with R² = 0.63. The graph includes data points for various regions such as Madrid, Barcelona, Bizkaia, Alava, Alacant, Valencia, Malaga, Cordoba, Jaen, Zamora, Teruel, Ourense, Toledo, Guadalajara, and others.](image-url)
Heterogeneity in development experiences

Some international evidence

(a) Spain, 1940-2000

(b) France, 1872-1975

(c) China, 2000-2015

(d) US, 1880-1940

(e) Costa Rica, 1963-2011

(f) Indonesia, 1971-2010

The Spanish development experience

*Industrialization and lack thereof*

(a) Employment shares: Manufacturing

(b) Employment totals: Manufacturing

(c) Employment shares: Services

(d) Employment totals: Services

(some provinces examples)
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Model

1. Growth and structural change *a la* Duarte, Restuccia (2010)
   - Closed economy w/ many regions $r = 1, 2, \ldots, R$ and 3 sectors $j = a, m, s$
   - Sector-region specific productivity
   - Household preferences with non-unitary income and price elasticities

⇒ Usual two forces of structural change

- Migration frictions *a la* Artuç, Chaudhuri, McLaren (2010)
  - Workers move to locations with highest value
  - Idiosyncratic taste shocks for locations
  - Route-specific migration costs

⇒ Smooth upward-sloping labor supply in each region

- Trade frictions *a la* Eaton and Kortum (2002)
  - Continuum of tradable varieties within each sector
  - Variety-specific productivity in each region
  - Route-specific iceberg trade costs

⇒ Regional trade driven by comparative advantage

  a) Intra-sectoral trade (share of imported sectoral value added)
  b) Inter-sectoral trade (difference between sectoral expenditure and employment shares)

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- We want the model to account for the Spanish development episode
  - Match data every ten years in the period 1940-2000
    Productivity, employment, and migration flows
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- Large parameter space for $R = 47$ (provinces within the Iberian Peninsula)
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  - Time changing:
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    - Trade costs: sector-route specific
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• Challenge: identify trade costs w/o trade data
  – Correlation between sectoral employment and expenditure shares
    Gervais and Jensen (2019)
Calibration Results

Four Main Patterns

1. Increase in sectoral productivities, mainly 1950-1990
   - Agr > Man > Ser

2. Decline in trade costs (smaller in Ser)
   - Investment in road infrastructure and transport equipment

3. Decline in migration costs towards leading areas 1950-1980
   - Construction of cheap housing in outskirts of big cities since late 1950s
   - Accumulation of migration networks
   - Birth of welfare state early 1980s

4. Initial dispersion of sectoral productivities ('til 1970), convergence afterwards

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Engines of Development

• What were the drivers of the rural exodus and uneven industrialization?

1) Decline in migration costs
2) Early divergence in productivities across regions

• Both together: account for difference between the US (1880-1940) and Spain
• One by one: Spain similar to India (1987-2011) or Brazil (1980-2010)
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• Why?

  • Both forces ↑ migration from laggard to leading regions
  • ↑ migration ⇒ Prevents industrialization in laggard areas
    → Smaller demand for local manufactures in laggard areas (PE)
    → Limits wage growth in industrial provinces, which allows them to serve all country (GE)

    (Strength of both mechanisms depends on level of trade frictions)
Role of rural exodus

Without any population movement since 1940:

1. Initially agrarian provinces would have also industrialized → Changes in productivity and trade costs were conductive of industrialization → Result reinforced when allowing for industrial agglomeration economies

2. Spain in 2000 would have been a poorer and more agrarian country (GDP growth: 38 pp less; ▽ Agr: 3.4 pp less; △ Ser: 8.8 pp less)

3. No de-industrialization at country level • Leading provinces cannot lever up industrial comparative advantage • Lower increase in industrial productivity at the aggregate (misallocation) → Slower industrialization (△ Man: 5.4 pp less)
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Lagging provinces

Laggard Provinces

(a) Jaén: Emp. Levels

(b) Palencia: Emp. Levels

(c) Teruel: Emp. Levels

(d) Zamora: Emp. Levels

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  - Farmers in those regions migrated and helped industrialization elsewhere
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• Further work: understand differences in development patterns across countries
  - Factors affecting migration costs and technology diffusion seem first-order