Trading Tasks:
Globalization in the Information Age

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An Anecdote from WIRED

Almost three years ago, Scott Kirwin was ***Wired*'s** pissed off programmer. Tossed from his job and raging against globalization, he had launched the Information Technology Professionals Association of America to lobby against offshored work and imported workers. These days, Kirwin still works with computers. He's just less pissed: In June, he shuttered the ITPAA. **"I don't view outsourcing as the big threat it was,"** he says. What changed? Well, Kirwin found better work as an analyst and software architect. And he noticed that the **talents that make him valuable couldn't be reduced to a spec sheet and emailed to Hyderabad**.

History of World Trade, Part I

Prior to the Industrial Revolution

- Transportation slow, dangerous, and very costly
- Limited trade by sea and along the Great Trade Routes (e.g., the Silk Road)
- Most goods produced close to where they were consumed

With the Industrial Revolution

- New technologies implied gains from specialization of workers by task

Adam Smith's Pin Factory

"One man draws out the wire, another straights it, a third cuts it, a fourth points it, a fifth grinds it at the top for receiving the head; to make the head requires two or three distinct operations; to put it on, is a peculiar business, to whiten the pins is another; it is even a trade by itself to put them into the paper; and the important business of making a pin is, in this manner, divided into about eighteen distinct operations, which in some manufactories, are all performed by distinct hands, though in some others the same man will sometimes perform two or three of them."

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With the Industrial Revolution

- New technologies implied gains from specialization of workers by task
- Falling transportation costs made **separation of producers and consumers** possible

David Ricardo's Classical Theory

- When Ricardo penned his celebrated treatise in 1817
  - Communication was no faster and only slightly less costly than shipping goods from one country to the other
  - Specialization required proximity: **the industrial factory**
  - Almost all trade involved **exchange of complete goods**
  - Goods produced according to comparative advantage

Sources of Comparative Advantage

- Study of trade has focused on identifying **sources of comparative advantage**
- Eli **Heckscher** and Bertil **Ohlin**:
  - Role of **factor endowments**
  - Can explain why China exports toys and apparel, the United States exports aircraft and pharmaceuticals

- For nearly two centuries, core of international trade theory dominated by thinking about the production and exchange of complete goods

Trade of Yesterday and Tomorrow ???

History of World Trade, Part II ???

- Revolutionary progress in communication and IT has enabled historic (and ongoing) **fragmentation** of production processes
  - **Output of many tasks can be sent electronically**
  - **Coordination is possible over great distances**
  - **Specialization by task no longer requires proximity (separation of producer from himself)**
  - **Global supply chains**
- Need a new paradigm for studying international trade: one that emphasizes **trade in tasks**

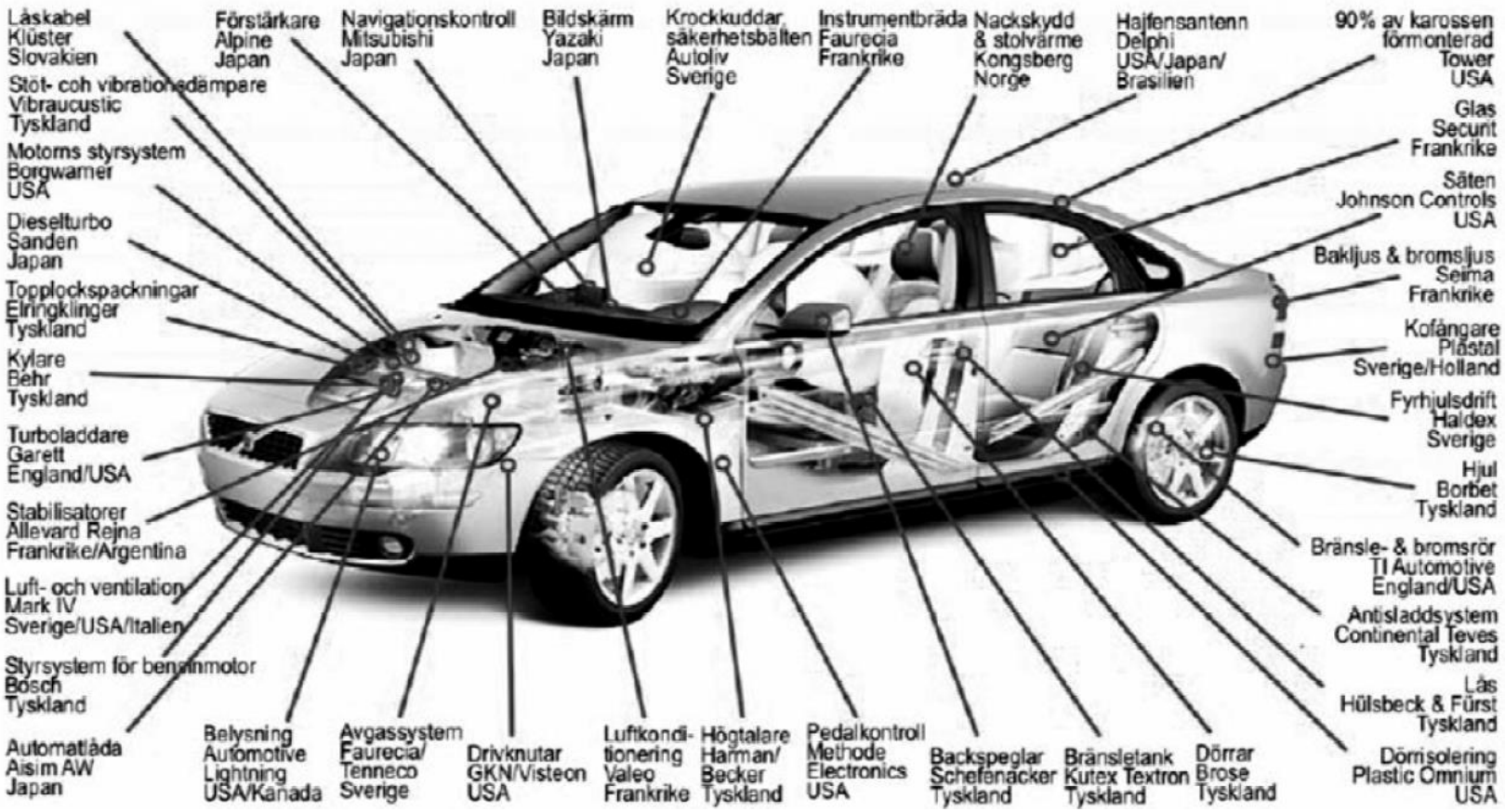
Examples of Task Trade, I

Mattel's Barbie Doll

- Designed in Mattel's headquarters in El Segundo, CA
- Oil refined into ethylene in Taiwan and formed into plastic pellets to produce doll's body
- Moulds for doll made in US
- Nylon hair is manufactured in Japan
- Paint pigments for decoration prepared in US
- Cotton cloth and doll clothing made in China
- Assembly in Indonesia and Malaysia
- Quality testing in the US
- Marketing around the globe

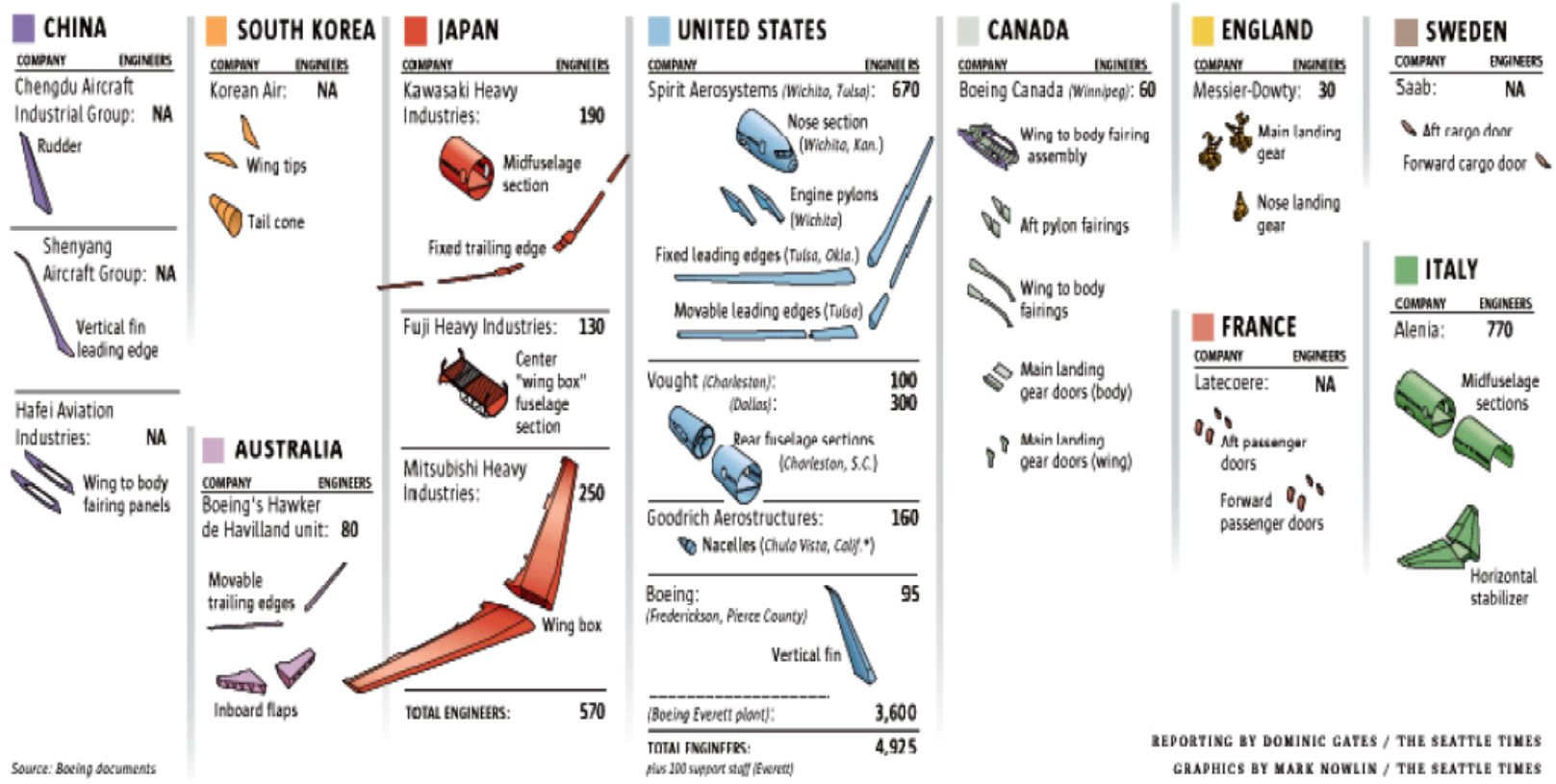
Examples of Task Trade, II

Volvo S40



Examples of Task Trade, III

Boeing 787 (43 suppliers in 135 sites; 70% parts offshore)



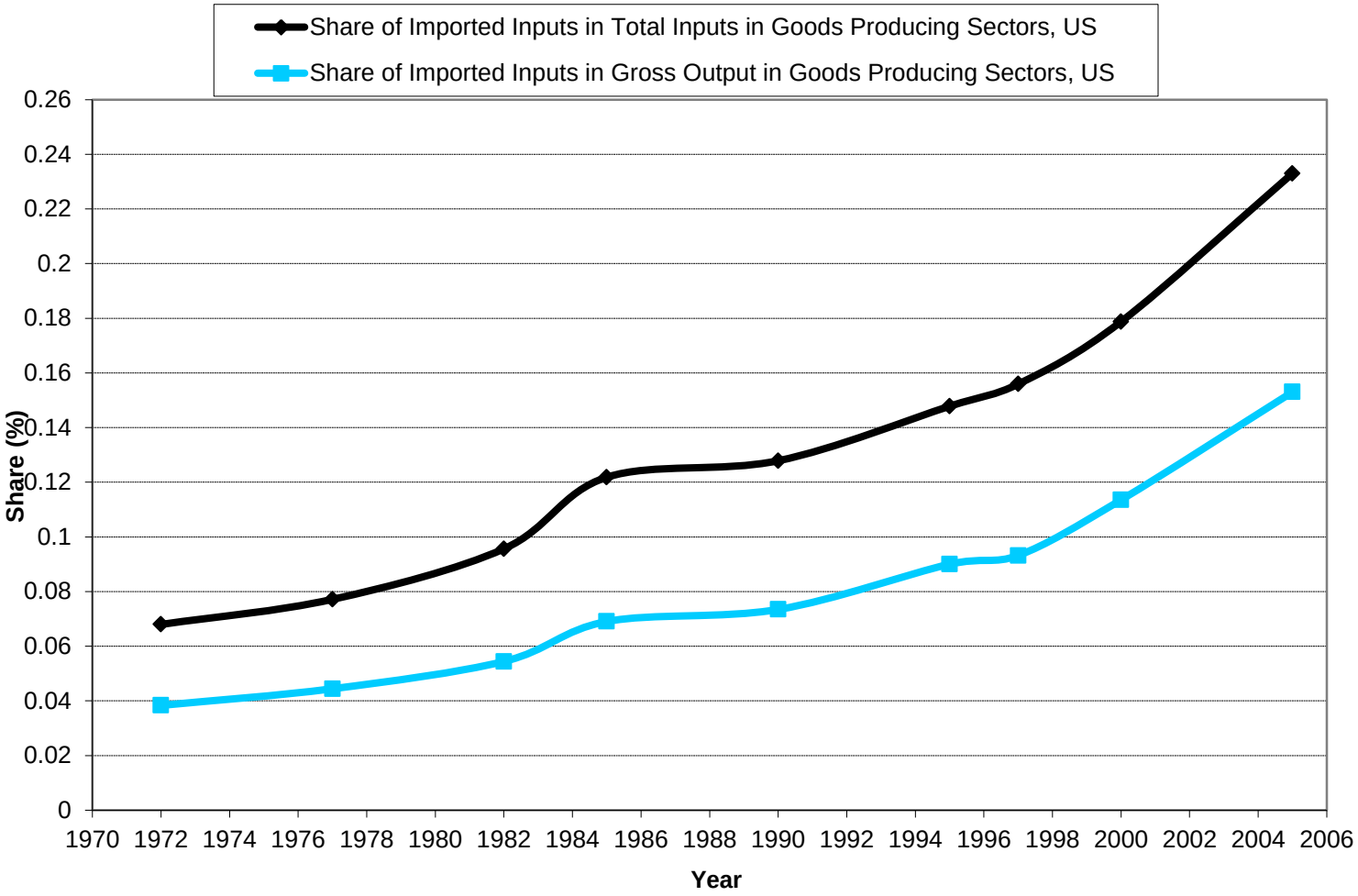
Offshoring of Service Tasks

- Call centers: telemarketing and customer care
- Back office: data processing, payroll, bookkeeping
- IT: systems support, web design
- Publishing: copy editing and proof reading
- Legal support services
- Accounting: tax form preparation
- Software development
- X-ray readings

And even …


OMAHA WORLD-HERALD
KOTERBA
NO. YOU MAY NOT OUTSOURCE YOUR HOMEWORK TO INDIA.

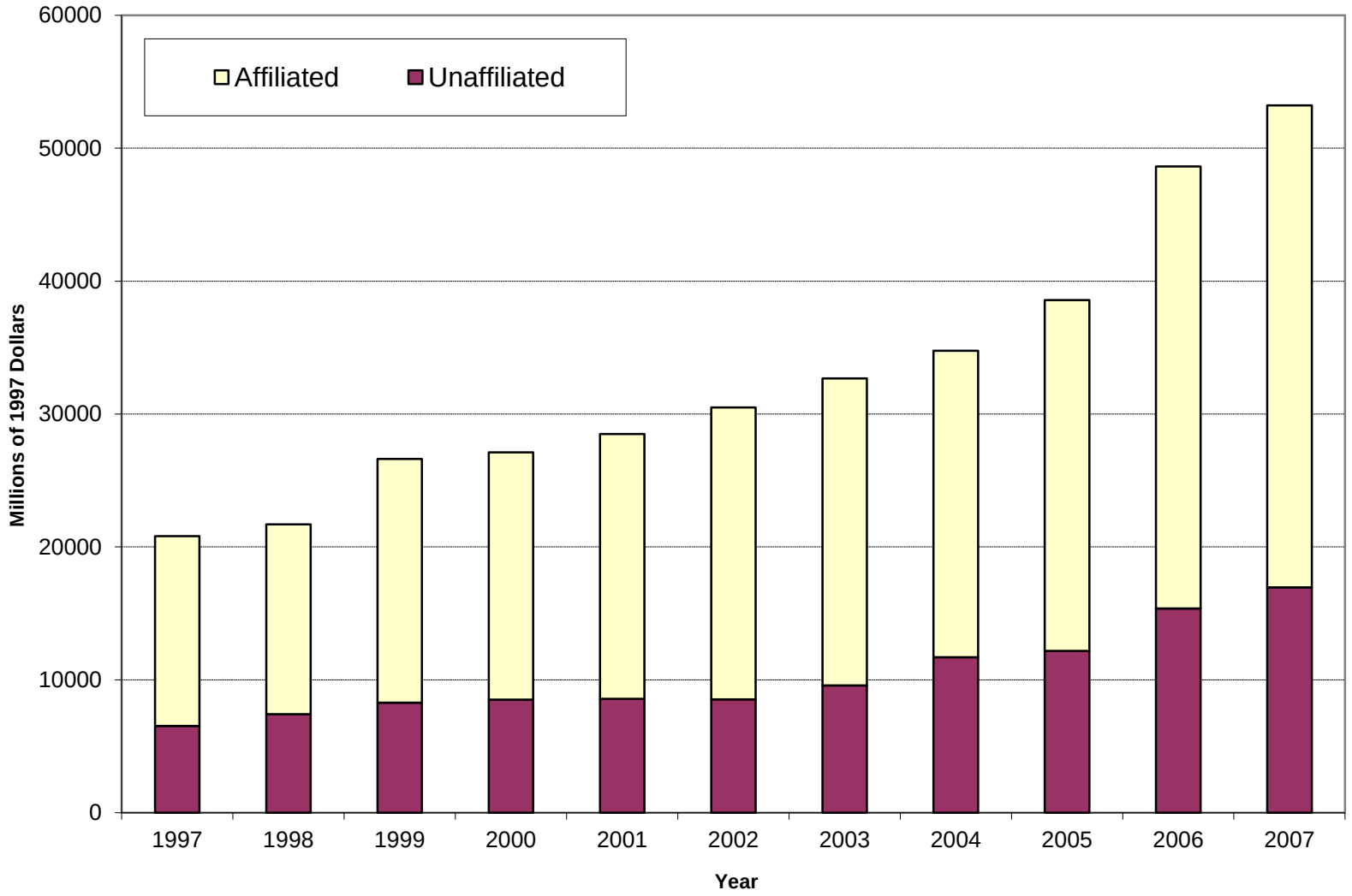
US Imported Inputs

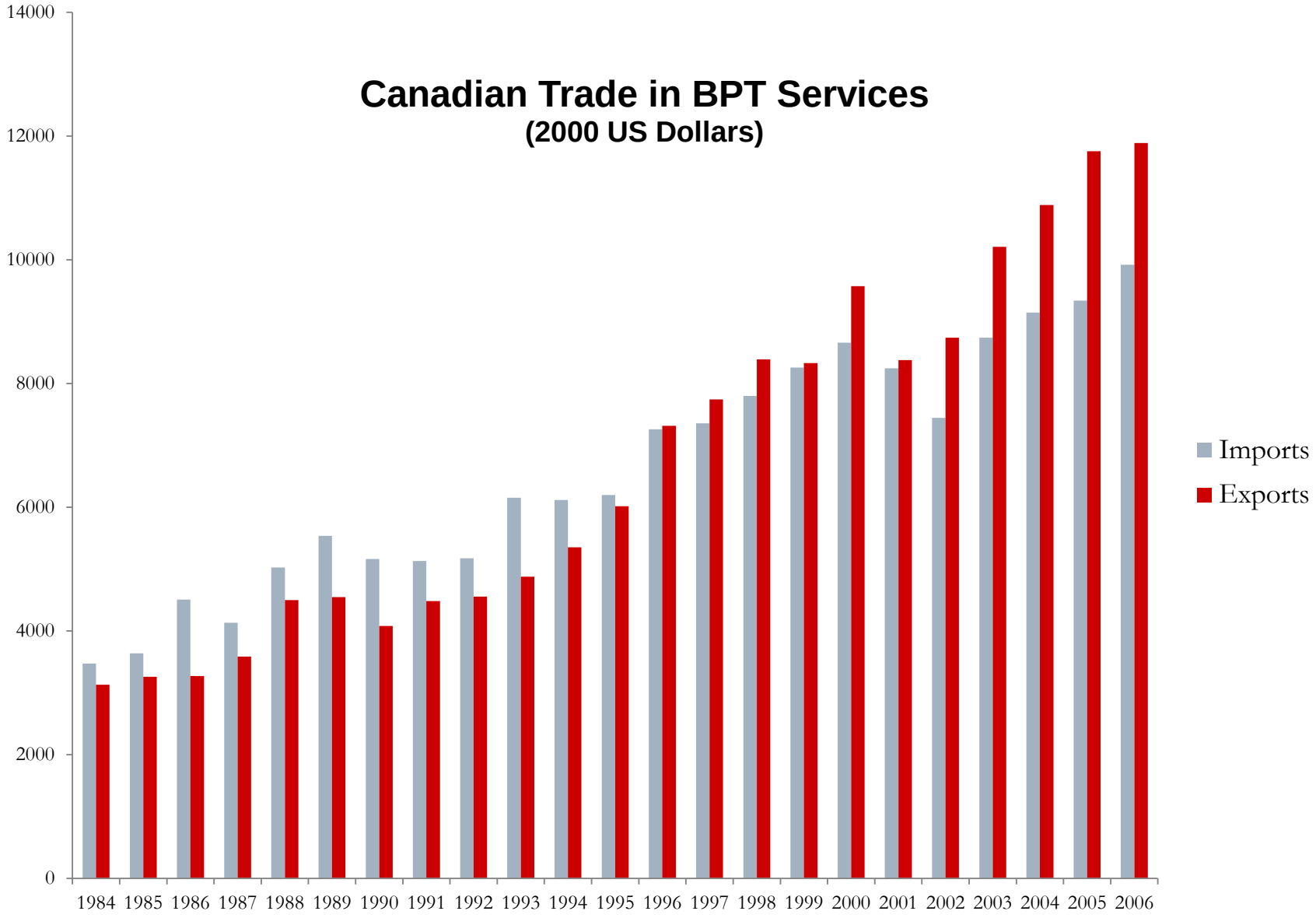


Canadian Imported Inputs

- Imported intermediate inputs as fraction of total intermediate inputs used in goods-producing industries:
  - 1995: .508
  - 2000: .521

Total US Imports of Business, Professional, and Technical Services




Canadian Trade in BPT Services
(2000 US Dollars)
14000
12000
10000
8000
6000
4000
2000
0
1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006
Imports
Exports

The World is Not (Yet) Flat

- Most exchange still takes place between partners located very close to one another
- Offshoring still involves substantial costs
- Considerable heterogeneity in the cost of trading tasks
  - **Routine vs. Nonroutine tasks**
  - **Electronic vs. Personal delivery**
- Tradability of a task does not correspond perfectly (or even very well) with the skilled required to perform it

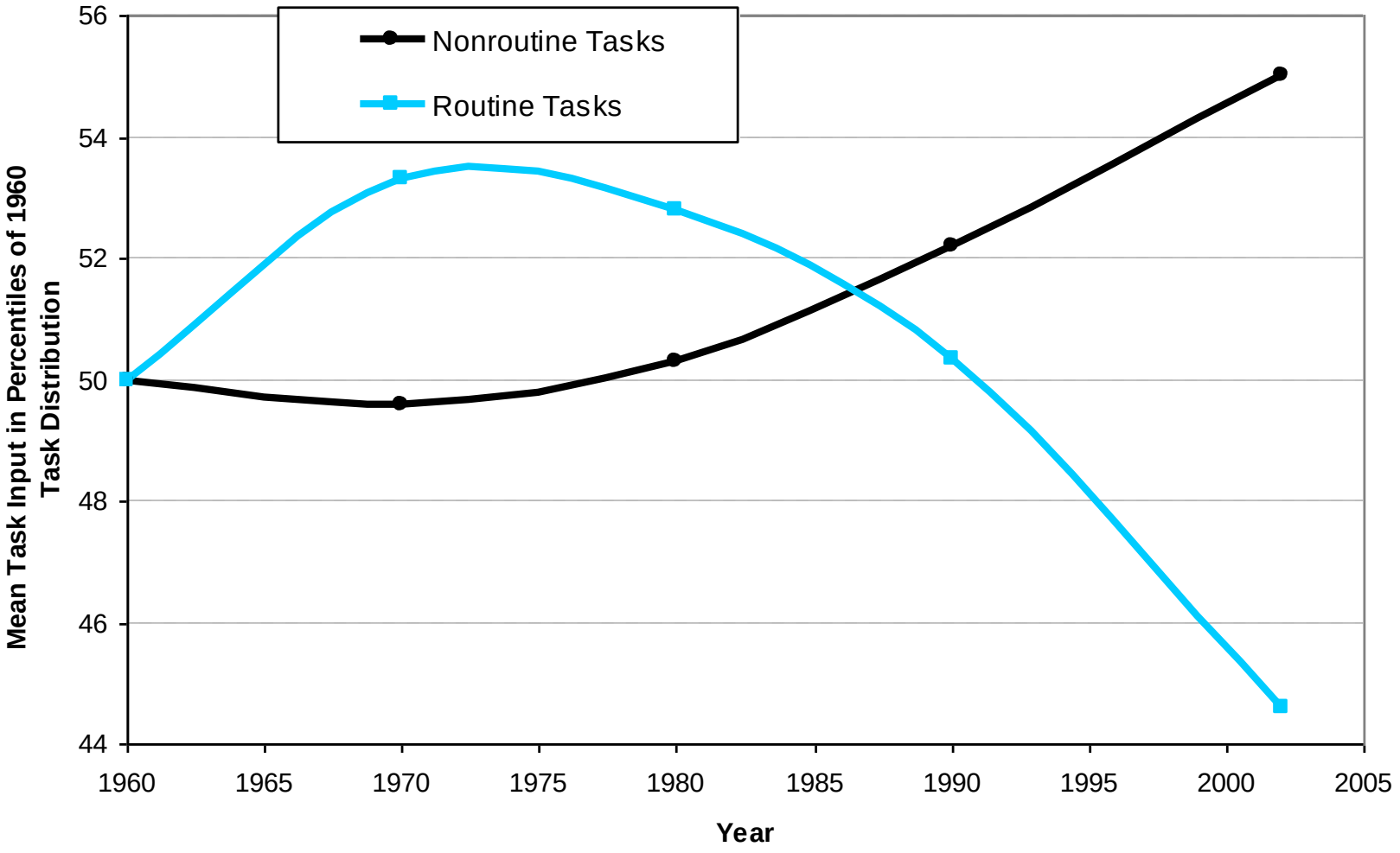
Blinder "Offshorability" Index

Occupation	Index
Computer Programmers	100
Office Clerks	94
Customer Service Reps	94
Bookkeeping and Auditing	84
Stock Clerks and Order Fillers	34
Shipping and Receiving Clerks	29
Sales Managers	26
Business Operations Specialists	25

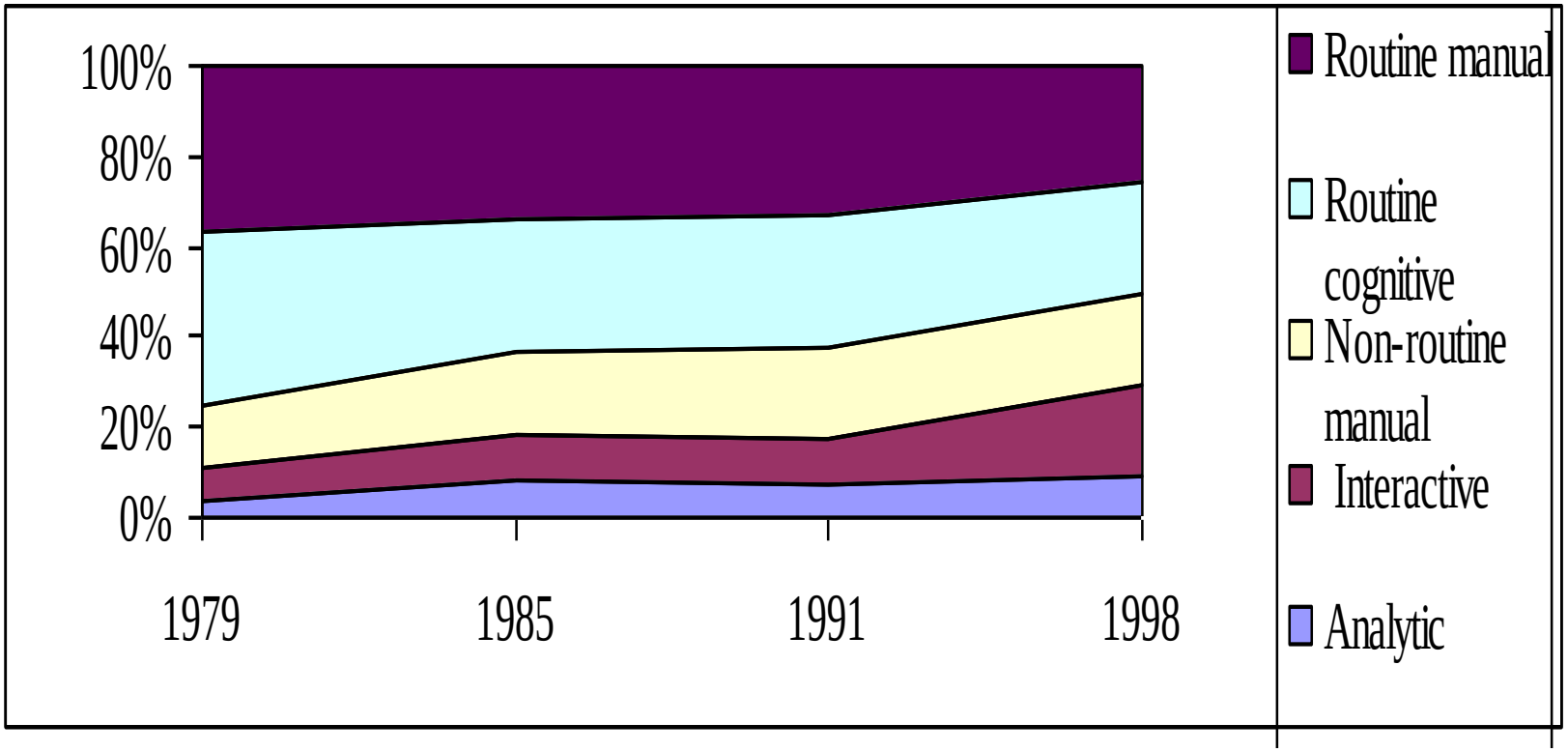
Labor Market Evidence

- If task trade has been growing due to improvements in firms' abilities to separate functions in time and space, should see workers in high-wage countries performing
  - fewer of the tasks that can be moved offshore at relatively little cost
  - more of those for which proximity is valuable

Trends in US Routine vs. Nonroutine Tasks



Tasks Performed by Less Educated German Workers



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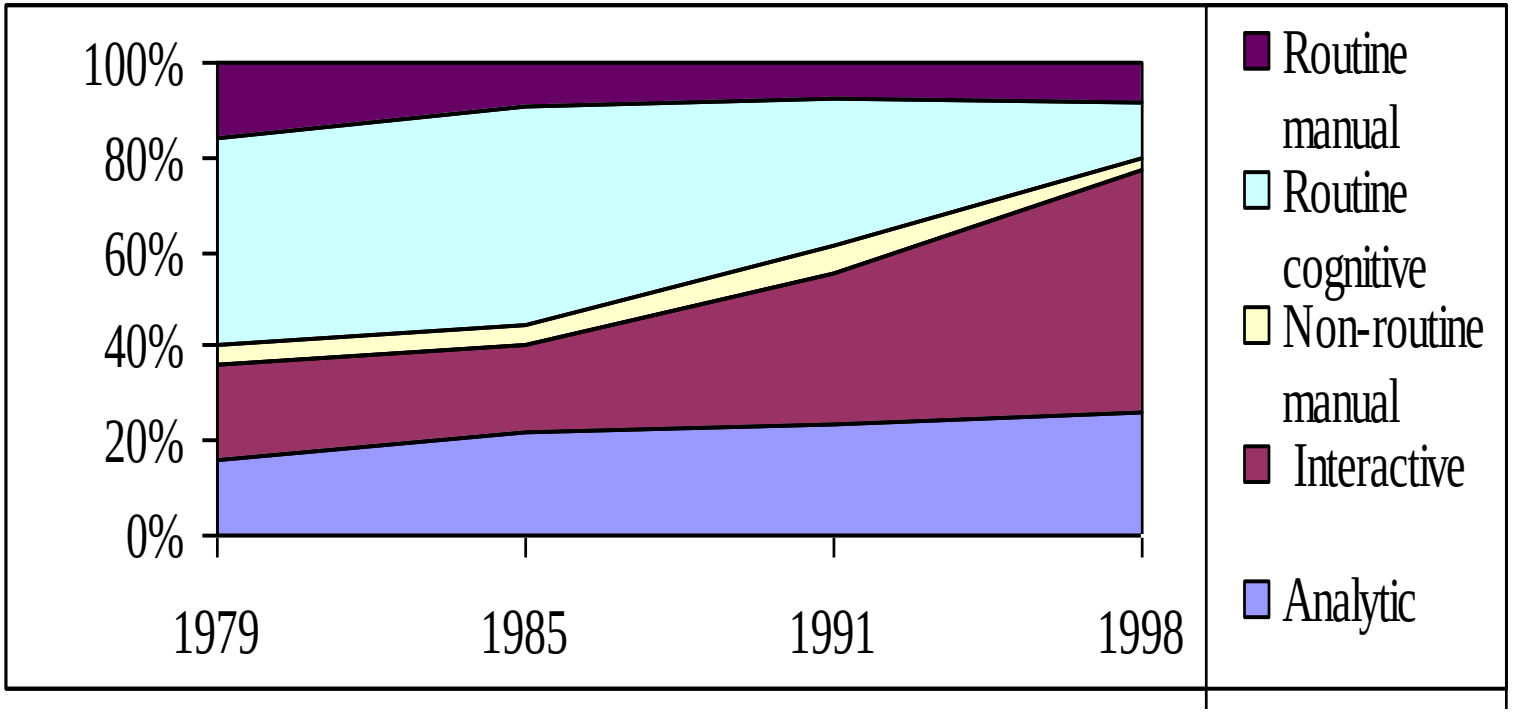


Towards A New Paradigm

- **Esteban Rossi-Hansberg** and I have developed a simple analytical framework that can be used to study effects of improved opportunities for offshoring
- Conceptualize the production process in terms of the tasks needed to produce goods
- Tasks differ in "offshorability" – those with low offshoring costs can be separated from headquarters at lower cost
- We use our model to study the effects of improved opportunities for offshoring associated with the IT revolution

The Effects of Offshoring

- How do improved opportunity for offshoring affect domestic labor markets in industrialized countries?
- **Thought experiment**: Suppose cost of offshoring tasks by unskilled labor declines throughout economy
- Three effects:
  - **Productivity Effect**
  - Labor-Supply Effect
  - Relative-Price Effect

The Productivity Effect

- Often overlooked in the policy debate about offshoring
- A decline in the cost of offshoring:
  - Reduces the cost of tasks already performed offshore
  - Leverages time of domestic labor, who perform tasks that cannot be moved offshore (cf. Scott Kirwin)
  - Raises firms' profits in proportion to their use of factor whose services is being offshored
  - Benefits most the industries that offshore most, and thus boosts demand for services of factors used intensively in these industries
- The productivity effect potentially can outweigh the adverse labor-supply and relative-price effects for domestic labor

Offshoring as Technological Progress

- **Close analogy between falling costs of offshoring tasks and factor-augmenting technological progress**
  - Both reduce the cost of using a factor and the amount of local factor needed to produce a given amount of output
  - Both benefit firms that use the factor intensively
  - Both create incentives for these firms to expand
  - Expansion of these firms can lead to a net increase in demand for factor whose productivity has increased

Offshoring High-Skill Tasks

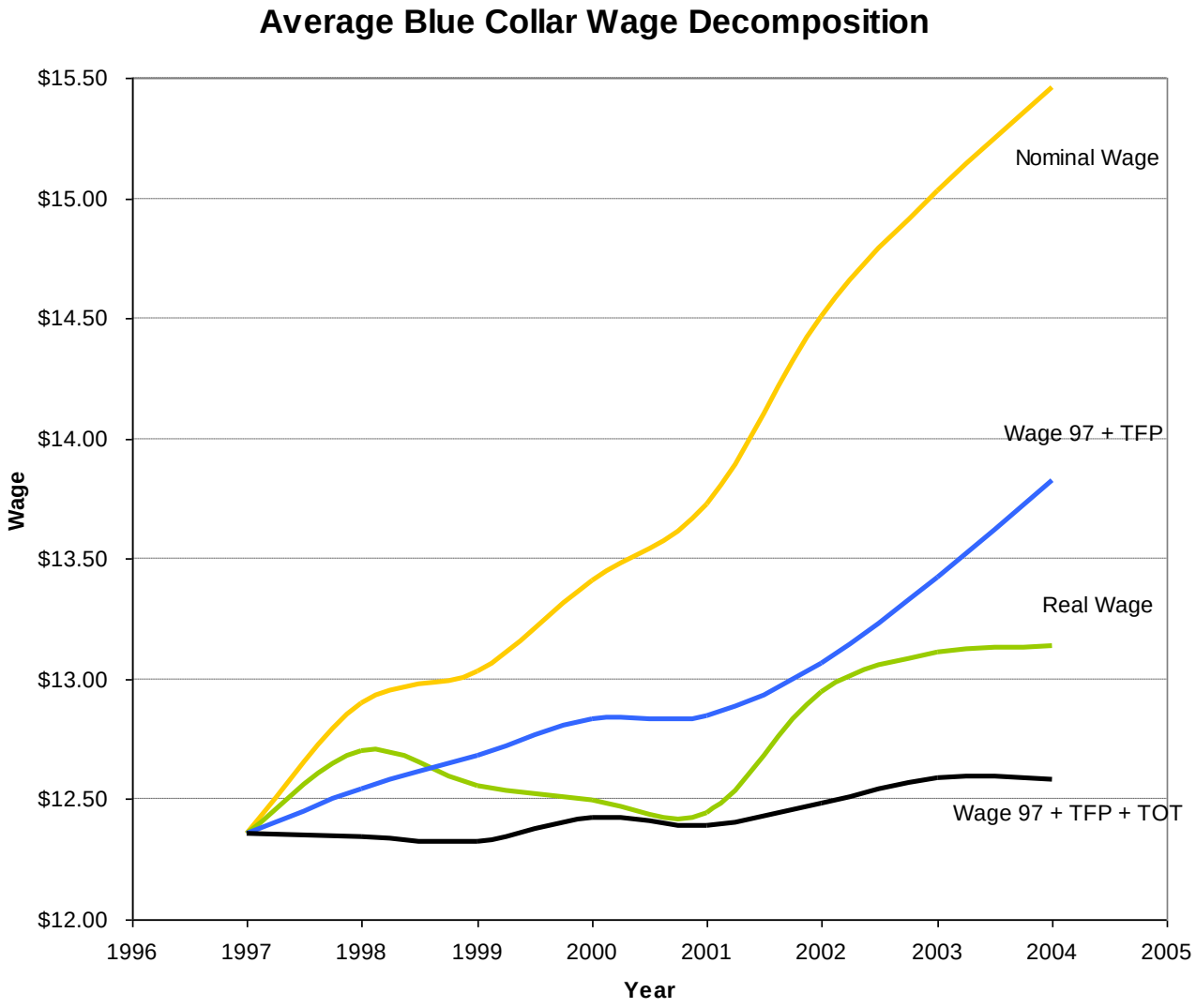
Offshoring of white-collar jobs has generated even more media frenzy than migration of blue-collar jobs

- Modest in the data
- Can be analyzed analogously
- Equivalent to skill-augmenting technological change

Decomposing U.S. Low-Skill Wages

- Part of the movement of real wages due to general increase in US productivity unrelated to offshoring

- Part of the movement of real wages due to falling relative price of labor intensive goods


Average Blue Collar Wage Decomposition
$15.50
$15.00
$14.50
$14.00
$13.50
$13.00
$12.50
$12.00
Wage
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
Year
Nominal Wage
Wage 97 + TFP
Real Wage
Wage 97 + TFP + TOT

Decomposing U.S. Low-Skill Wages

- Part of the movement of real wages due to general increase in US productivity unrelated to offshoring
- Part of the movement of real wages due to falling relative price of labor intensive goods
- **The unexplained (positive) residual**: Perhaps a productivity effect?

Offshoring, Productivity and Labor Demand

- Feenstra and Hanson: Share of imported intermediates has positive association with industry productivity
- Amity and Wei: Intensity of offshored services has positive association with industry employment
- Harrison and McMillan: For US multinationals that do different tasks at home and abroad, foreign and domestic employment are **complements**.

Conclusions

- **In the past:**
  - Countries produced mainly complete products that they consumed and traded with other nations
  - Producers took advantage of productivity gains that derive from specialization by dividing production process into a variety of tasks
  - But these tasks had to be performed in close proximity due to the high transportation and communication costs
- **Today:**
  - Drastic reductions in these costs have facilitated direct trade in tasks
  - Producers and consumers can capture the traditional benefits that derive from worker specialization
  - Plus additional gains that are generated when tasks are located where they can be performed most cheaply

Conclusions

- When thinking about modern trade, we need to think about both **tasks** and goods
- Offshoring of tasks performed by a particular factor is like technological progress that augments the productivity of that factor
- Improved opportunities for offshoring may have buffered the impact of increased competition from Chinese and Indian firms on wages in the industrialized countries