

Discussion of

Relative Prices and Sectoral Productivity

by Margarida Duarte and Diego Restuccia

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Contribution

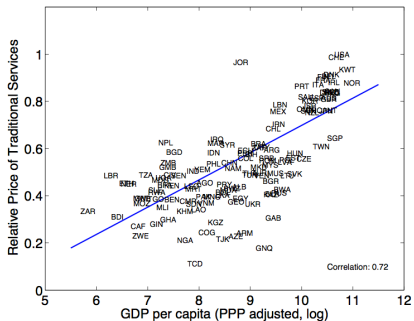
- A lot of work on structural change from manufacturing to Services
 - But what are services?
 - A very heterogeneous “sector”
 - This paper: takes services more seriously, by tackling their heterogeneity
- ⇒ important paper

What are services?

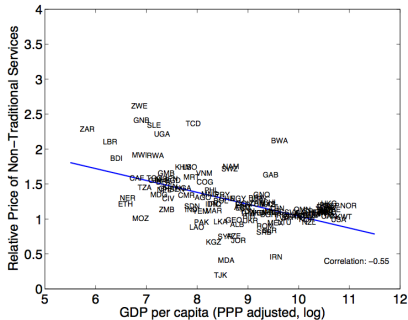
- Very heterogeneous “sector”
- Diego and Margarida: separate service industries with
 - rising prices: “traditional services”
 - falling prices: “non-traditional services”

The relative price of services: disaggregated

Relative Price of Traditional Services



Relative Price of Non-traditional Services



Traditional and non-traditional services

Striking:

- The second group is large:
 - 31 household expenditure categories out of 42.
 - Expenditure share?
- Its price relative to the price of GDP falls by 37% from bottom to top of the income distribution.
 - Explicitly comparing to manufacturing number would be useful.
- Its real expenditure share grows with development.
 - What about the nominal share?
I guess, from combining F3 and 4, that it falls slightly.

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Measurement

- Data: ICP \Rightarrow many countries, many sectors
- What are “traditional” / “non-traditional” services?
The authors: define by change in relative price.
These sectors also differ in their substance:
 - housing/education/health/government versus
 - transportation/communication/finance...
- Measuring quantities/prices in services is hard.
But mostly so in traditional services. Not as bad in non-traditional services, on which the authors focus.

Productivity implications

- In most sensible models, a declining price is associated with rising productivity.
- ⇒ use observed price patterns to back out productivity differences.
- Two approaches: development accounting and structural
 - Both suggest very large productivity differences in non-traditional services across countries, as large as or larger than those in manufacturing.
 - Because non-traditional services are an important input in manufacturing, their role is larger when the input/output structure of the economy is taken into account.

Productivity measurement I: development accounting

$$Y_i = A_i L_i, \quad i \in \{m, s_T, s_N, o\}$$

Want: A_i . Problem: Limited availability of L_i data.

Assuming labor mobility and competitive markets:

$$A_i = \frac{Y_i/Y}{p_i Y_i / \sum_j p_j Y_j} \frac{Y}{L}$$

- high if country productivity Y/L high, or
- if Y_i/Y high relative to expenditure share (i.e., if p_i relatively low).

Results: D_{10}/D_1 around 70 for m, s_N , around 20 for s_T .

What about o ?

Productivity measurement II: structural model

- Three sectors: manufacturing, traditional and non-traditional services
- Production with labor and intermediate goods (from all three sectors)
- Preferences homothetic and Cobb-Douglas
⇒ constant expenditure shares
- Sectors differ in intermediate input share and intensity of use of each intermediate input.
- Note: real expenditure shares can still differ with sectoral productivity
⇒ use these to back out sectoral productivity for each country.
- Static model with full mobility – difference to above are input/output links.

Productivity measurement II: results

Model:	Ratio D_{10}/D_1		
	A_m	A_{sT}	A_{sN}
Baseline	24.5	7.9	107.9
No Intermediate Inputs	50.8	20.3	102.2
No Sectoral Differences	35.7	35.7	35.7
Development Accounting	70.5	21.0	73.1

Intuition for differences:

- 1 Manufacturing more intermediate-input intensive.
This amplifies productivity differences.
⇒ smaller productivity advantage required to match data.
- 2 Manufacturing uses more non-traditional services as input than the other way round (.3 vs .1-.15):.
⇒ a larger part of output growth in manufacturing is due to productivity growth in NTS than the other way round.

⇒ Structural model finds larger diff in NTS and smaller in Mfg.

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“The evidence and results in this paper show that there are substantial differences in the relative price behavior across service categories and that these differences matter for productivity inferences. **This paper does not address, however, the origins of these observed differences in relative prices.** We leave the identification of the fundamental characteristics of traditional and non-traditional services that determine their productivity and price behavior to future research.” Curiously waiting for the follow-up!

Two main comments

- 1 agriculture
- 2 implications for structural change/identification of productivity

1. Where is agriculture?

Paper written with a complete focus on heterogeneity within services, and on non-traditional services more particularly.

Findings matter for both

- understanding which sector is holding back poor countries and
- understanding structural change.

In a broad sample, it then is indispensable to also consider agriculture.

- How does productivity variation in NTS compare to agriculture?
- NTS productivity very low in poor countries, and sector small: opposite of agriculture. Suggests
 - low income elasticity or
 - high substitutability or
 - mostly an intermediate good?

Important question that also matters for productivity estimation.

2. The structural model

Use a richer structure to back out sectoral productivity levels.

Then should show that the model performs well:

- reasonable assumptions
- good fit in non-targeted dimensions.

Natural dimension to explore here: structural change.

- What are the model implications for past sectoral productivity growth in the U.S.?
- What are the model predictions for structural change in the U.S., extrapolating these trends into the future?

Some strong assumptions

- 1 Preferences imply constant employment share in services.
⚡ last few decades in developed economies, since hitting GDP per capita of \$5-10K.
- 2 Constant intermediate shares from WIOD contrast with e.g. Donovan (2016). Ag vs rest?
- 3 Composition of input composite seems to change over time.

Identification of sectoral productivity

Data:

- manufacturing productivity rises relative to services productivity, while manufacturing expenditure share falls
- non-traditional services productivity rises relative to TS productivity, while nominal expenditure share falls (across countries; stable in U.S.)

This suggests:

- gross complementarity in consumption between manufacturing and a services aggregate, and
- (probably weaker) gross complementarity between the two types of services.

This structure matters for productivity estimation.

Identification of sectoral productivity

Preference specification matters for productivity estimates.
Simplified, in the model,

$$\frac{y_i}{y_j} = \left(\frac{p_i}{p_j} \right)^{-\varepsilon} = \left(\frac{A_i}{A_j} \right)^{\varepsilon} .$$

- Given ε , data on y_i/y_j (shares) pins down relative productivity.
- Problem: ε unknown.
- The authors assume $\varepsilon = 1$.
- If true $\varepsilon < 1$, authors' results understate true productivity differences.
- How to infer ε ?
 - If sectoral production not CRS, could estimate.
 - Use information from allocations – structural change: lower $\varepsilon \Rightarrow$ larger relative productivity differences \Rightarrow lower differences.

Reference: Similar approach used in Alvarez, Lippi, Lo Duca, and Restuccia (2008) "Labor Income Shares and Productivity Differences"

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Conclusion

My take:

- Great paper!
- Looking forward to the sequel.

Questions:

- For development: How important are differences in non-traditional services productivity relative to those in agriculture or manufacturing?
- For theory: How should we think about the relationship between NTS, TS and M in preferences and/or in production?