The Rise of the Service Economy

Doheun Kiel

Buera and Kaboski (2012), AER

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Motivation

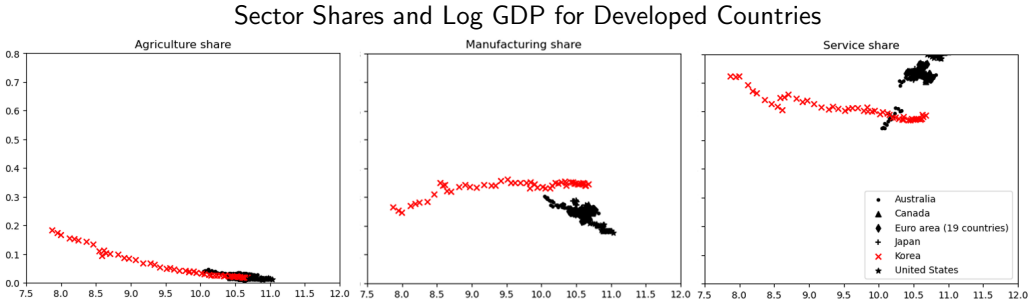
Q. What does the service economy mean?

- We usually categorize final outputs(value-added) to three sectors:
- **Agriculture, Manufacturing, Service.**
- This classification is based on **the type of output** produced, according to ISIC.
- The service economy means the economy where the **share of service sector is donminant** to other sectors.

Q. Is the rise of the service economy common trend for all countries?

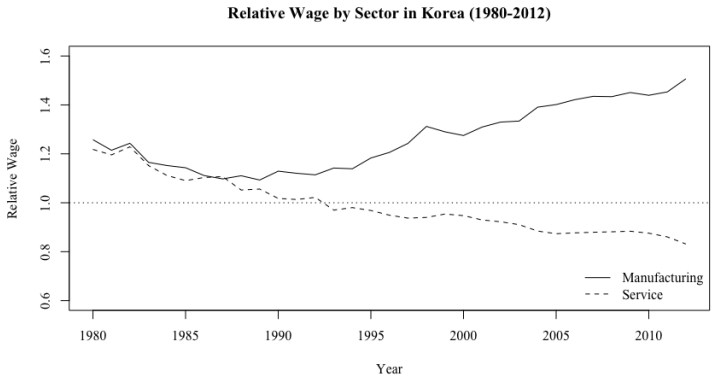
- Yes, for most developed countries (OECD, EU, etc).
- Except for **Korea**, which shows different trend, Herrendorf et al. (2014).
- **Why?** Herrendorf et al. (2014) do not explain this anomaly.
- But, Buera and Kaboski (2012) gives us a hint about this question.
- We will discuss it later.

Structural Change



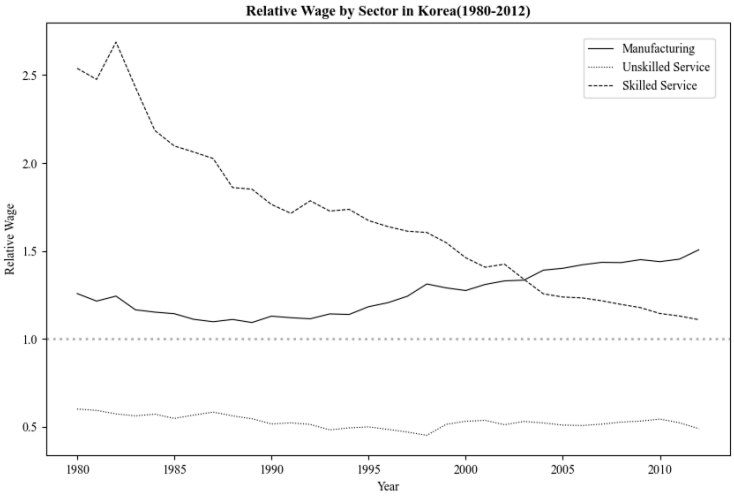
- *The Service Economy*: Steeply incresing trends in service share and decreasing manufacturing share along with log GDP growth except for Korea.
- There's somehow a **decreasing and flattened trend in service share in Korea**.
- Hence, **manufacturing sector maintains its share** despite the growth of log GDP.

Relative Wages by Sector

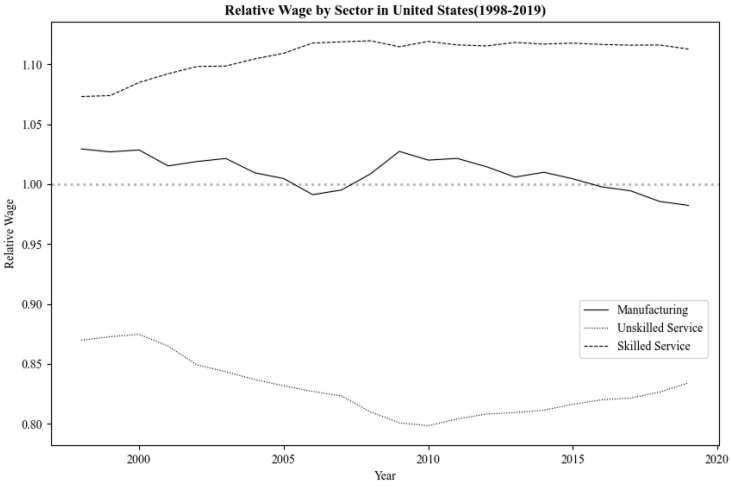


$$Relative\ Wage_t = \frac{(Average\ Wage\ by\ Sector)_t}{Average\ Wage_t}$$

Relative Wages by Sector and Skill-intensity (Korea)



Relative Wages by Sector and Skill-intensity (USA)



Introduction

Buera and Kaboski (2012) develop a theoretical model to explain these changes.

- post-1950, several changes have occurred in USA economy.
- **The growth of the service sector** and **the relative demand for high-skilled labor.**
- But two phenomena are studied *separately* in the literature.
- This paper aims to unify these two phenomena.

Key Takeaway

"The movement of consumption into **more skill-intensive output** leads to **the growth in services**"

Key Idea

If you are high-skilled worker,

are you going to cook fried chicken by yourself or use delivery app(e.g. Baemin) to order fried chicken?

Key Idea

Skills are speciallized, and specialization plays an important role in **the decision between home production and market production of services.**

- The increase in the consumption of moer skill-intensive wants causes the rise in the importance of market services.
- This leads to increase in the quantity and price of services.
- The higher wage amounts to a higher opportunity cost of home production, high-skilled workers to purchase even wider range in service market.

Empirics

A. Service Share

Trends in the Service Economy

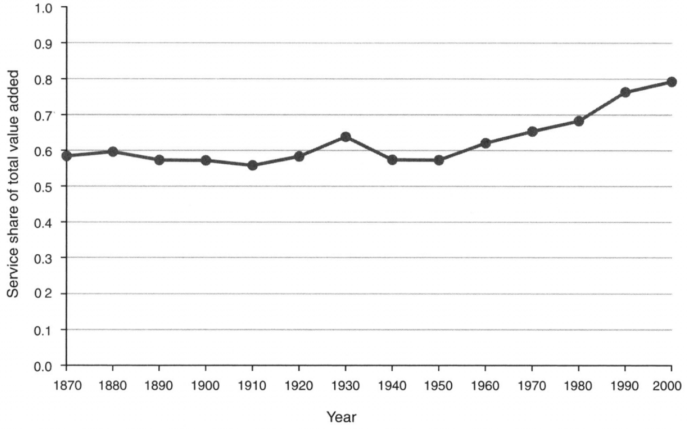


FIGURE 1. GROWTH OF SHARE OF SERVICES IN VALUE-ADDED (CURRENT PRICES)

- post-1950 USA, several changes have occurred in service economy.
- The growth of the service sector and the relative demand for high-skilled labor.

Relative Quantity and Price of Services

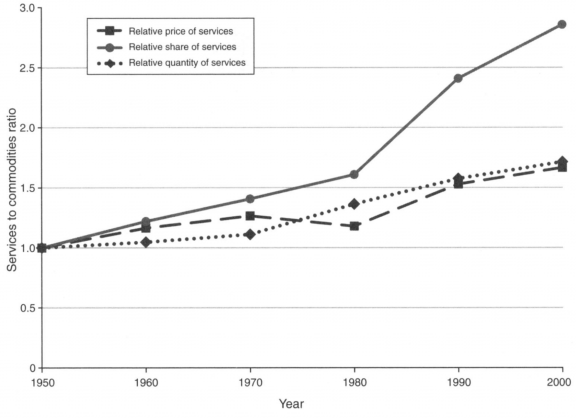


FIGURE 2. GROWTH OF RELATIVE PRICE AND QUANTITY OF SERVICES

- By making relative term using value of 1950 as a denominator, we can see:
- The relative quantity and price of services have increased dramatically.

Split-Sample Regression

- In 1950, the United States had an income per capita of \$9,200 (1990 USD)
- Dividing the sample of country-year observations in this \$9,200 threshold,
- Run the following regressions on the low and high income samples.

$$\textit{service share of value-added}_{i,t} = \alpha_i + \beta_1 \ln y_{i,t} + e_{it} \tag{1}$$

- $\ln y_{i,t}$ is log of per capita income of country i at time t.
- α_i is country fixed effect.
- e_{it} is error term.

Results: Split-Sample Regression

	$< \$9200$	$\geq \$9200$
β	0.06(0.01)	0.22(0.02)

- The coefficient of $\ln y_{i,t}$ is positive and statistically significant in both samples.
- it increases almost threefold from 0.06 to 0.22 comparing low- to high- income sample.

The coefficient is also positive and statistically significant in both samples divided by time.

	before 1950	after 1950
β	0.08(0.01)	0.11(0.01)

- It increases from 0.08 to 0.11, lower thang the income-based split.
- This suggests that the growth of service sector is more pronounced in high-income than time itself.

Empirics

B. Composition of Services

High-skill and Low-skill Services

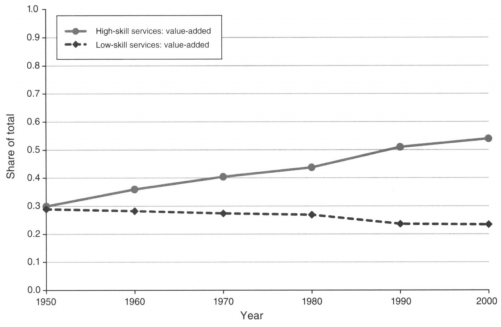


FIGURE 3. GROWTH OF LOW- AND HIGH-SKILL SERVICE SHARES

Note: The category of high-skill services includes all industries with at least 12.5 percent of workers college-educated in 1940.

- Rank skill-intensity fraction of worker (≥ 12 *years of schooling*) and partition 1950 services into half
- high-skill services; at least 12.5% of workers has educated more than 12 years.

The Growth of Decomposed Service Industries by Skill-Intensity

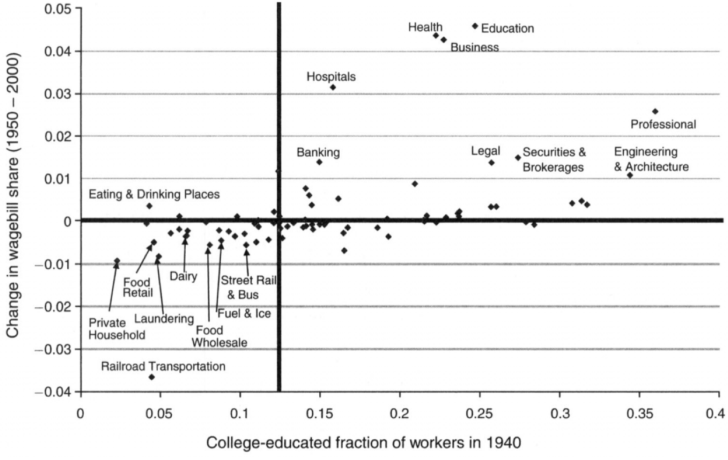


FIGURE 4. GROWTH VERSUS SKILL INTENSITY OF DISAGGREGATE SERVICE INDUSTRIES

Empirics

C. Market for High-Skilled Labor

Relative Wage and Labor Supply of College-Educated Workers

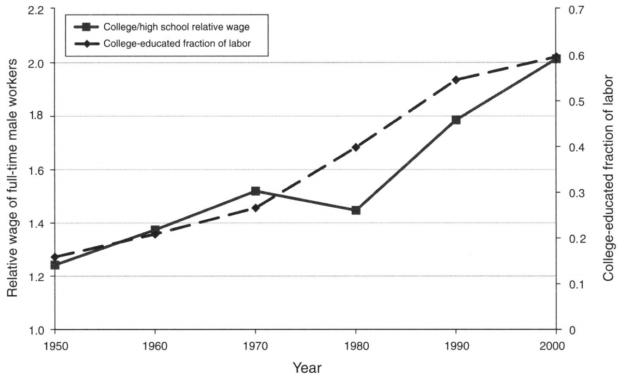


FIGURE 5. GROWTH OF COLLEGE PREMIUM AND FRACTION COLLEGE-EDUCATED

- Relative Wage; w_{college} increases from 125% in 1950 to 200% of $w_{\text{high school}}$ by 2000.
- Relative Quantity; $\frac{L_{\text{college}}}{L_{\text{high school}}}$ increases from 15% to 60% during the same period.

Split-Sample Regression: Revisited

$$\textit{fraction of college-educated adults(25+)}_{i,t} = \alpha_i + \beta_1 \ln y_{i,t} + e_{it}$$

- The service share in equation (1) is now replaced with the fraction of college-educated adults(25+)
- yield a fivefold increases between low and high income group.

	$< \$9200$	$\geq \$9200$
β	0.04	0.23

Relative Wage and Price of Services

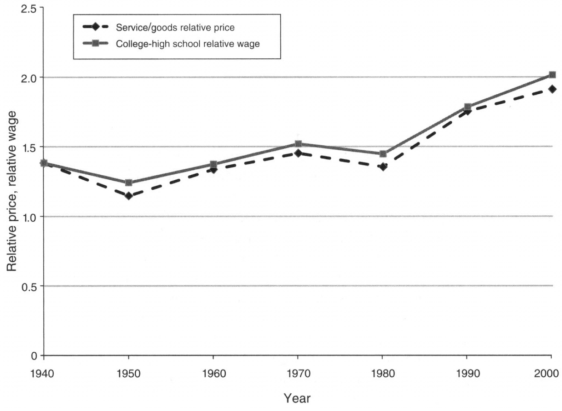


FIGURE 6. CORRELATION OF SKILL PREMIUM AND RELATIVE PRICE OF SERVICES

- The relative wage of college-educated workers and the relative price of services over time.
- Normalized the two to be equal in 1940.

Preview of Model

Static Stand-in Representative Household Model

Stand-in Representative Household Model

A stand-in represnetative household faces a range of satiable **wants** that differ in their production costs.

The household's decisions are:

- the fraction of members that are required to obtain speciallized skills (high-skilled and low-skilled labor)
- the allocation of high- and low-skilled members' time between market work and home production.

Marker services and home production services

- Marker production has a cost advantage due to use of more speciallized skills
- Home production assumed to be more customized, which gives more utility.
- Goods are produced only in the market and always the intermdiate input in the production of services.
- The final output takes the form of services whether it is market produced or not.

Fraction of Members

- The household contains members differentiated by their skill level e that are high-skilled($e = h$) and low-skilled($e = l$). ex-ante they are identical.
- The household chooses the fraction of high-skilled members f^h and the fraction of low-skilled members f^l.

$$f^h + f^l = 1$$

Non-homothetic Preferences

The household holds preferences over a continuum of dircrete, satiable wants indexed by the service that satisfies them, $z \in \mathbb{R}^+$

$$C^e(z) : \mathbb{R}^+ \to \{0, 1\}$$

$$H^e(z) : \mathbb{R}^+ \to \{0, 1\}$$

Indicator Functions $C = \{C^l(z), C^h(z)\}$ and $H = \{H^l(z), H^h(z)\}$

The stand-in household holds preferences over wants and the method of satisfying those wants.

Utility Function

The household holds preferences over a continuum of dircrete, satiable wants indexed by the service that satisfies them, $z \in \mathbb{R}^+$

$$u(C, H) = \Sigma_{e=l,h} f^e \int_0^\infty [H^e(z) + \nu(1 - H^e(z))] C^e(z) dz \tag{2}$$

where $H(z) \leq C(z)$ and $0 < \nu < 1$ is the discounted utility for market services.

Marginal Utility from Consuming Want z

$$MU(z) = [H(z) + \nu(1 - H(z))] C(z)$$

The marginal utility of consumption z is symmertric in e.

References

Buera, Francisco J and Joseph P Kaboski, "The rise of the service economy," *American Economic Review*, 2012, *102* (6), 2540–2569.

Herrendorf, Berthold, Richard Rogerson, and Akos Valentinyi, "Growth and structural transformation," *Handbook of economic growth*, 2014, *2*, 855–941.