

## **A Flat World, A Level Playing Field, a Small World After All, or None of the Above?**

Review of Thomas L Friedman, *The World is Flat*.

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January 31, 2006  
*Preliminary Version*

### **What Might that “Flat World” Metaphor Mean?**

Stumbling onto a book titled “The World is Flat” by Thomas Friedman would leave a book browser puzzled about its likely content. My first guess would be epistemology and evolution. “The World is Flat” must be a reference to the pre-Columbian sailor’s worry about falling off the edge of the earth, and the tenacious clinging to that idea by members of the Flat-Earth Society in the face of “overwhelming” “scientific” evidence. Put that into the current context, the debate about the intellectual legitimacy of “intelligent design”, and you are led to my conclusion: “The World is Flat” is probably a book about faith-based decision-making and the teaching of intelligent design in the schools. This book is going to surprise. It will show that a flat earth is not a straw man at all, and that science is only another kind of religion, seeking to burn its heretics at the stake with all the vigor of traditional religion.

But as I obsess on this, I wonder why Friedman didn’t choose the title “The Earth is Flat.” That would be a better title for a book about epistemology and evolution. Remember it is the Flat-Earth Society, not the Flat-World Society. “World” has a meaning that is much broader than “earth.” Earth is the planet, the dirt at your feet, real physical stuff. Our world is heaven and earth; our world is mankind; your world is where you live; your world is your friends and your beliefs. So I gather that there must be some important meaning here. I wonder what it is?

Alas, the subtitle “A Brief History of the Twenty-first Century” unsettles this brief flight of fancy about the content of this book, but it leaves the browser utterly confused. How could “The World is Flat” and “A Brief History of the Twenty-first Century” have anything to do with each other? That bold subtitle reminds me of the New Yorker cartoon that hung outside a history professor’s office at UCLA for many years. It depicted a student receiving a final exam in a history course: “Explain World War II. Use both sides of the page if necessary.” Friedman’s boldness here goes beyond brevity, since this is a brief history of the Twenty-first Century written before the Twenty-first Century has occurred.

Enough with all these diverting thoughts. It’s time to look at the blurb. The blurb points in a wholly different direction: “... the convergence of technology and events that allowed India, China, and so many other countries to become part of the global supply chain for services and manufacturing, creating an explosion of wealth in the middle classes of the world’s two biggest nations and giving them a huge new stake in the

success of globalization? And with this “flattening” of the globe, which requires us to run faster in order to stay in place, has the world gotten too small and too fast for human beings and their political systems to adjust in a stable manner?”

Huh? That last sentence packs in at least two too many metaphors for me to process: a flat earth, people running faster but staying in place, a small world and a fast world. And then there is the “explosion” in the previous sentence. What is Friedman getting at with this *mélange* of metaphors? I understand that China has increased its exports of manufactures to levels far above anyone’s expectations. I understand that call centers and some back-office functions and some software coding have moved to India. I understand that GDP growth in both China and India has been phenomenal and has lifted hundreds of millions out of poverty. But what is the meaning of that flattening metaphor? What is the alternative to a flat world? A smooth sphere? Bumps? That’s a puzzle worth solving.

### Friedman’s “Aha” flat moment

Friedman’s “aha” flat moment came on a golfing outing during a Discovery Channel excursion to Bangalore, India where, surrounded by buildings emblazoned with US tech names, he was told to “Aim at either Microsoft or IBM.” (p3). Friedman recounts that Columbus, sailing in search of India apparently on the premise that the Earth is round, encountered exotic native Americans unlike the Europeans with which he was familiar and pronounced them Indians, allowing Columbus to carry the news back to King Ferdinand and Queen Isabella: the Earth is round. Likening his Discovery Channel crew to the sailors on the *Nina* and the *Pinta* and the *Santa Maria*, when Friedman found in Bangalore not Indians but Americans in name and speech and business practices, he “shared my discovery only with my wife, and only in a whisper. ‘Honey.’ I confided, ‘I think the world is flat.’” (This made me wonder: If Columbus had found Italians in the New World would he have concluded the Earth is flat??)

Once “flat” was in Friedman’s head, he couldn’t seem to get it out. When on that same trip to Bangalore, Friedman was told by Nandan Nilekani, CEO of Infosys Technologies Limited, “Tom, the playing field is being leveled.” Friedman concludes “What Nandan is saying, I thought, is that the playing field is being flattened... flattened? Flattened? My God, he’s telling me the world is flat!” p.7

Flattened? I still don’t get it. To digress briefly into the use of metaphors in economics I routinely ask my Ph.D. classes in international economics what they think I mean when I tell them “Joe’s elevator doesn’t stop on all floors.” The foreign students (of which there are many) whose native language is not English imagine literally an elevator in Joe’s building that isn’t working right. American students (of which there are only one or two) suspect that what I mean is “Joe isn’t playing with a full deck.” What I want these students to understand is that models in economics are highly metaphorical and if students cannot tell the difference between the literal mathematical properties of models and the subtle messages of the models, they are not understanding the language. Decoding metaphors is the hardest part of learning a new language. When we emphasize

only the grammar and the syntax in our economics courses, we leave little room for the kind of experience with the language that allows students to learn converse in Economics, and we graduate students who can parse an Economics sentence but cannot create one.

That is my way of saying that I am open to a good new metaphor, but a metaphor isn't going to work for me unless I can figure out what it means. I know what a "small world" means. I have some ideas what a "level playing field" may mean. But a "Flat World" for me is an elusive idea. Worth learning about.

## **Models of Global Competition**

### **Flatness is Familiar in Economic Geography**

Literal flatness is not a new concept to economists: There are Von Thünen ringed cities in the centers of flat planes of agricultural land and Lösch hexagons that divide a flat plane of demand into identical service areas with a supply point in the middle of each. And there are Hotelling competitors that cluster inefficiently together in the center of a straight-line segment along which customers are distributed uniformly (a flat distribution). There are important messages in these and other models of economic geography. Best to reflect on them before getting too entranced by Friedman's metaphors.

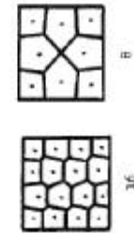
The German farmer Johann H. Von Thünen noticed that farmland closer to the towns where the produce was sold commanded a premium price, and he is credited with being the father of economic geography because in 1826 he postulated a featureless (flat) plane of land with a town in the center. Crops shipped from farm to town had different ratios of transportation cost to value. Fertilizers and farm implements were shipped the other way. These assumptions create a sequence of "Von Thünen" concentric rings of farmland around the town center, with the land rents highest near the center, with "heavy" crops that need fertilizers produced close to market. (A modern version of this idea is the micro-economic exam question: "Why does the State of Washington ship its best apples to other states, not its worst?")

Von Thünen's theory of concentric rings presumes the existence of towns, but where do these towns come from? These might be market towns where farmers exchange one crop for another. They might be industrial centers. On this question Weber(1929) postulates a mathematical programming problem of industrial location in which materials can be found at discrete supply points on a featureless (flat) plane and manufacturing must procure these resources and ship finished products to prespecified locations of demand. Should the processing be done where the materials can be found, or where the product is sold? It depends on whether processing adds weight or reduces weight.

Next comes Lösch (1938 and 1944) who postulates another mathematical programming problem with demand uniformly spread on an infinite plane. The problem is to locate supply points in this plane to minimize the total distance traveled from customers to supply points. The most efficient shape that minimizes the average distance between

customers and supply point is a circle with the supply point in the center. But circles cannot be a solution to Lösch's problem because they cannot tile a plane. Of the three regular shapes that can tile a plane - equilateral triangles, squares and hexagons - it is hexagons that come closest to circles. Thus Lösch's infinite featureless (flat) plane of demand is cut most efficiently into equal-sized hexagons with a supply point located at the center of each.

I actually wrote my first published paper (my Senior Thesis at Princeton)<sup>1</sup> on the Lösch problem but with demand limited geographically to squares and circles rather than infinite planes. How is a square of demand optimally cut into market areas if there are eight supply points? What about 16? With 16, do we want four rows of squares? The answers are in the figures at the right. For 16 supply points, the optimum is not four rows of squares; the optimum is a compromise between the ideal hexagons and the squares.



While Von Thünen describes an economic equilibrium, Weber and Lösch describe only a mathematical optimization problem that may or may not be approximated by firms seeking locations that maximize profits. Probably not, since these socially optimal solutions leave firms in advantaged positions relative to their closest customers. That market power is sure to be exploited with monopoly pricing, which in turn is sure to be contested by location and/or pricing decisions of other firms. Where might competitive firms locate in a flat world? An economic equilibrium model of competition on a flat line segment (call it a beach) has been offered by Harold Hotelling(1929) who argues that competition will induce both sellers (hot dog stands) to crowd together at the center, producing an inefficient outcome. The Hotelling model is routinely applied to competition between two political parties, each positioning itself close to the median voter.

## The Message of Models of Competition in Flat Planes

From these references we should receive an important message that needs to be absorbed as we try to decode Friedman's flat-world metaphor. Geography, whether physical or cultural or informational, limits competition since it creates cost-advantaged relationships between sellers and buyers who are located "close" to one another. The key word is relationships. Flatness doesn't create a relationship-free equilibrium; it merely changes the geography of relationships. It turns irregular hard-to-define geographic regions of customers committed to the same supplier into regular hexagons with the supplier at the center.

Flat featureless planes of competition are the preferred spaces for the mathematical modeling of geographical competition, not because flatness closely resembles nature but only because modeling of competition in real geographies with rivers and oceans and hills and mountains is beyond the reach of algebra. The point of this modeling is not to

<sup>1</sup> "Location Equilibria," *Journal of Regional Science*, Vol, 8 (No. 2, 1968), 229-242

show what flatness implies. The point is to show what transportation costs imply. The what-if question that these economic geographers ask is *not*: “What if the world were flat instead of spherical or bumpy?” Their what-if question is: “What if transportation costs were low instead of high? What do declines in transportation costs do to the intensity of competition and the geography of prosperity?”

## Some Real Questions for Economic Geography to Explore

There are countless real “globalization” questions for this kind of economic geography to answer. For example: What if Europe were to form an economic union that allowed the four freedoms among countries: free movement of goods, people, services and capital, all supported by a common currency? Which kinds of activities would concentrate and which would disperse? Do the peripheral countries, like Sweden, benefit or lose out? What happens to a central country, like Switzerland, that doesn’t join?

When looking for problems that can be studied by economic geography, it is wise to keep in mind that the distance effects need not come from simple transportation costs. Physical distance may create and reinforce linguistic and cultural barriers that make it hard to exchange thoughts between people located far from each other in the cultural landscape. In that kind of world, there would be specialized cultural services (e.g. plays and newspapers and legal services) made by locals for locals. These couldn’t be shipped very far because the messages would melt away to meaninglessness if the content were shipped over great distances to unreceptive cultures.

But suppose that, by an accident of history, a geographically large area with a large population adopted much the same language and much the same culture. Though large physically, this area is small culturally. Call it the United States of America. Within this country, how many “Hollywoods” do you suppose might emerge? If the agglomerative externalities (economies of scale) were moderate compared with the cultural shipping costs, hundreds of Hollywoods might be sprinkled around the US each producing specialized products suited to the local markets. But suppose the benefits from agglomeration are large and the competitive outcome allowed only one Hollywood to emerge producing one homogenous cultural product that is not customized for Southern tastes nor Eastern Tastes nor Midwestern tastes nor Western tastes. The same movies are displayed in theaters all over the country. Enter into this drama a new actor: globalization. Suppose that communications innovations drive down the “shipping costs” for cultural products to points outside the United States. Suppose English is the language of global commerce and children all over the world drink Coke and wear jeans. Then what happens? Would a Bollywood emerge and compete actively for the US market? Or would global competition allow only a single Hollywood? Does our Hollywood win or lose from this form of cultural globalization?

If your instincts are the same as mine, you are thinking that Hollywood wins big time from declining cultural “transportation” costs, and many of the rest of us living in Los Angeles benefit as well. It is the local cultural providers in France and Mexico and Canada and India and China that are probably hurt from an extension of the reach of US

cultural services. (As I write these sentences I am resisting the very strong desire to write 'The World is Not Flat' to convey my disagreement with Friedman but at the cost of using a metaphor I do not understand. From the standpoint of the countries on the receiving end of this cultural exchange, they might complain about the "flatness" of a one-cultural world and at the same time object to the "no n-flatness" of the competitive landscape that leaves the United States firmly in a favored position. )

Cultural products are one of many intellectual services in which the US is the global leader. Like the movie industry, the production of these intellectual services is geographically clustered inside the United States, presumably because of powerful local agglomerative externalities. Finance is done in New York City. Innovations in electronic technology occur in the Silicon Valley and Boston and Austin. Biotech is clustered in San Diego. Country music in Nashville. Education in Los Angeles. Now imagine a cultural and telecommunications revolution that allows the reach of these clustered intellectual services to be extended, allowing financial innovations made in New York to be used in Hong Kong, and software designed in Seattle to be marketed in India. Does this help or hurt the United States? I am thinking that the US is a big winner not a loser from the extension of the market for its intellectual services, provided, of course, that the rest of the world offers intellectual property protection. Then we get a larger market but not much in the way of new competitors because of the highly localized economies of scale.

But the answer to all these questions are the same as the answer to Weber's question of where to locate manufacturing: *it depends*. It depends on the power of the agglomeration externalities, and the costs of delivery and the distribution of consumers and their preferences across space.

### **Another book with another title**

Clearly there is a book to be written about the impacts of the dramatic decline in transportation and communication costs that we have recently experienced – cargo containerization, air shipment, telecommunications, the Internet, e-mail, voice-mail and the cell phone. The title of that book would not be "The World is Flat." The title would be "It's a Small World After All."

I first realized this on a trip to Disneyland in 1975. After a trip through the adventure "It's a Small World After All" it dawned on me that, under their outfits, the puppets depicting Asians and Europeans and Americans and Pacific Islanders are all pretty much identical. Though clothing and instruments are different, Walt Disney created a Small World by having all the puppets sing the same happy song. Disney gave us the world we should be striving for – a world with a rich smorgasbord of cultures but without the frictions that cultural differences usually engender. Not one flat common culture. (I did not whisper my discovery to my wife. She was already asleep. )

## A level playing field?

A “small world” is a clear metaphor, but a “flat world” is for me an elusive new metaphor. The most prevalent metaphor for discussing global competition is “a level playing field” which actually is not crystal clear either. A “level playing field” refers to rules of the game that “unfairly” favor one competitor over another. If the football field is level, the better team will emerge victorious, but a sloped field confers advantages to the team defending the higher goal.

“Fairness” requires a level playing field, but fairness and levelness are in the heart and eye of the beholder. If you are bigger and faster and smarter than I am, just because of your genetic draw, that doesn’t seem fair to me. That’s not a level playing field. Better offer a handicap or a point spread. That would make it fair. If you want to push this to the extreme, it is unfair for there to be a loser at all. Can’t we all be winners? (With grade inflation, we are doing this on campus.)

The literature on the theory of international trade has many models with sloped playing fields, including ones with technological differences and with policy differences across countries. Here is a model-building exercise that I offer my students. It is appealing because it has a geographic aspect to it and because it yields a surprising conclusion. Imagine that there are two countries – Japan and the United States. Japan sits on the top of a hill and the United States sits at the bottom. To get US goods to Japan, one has to hire porters to carry the goods up the hill. But the Japanese can put their products in a chute and let gravity do the work - costlessly transporting Japanese goods down the hill to the US market. Not a level playing field, you should be thinking. Japan is clearly in the advantageous position. Not so fast, I caution the students. Who pays for lugging the US products up the hill? Why do you presume it is the US and not the Japanese? This should get them thinking about elasticities of supply and demand. If US goods are in short supply and are desperately desired by the Japanese, while Japanese goods are abundant and not much desired by Americans, then it is the US at the bottom of the hill that is in the advantageous position and it is the Japanese who pay for the lugging of the goods up the hill. If the Japanese build their mountain artificially with trade barriers that make it difficult to ship Washington apples to Japanese consumers, and if the Japanese consumers would pay any price for those apples while Americans could care less about the latest Sony gadget, then it is the Japanese who pay for the barriers, not the Americans. So be careful when you put rocks in your harbor. And be sure to wear the right kind of glasses when you are viewing the playing field. What looks tilted one way with your regular glasses may be tilted the other way with econ-oculars.

## Did David Ricardo Understand Outsourcing?

The public debate about the benefits and costs of “outsourcing” has been a heavyweight slugfest. Are there gains from trade or are there not? In the corner on the right, we have Professor Greg Mankiw, chairman of the Council of Economic Advisors, wearing the Crimson trunks and representing traditional thinking about the benefits of free trade. In the corner on the left, we have the newly-formed tag-team of Senator Charles Schumer and Dr. Paul Craig Roberts, loudly and publicly promising a first-round knock-out of Mankiw’s traditional way of thinking. (Yes, that is the same Paul Craig Roberts, who has always fought from the corner on the right.) In the front row, behind the Schumer/Roberts corner is the former Democratic Presidential nominee, Senator John Kerry, pointing a long finger at the “Benedict Arnold” businessmen whose company logos he imagines emblazon Chairman Mankiw’s trunks. To the surprise, of many, sitting beside John Kerry is none other than Paul Samuelson. Thomas Friedman has chose to sit with Mankiw.<sup>2</sup>

Commenting on outsourcing, Chairman Mankiw, in the *Economic Report of the President, 2004*, advises:

“When a good or service is produced more cheaply abroad, it makes more sense to import it than to make or provide it domestically.”

But, based apparently on some serious late-night library work, Schumer and Roberts reply in the *New York Times*<sup>3</sup>

“when Ricardo said that free trade would produce shared gains for all nations, he assumed that the resources used to produce goods -- what he called the "factors of production" -- would not be easily moved over international borders.

Comparative advantage is undermined if the factors of production can relocate to wherever they are most productive: in today's case, to a relatively few countries with abundant cheap labor. In this situation, there are no longer shared gains -- some countries win and others lose.”

“And one thing is certain: real and effective solutions will emerge only when economists and policymakers end the confusion between the free flow of goods and the free flow of factors of production.”

My first reaction to Schumer and Roberts was: You need to write on the blackboard 100 times: “There are gains from exchange.” Ricardo’s (1817) *Principles of Political Economy and Taxation* was a good start, but take a look at the book that got Ricardo thinking about the issues: Adam Smith’s (1776) *An Inquiry into the Nature and Causes of the Wealth of Nations*. It was Adam Smith who emphasized the gains from exchange

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<sup>2</sup> “The current debate about off-shoring is dangerously hot. But the debate about work going to India, China and Mexico is actually no different from the debate once held about ... shoe work leaving Massachusetts or textile work leaving North Carolina. Work gets done where it can be done most effectively and most efficiently. .... Every person, just as every corporation, must tend to his or her own economic destiny, just as our parents and grandparents in the mills, shoe shops and factories did.” Friedman, p. \*\*

<sup>3</sup> New York Times Op-ed Piece, **January 6, 2004**.

and the division of labor: "The propensity to truck, barter and exchange one thing for another is common to all men, and to be found in no other race of animals." It is the opportunity to exchange that allows the division of labor, from which flow the incredible efficiencies characteristic of modern economies.

The very fact that there is an exchange confirms that there are gains. When ownership is freely passed from seller to buyer, the product or service increases in value, passing from one who values it less to one who values it more. The gains from exchange occur when buyer and seller reside in the same country, and occur likewise when buyer and seller reside in different countries. Location of residence of buyer and seller is utterly irrelevant.

What about factor mobility? Does this vitiate the gains-from-exchange argument, as Schumer and Roberts suggest? Not in the slightest. It is irrelevant to the argument whether or not the buyer or seller chooses to move in order to effect the exchange. When a New Yorker hears of a better job in California, and decides to make the move, there are gains from the exchange that exceed the costs of the move. If the New Yorker can deliver the services over the Internet, all the better, since the costs of the move are not subtracted from the gains of exchange. Substituting "New Delhi" for "New York" in this factor mobility argument matters not in the slightest.

"Nonsense, nonsense. Leamer, you are just another John Doe", Professor Samuelson(2004) would disdainfully observe:

"Prominent and competent mainstream economists enter into the debate to educate and correct warm-hearted protestors who are against globalization. Here is a fair paraphrase of the argumentation that has been used recently by Alan Greenspan, Jagdish Bhagwati, Gregory Mankiw, Douglas Irwin and economists John or Jane Doe spread widely throughout academia.....

Correct economic law recognizes that some American groups can be hurt by dynamic free trade. But correct economic law vindicates the word "creative" destruction by its proof [sic] that the gains of the American winners are big enough to more than compensate the losers.

The present paper provides explication of the popular polemical untruth."

If you find this an elliptical way of expressing disagreement with Mankiw et.al, try digging the explanation why from the body of the text, Samuelson(2004). Fortunately I had some class notes on this issue that stood ready on the shelf that I can share with you. It's a terms of trade effect that Samuelson is talking about. Disturbances to equilibria can change the terms of trade and alter the distribution of the gains. (Even John and Jane Doe know that.) A flow of migrants is one such disturbance.

I am going to call it “immiserizing outsourcing” in honor of Jagdish Bhagwati, who stands just above John and Jane Doe in Samuelson’s hierarchy.<sup>4</sup>

## Immiserizing Outsourcing: Adverse Terms of Trade Effect on US

### Intellectual Property

The model of outsourcing presented here illustrates what might happen if the US loses geographical control over its knowledge assets. This puts US prosperity at risk. It’s a possibility, not very close to reality, I think.

Jagdish Bhagwati(1958) raised the possibility of “immiserizing growth” almost fifty years ago in a classic paper. Bhagwati warned that a country that grows more rapidly than its trading partners inevitably floods the markets with its export goods, which can lower the country’s terms of trade and make the growing country actually worse off. Factor mobility can also affect the terms-of-trade, a possibility explored by Kemp(1966) and Jones(1967) who raised the possibility of immiserizing capital flows in a two-sector model with technological differences. Reverse the labels K and L and you have a long list of theorems on the effect of labor mobility on welfare. For a survey of the articles on the effects of tariffs in this kind of model, see Ruffin(1984). This literature addresses the implicit policy question lying behind the comments by Schumer and Roberts: Should the US attempt to halt outsourcing with some form of tax policy?

We can capture this immiseration idea in a simple Ricardian model. Figure 1 illustrates the production possibilities of typical US and Indian workers<sup>5</sup>. They are equally productive in making apparel, but the US has a technological superiority in writing software. This superiority may come only from geography and history: Designing and writing software code requires close communications among the participants, and the Indian programmers are too far from the US to benefit from the agglomeration externalities that come from the need for clear communications. You cannot be a programmer unless you are “here”.

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<sup>4</sup> Leamer(2004) offers a Ricardian model of immiserizing outsourcing discussed here and also a Heckscher-Ohlin model of “trickle-up outsourcing” with two factors of production: masters who create the new products and helpers who build them. When the masters discover a new communications technology that allows them to hire helpers who live in low-wage foreign countries there are two immediate effects: the masters get a salary increase and the helpers lose their jobs. What comes next is not entirely clear. The helpers look for work in the local service sector, which increase in supply puts downward pressure on wages, but offsetting that force is the new demand for local services that comes from the increased earnings of the masters. It is possible that this “trickle down” effect is so strong that the helpers end up with higher-paying jobs in the local service sector, in which case masters and helpers share the efficiency gains that come from outsourcing. But it is also possible, that helpers end up with lower wages, in which case the masters get all the gains and then some.

<sup>5</sup> For expositional purposes, I am illustrating the production possibilities of a typical worker, not the economy overall. For this reason, the diagrams says nothing about the trade balance.

**Figure 1**      **Production Possibilities: US and Indian Workers**

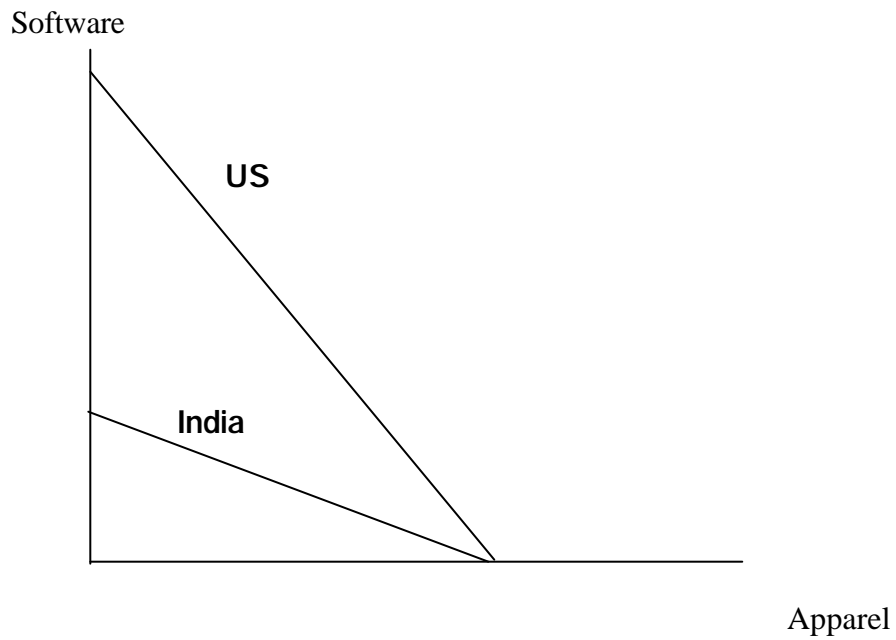


Figure 2 illustrates the usual Ricardian equilibrium under these conditions: The US specializes in software and India specializes in apparel. Workers in both countries are made better off by this exchange. In this equilibrium US workers have higher living standards than the Indians because of the US absolute advantage in software.

**Figure 2**      **Specialization and Consumption: US and Indian Workers**

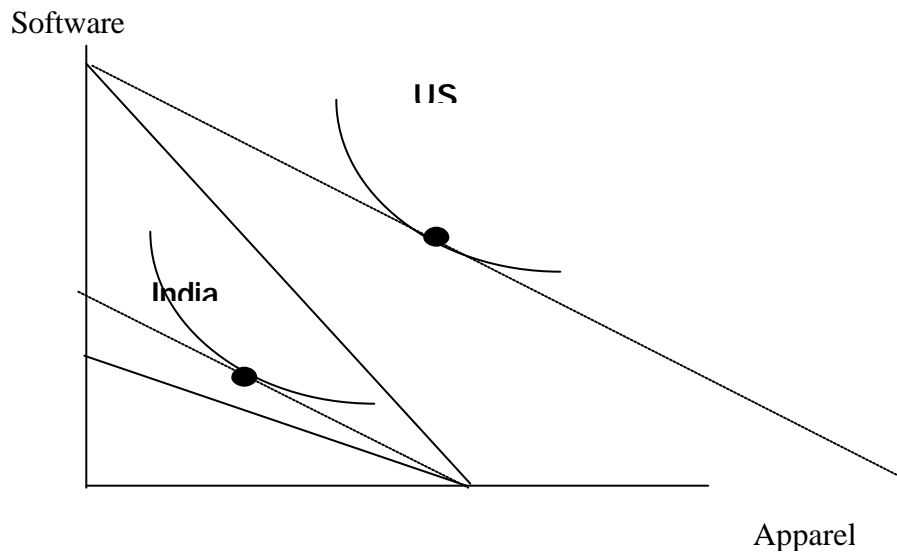
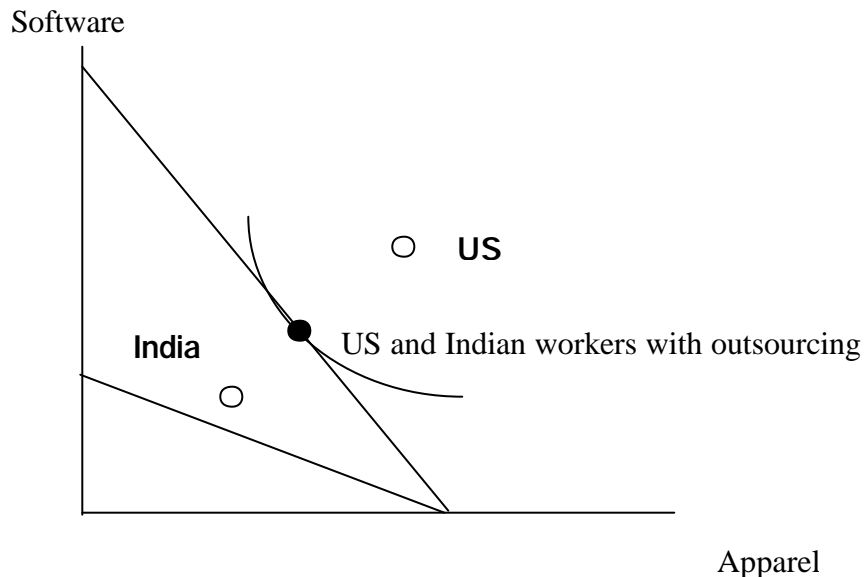


Figure 3 illustrates the effect of a change in communication technology that allows Indian programmers to participate in the conversations that are essential to the design and writing of computer code. The straight lines represent the initial production possibilities and the open circles the initial consumption points. The effect of delivering Indians to the US workforce over wires is to flood the global marketplace with cheap software, which causes a terms-of-trade deterioration for the US. This terms of trade deterioration for the US and improvement for India must eliminate the income differences in the two countries to stop the flow of Indian to the US through wires. In the final equilibrium, the technological difference between US workers and Indian workers is completely eliminated. The US workers are made worse off by this outsourcing since they lose completely the gains from trade that came from their monopoly position (market power) in the software industry.

**Figure 3** Common Consumption Point, After Outsourcing



There is an important message here. The US enjoys monopoly rents from the intellectual property that it creates, but those rents may dissipate if the franchise for creating intellectual property is extended to our customers. While this is a real issue, I doubt that this Ricardian model captures production of intellectual property very accurately. A critical implicit assumption is that software programs are as alike as plain white t-shirts. If there are more t-shirts produced, with downward sloping demand, the price of t-shirts must fall. That is what causes the terms-of-trade deterioration in this Ricardian immiserizing outsourcing model as more coding is done in India. But intellectual properties are not stacks of identical plain-white t-shirts. While some software programs compete with each other, many do not, and the value of one can be enhanced by the existence of others. For this reason, I don't think we need to worry about terms-of-trade

deterioration for our intellectual properties - movies, drugs, financial derivatives, equipment and software - provided that we have adequate intellectual property protection.

We do need to worry about the new competition for mundane coding tasks. In those same notes I have a Heckscher-Ohlin model with production done by masters and helpers. The masters all live in the US. Helpers reside in the US and in India. It takes masters and helpers to make software. It takes only helpers to make apparel or nontraded services. Absent the outsourcing opportunity, US software masters hire helpers locally, and the US exchanges software for apparel with India. A change in the communications technology that allows US software masters to hire India helpers eliminates all the US helpers jobs in the software sector. These US helpers move to the US nontraded service sector. Who wins and who loses from this change? Keep in mind that there are global efficiency gains that might find its way to US helpers. I call that trickle-down outsourcing.

But all is not well for the creative innovative function either, at least as it applies to manufacturing. Cost-reducing process innovations can only be made by those who are actually producing the product, and as we move more manufacturing to China we are certainly also moving the process innovations there as well. It remains to be seen if product innovation can remain in the US when production is done elsewhere. \*\*\*

## **More Detective Work: How does Friedman use the “flat” word?**

Now that we have diverted to a brief review of flatness in economic thought, it is time to return to our first task: trying to decode Friedman’s flatness metaphor.

One way to uncover what Friedman means by “The World is Flat” is to see how he uses the f-word. Since it occurs on virtually every page of this 450-page book, there is plenty of grist for the mill.

“..what the flattening of the world means is that we are now connecting all the knowledge centers on the planet together into a single global network.” (p.8)

“from 1492 to around 1800.. it shrank to world from a size large to a size medium. From 1800 to 2000,.. shrank the world from a size medium to a size small. ...around the year 2000 we entered a whole new era... shrinking the world from a size small to a size tiny *and flattening the playing field at the same time.*” (p. 9-10) (my italics)

“to flatten their accents in order to compete in a flatter world.” (p.27)

“That is why I introduced the idea that the world has gone from round to flat. Everywhere you turn, hierarchies are being challenged from below or transforming themselves from top-down structure into more horizontal and collaborative ones.” (p.45)

“common standards create a flatter, more level playing field.” (p. 52)

“Just as the national highway system that was built in the 1950s flattened the United States, broke down regional differences, and made it so much easier to relocate in lower-wage regions, like the South... the laying of global fiber highways flattened the developed world.” (p. 69)

“For the world to get flat, all your internal departments – sales, marketing, manufacturing, billing, and inventory – had to become inoperable, no matter what machines or software each of them was running.” (p. 74)

“There is no future in vanilla for most companies in a flat world. A lot of vanilla making in software and other areas is going to shift to open-source communities.” (p. 91)

“My bottom line is this: Open-source is an important flattener because it makes available for free many tools, from software to encyclopedias, that millions of people around the world would have had to buy in order to use, and because open-source network associations - with their open borders and come-one-come-all approach – can challenge hierarchical structures with a horizontal model of innovation ...” (p 102-3)

“China will never be truly flat until it gets over that huge speed bump called “political reform.”” (p. 126)

“Insourcing came about because once the world went flat, the small could act big – *small companies could suddenly see around the world.* (p. 143) (My italics)

“Search engines flatten the world by eliminating all the valleys and peaks, all the walls and rocks, that people used to hide inside of, atop, behind or under in order to mask their reputations or parts of their past.” (p. 158) (My italics)

*“The net result of this convergence was the creation of a global, Web-enabled playing field that allows for multiple forms of collaboration – the sharing of knowledge and work – in real time, without regard to geography, distance, or in the near future, even language.... **That is what I mean when I say the world has been flattened,**” (pp. 176-77) (authors italics and boldface).*

From these examples one can infer that Friedman’s use of the flatness metaphor is virtually all encompassing. Usually, and certainly in the last quotation, he is really writing about a small world in which distance, measured physically, linguistically, and culturally, doesn’t isolate your job from competition from far-way workers. Even flatness as a visual metaphor, which is apt, is equivalent to a shrinking globe – in a spherical earth you cannot see around the world and cannot recognize the opportunities

very far from where you reside. If the world were flat, you can see it all. That's equivalent to a smaller globe that allows you to see far-away opportunities.

## Friedman's Ten Forces that Flattened the World

Further understanding of the flat world metaphor comes from an examination of Friedman's list of the ten forces that flattened the world. Here they are.

1. 11/9/89 The Fall of the Berlin Wall
2. 8/9/95 The Birth of the Internet (When Netscape Went Public)
3. Work Flow Software Software that coordinates tasks.
4. Open-Sourcing The Self-Organizing Collaborative Communities that produced Linux and Wikipedia.
5. Outsourcing, Y2K The fiber-optic bubble created the potential to move software coding to India and Y2K demand for coding far in excess of US capacity created the necessity.
6. Offshoring The movement of manufacturing jobs to low-wage developing countries.
7. Supply-Chaining Wal-Mart supply chain management practices.
8. "Insourcing" UBS which not only picks up your broken Toshiba laptop but repairs its as well. Small companies can act large because the fixed-cost logistics infrastructure is supplied by a third party.
9. "In-forming" Google and Internet searches
10. The Steroids Digital, mobile, personal and virtual communications. Videoconferences.

That seems like a rather eclectic list. Rather than ten, my list of revolutionary forces has three items:

1. **More Unskilled Workers:** The economic liberalizations in China and India and Russia and South America and on and on have added to the effective global labor markets a huge number of unskilled workers.
2. **New Equipment for Knowledge Workers :** The Internet and the Personal Computer have fundamentally changed the nature of knowledge work, raising productivity and emphasizing talent.
3. **Communications Innovations:** The cell-phone and the beeper and e-mail and voice-mail keep us all wired and connected 24/7, thus eliminating the borderline between time at work and time at leisure. These same communication tools, together with the Internet and virtually costless telecommunications have extended the geographic reach of suppliers, and have increased the intensity of competition for mundane work.

The first two of these are not "flattening" forces at all. The increase in supply of unskilled workers is bad news for those who compete in that market segment but good news for those who do not. That doesn't sound like flattening to me. The new equipment

for knowledge workers greatly increases the productivity of those with natural talent but that leaves the less talented with less to do and with lower pay. Today, Thomas Edison would be surprised to see the PC and the Internet doing most of the perspiring, and shocked to discover that genius is 99% inspiration and 1% perspiration. That doesn't sound very "flat" to me.

It is the third of these revolutionary changes that may be a force for "flattening", or more accurately, a smaller world. I can buy an electric drill from my local hardware store or I can use the Internet to buy the drill from a supplier in Dallas or Newark and have it shipped by next day air. That means that my local hardware store is competing over a much larger geographic area and the rents that come from location are reduced. This can occur in the labor markets as well, with far-away workers bidding to do my tasks.

## Markets or Relationships?

The worry that your job is going to be taken away by a cheaper worker in India or China is based on the supposition that there is a "market" for the tasks that you perform. Though we economists talk as if most exchanges were mediated by markets to which our simple supply and demand model applies, in fact most exchanges require long-term relationships between buyer and seller. The "capital" invested in these long-term relationships creates a situation of bilateral bargaining that responds to competitive pressures in much softer ways than would a market. It's the difference between contestable versus negotiable exchanges. A market has contestable exchanges that cannot be consummated if they deviate in the slightest from the "market." If the global market offers to do your work for 1 cent less today, then you either accept a wage reduction tomorrow morning, or you lose your job. That isn't your situation, is it, o ye of tenure status? Your university job is not contested, is it? Your job is negotiated. The supply and demand balance for economists can change sharply but it will take a very long time for you to feel that change. You negotiate with your employer (the University) and your employer negotiates with the paying customers (state legislators and voters and students and donors).

That isn't like a market at all. At the economist's hypothetical "market", countless faceless buyers meet countless faceless sellers, and carry out exactly the same transaction – exchanging at one "instant" of time  $x$  units of a good or service A whose value is transparent to both buyer and seller for  $y$  units of good or services B, also with a transparent value.<sup>6</sup> The market is thick with buyers and sellers, but there are no relationships. These market participants don't even know each other.

Buyers and sellers in this hypothetical market are all brought together into the same "space" so that they can overhear the terms of the exchanges being offered by others, and from that information cut a better deal for themselves. With all that overhearing the participants haggle their way to a collective rate of exchange, the "market price" at which total sales exactly match total purchases. Having found this market rate, the exchanges

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<sup>6</sup> Often, one of the items exchanged is "money," standing for a basket of goods or services.

take place, and the participants go on their merry separate ways, never to see each other again.

In this hypothetical market, the identities of buyer and seller are totally irrelevant. It doesn't matter where the buyers or sellers reside, what their nationalities are, who they work for, who their parents are, where they went to school, how big are their bank accounts, how attractive they are, what are their beliefs, whether they are men or women, old or young, gay or straight, tall or short, convicts or ex-convicts, sinners or saints, common men or paragons. The exchange is completely impersonal.

A market is infinitesimally close geographically, but infinitely remote personally. "Arm's length" is the way we describe it. Close enough to overhear, but too far to shake hands and way too far to hug. (Gestures of trust.)

In fact, there are very few exchanges that are mediated by "markets." There are very few "commodities" whose value is transparent enough to allow the formation of a market. There are very few exchanges that take place at a frequency high enough and with full enough knowledge by other potential participants that market prices can emerge. Most exchanges take place within the context of long-term relationships that create the language needed for buyer and seller to communicate, that establish the trust needed to carry out the exchange, that allow ongoing servicing of implicit or explicit guarantees, that monitor the truthfulness of both parties, and that punish those who mislead. Many exchanges occur between colleagues who work for the same firm. Indeed, about 40% of US imports are carried out internal to multinational enterprises.

The fear that seems to underlie much of Friedman's flat earth metaphor, is that work is becoming commoditized and sold in global markets. What got him to his "flat world" conclusion was his observation that software coding in Seattle seems contestable from Bangalore.

But: Is Friedman's job commoditized? Is Friedman's job contested?

I think I am getting close to understanding the Flat World Metaphor. It is mostly about the commoditization of work, and the extension geographically of the contest for mundane work in manufacturing and services like sewing apparel and reading manuals at call centers over the phone and also not-mundane research and development. The central issue is whether most Americans are going to sell their products and services in a global "market" that completely determines the wages and working conditions, or are they going to offer specialized negotiable "craftwork" in which the forces of the global market are greatly attenuated. Are the dramatic changes in communications technology, including the Internet and also essentially free telecommunications turning secure negotiable jobs into insecure contestable jobs? Or are most jobs like professors and plumbers, that seem completely resistant to the changes around them?

## The Luddites preferred the old relationship-based way of selling cloth

An important determinant of contestability is product maturity. Product innovations are the waves that bring new high-paying skilled “craft” jobs to innovating communities, but standardization of the product and mechanization of the process inevitably cause the waves to recede as routinized jobs at low wages replace skilled jobs at high wages. Attitudes toward technology and trade naturally depend on whether the wave is advancing or receding. As we currently feel the undertow of the jobs receding from the United States, it is wise to understand that waves have been advancing and receding since the Industrial revolution began to standardize and mechanize the weaving of cloth at the beginning of the 19th Century.

Prior to 1780, British cotton textiles were produced in small artisan shops and on family farms using spinning wheels to make the thread and hand-driven looms to weave the cloth. The Industrial Revolution brought numerous new machines to help do the work, including John Kay’s flying shuttle patented in 1733, and James Hargreaves’ spinning jenny patented in 1767 and Richard Arkwright’s water-powered spinning frame in 1769. The availability of this machinery moved the jobs out of homes into small mills near streams that could supply the waterpower. Then steam power allowed the mills to leave the streams of rural England in search of cheaper urban labor. It was here that workers, caught in the undertow of mechanization and standardization, responded with the Luddite destruction of textile machinery. .

The Luddites were upset not just with the machines but also with the way that a market system prices standardized products. When artisans made customized goods, the price was negotiated and skilled workers’ interests could be pursued by wise and/or benevolent master craftsmen. That was relationship based exchange. But, once the product is standardized and the process of production is mechanized, the price is set by the “market” and laborers are forced in effect to bid against each other to do the work. Turned over completely to market forces, workers lose control of their workplace and their financial security and even their pride. The Luddite song, “General Ludd’s Triumph” points to these two concerns: machines and pricing:

The guilty may fear, but no vengeance he aims  
At the honest man's life or Estate  
His wrath is entirely confined to wide frames  
And to those that old prices abate

Here "wide frames" is a reference to the machines and “old prices” is a reference to the negotiated/administered prices that were a characteristic of artisan shops. Smash the machines and give us back our old prices.

## Which Activities are Contestable: Mundane Work or Creative Work?

The Luddites correctly perceived that mechanization and standardization of textile production was turning their jobs into tasks contestable by workers near and far. The key word here is “contestable.” Friedman’s flat world hypothesis seems to be that there are or will be many US jobs that are contested by Chinese and Indians. This strikes me as rather far from reality. It is only the mundane codifiable tasks in tradables for which there are global markets. You’d be surprised how few of those remain in the US. The proper response to the Chinese challenge is to make the educational and infrastructure investments that are needed to keep the high-paying non-contested creative jobs here at home and let the rest of the world knock themselves silly competing for the footloose mundane contestable jobs.

The words “mundane” and “codifiable” may not be altogether clear, and, to help out, here are some tasks, ordered by their mundanity:

- Type this page.
- Edit this page.
- Write an article for an Economics journal.
- Write a good joke.

I am told that Ph.D. students at Northwestern when faced with the task of transcribing printed pages of numbers into machine-readable files scan the documents and e-mail them to India for overnight typing. I wonder if very many students send their dissertations to India for editing? My experience with US-based editors ranges from annoyance to outright outrage. If you find an editor who makes you happy, you’d better cling to him for dear life. Create a relationship and for heaven’s sake don’t threaten to send the job to India if he doesn’t cut his fee. He will dump you in an instant, and you will have to do the editing yourself, or not.

In the case of typing a page, both parties to the transaction understand what it means to carry out the task and both can easily and accurately determine if the task was done well. But when I first ask you to edit my manuscript, neither you nor I know what that means. Once you have made an attempt, I can tell you if I like what you have done or not. If we pass manuscripts back and forth enough, you and I are going to learn what I mean when I ask, “Please edit this manuscript.” That’s an investment in language that is specific to you and me. That linguistic investment creates a strong bond between us – a relationship. That’s why there are no markets for editorial tasks – it takes a relationship.

Writing a publishable Economics article is a more difficult craft that can only be learned in a slow and sometimes painful trial-and-error-process. Part of the learning process involves face-to-face conversations with the other members of the guild, especially the master craftsmen. Absent frequent attendance at seminars and conferences, it is virtually impossible to learn this craft. Neither the Internet nor free telecommunications

has had much impact on that geographical reality. For the creation of new ideas – it takes a neighborhood.

Friedman knows this. According to Jaithruth Rao, MphasiS, (“one of the first people I met in Bangalore”)

“What we have done is taken the grunt work. You know what is needed to prepare a tax return? Very little creative work. This is what will move overseas. ... The accountant who wants to stay in business in America will be the one who focuses on designing creative complex strategies....” p.13,

And a few pages later, Tom Glocer, CEO of Reuters

“We think we can off-load commoditized reporting and get that done efficiently somewhere else in the world.” p.18

## **Globalization and The Four Mobilities**

This discussion has emphasized the globalization of markets for goods and some services, but the phenomenon of globalization is broader than that.

Globalization is the increased international mobility of goods, people, contracts (including financial claims) and thoughts (facts, ideas, and beliefs).

There is a difference between mobility and movement. Think about two reservoirs of water at different heights that are kept from seeking a common level by a separating barrier. Thus neither movement nor mobility. Next tear down the barrier and make the water completely mobile. One possibility is that there is a movement of water from the high side to the low side. Thus mobility and movement. Another possibility is that in anticipation of the removal of the barriers, the folks on the high end drain their reservoir to exactly the same height as the low reservoir. Now tear down the barrier, and there is mobility but not movement. Don't think “silly” when you read this. US wages can move down to foreign levels from the threat of competition, with no flows of goods or workers across the borders.

Of these four mobilities, it is the last that is probably the most important – the mobility of thoughts. Evidence for this comes from the two great tests of the power of globalization. The first test was created by Nature and the second by Man. Jared Diamond in his remarkable book *Guns, Germs and Steel* poses the question: why did Europe conquer the Americas, rather than the other way around? One of the answers is globalization. The north-south orientation of the Americas did not support the transfer of technology because innovative crops and livestock that would flourish in one latitude would not survive in another. In contrast, the middle latitudes stretched all the way from Europe to China, allowing grains discovered in the Middle East to be grown in Spain or in China, and gunpowder discovered in China to be deployed in European arms.

Though those east-west trade routes between Europe and China were established to exchange goods, it was the stowaway ideas that traveled with the goods that really mattered. Europe conquered the Americas because of its superior mobility of thoughts.

The second test of globalization came in the aftermath of World War II when about 2/3rds of humanity lived in inward-looking isolationist countries, and the other 1/3<sup>rd</sup> (Western Europe, the US, Canada, Japan, Korea and Taiwan, and a few others) created a great trading network within which stowaway ideas traveled freely along with the goods. The isolationist policies directly of the 2/3rds impeded the flow of ideas across borders, but worse still, in an effort to maintain political support for those external barriers, these countries typically controlled, that is to say slowed, the exchange of ideas internally, through control of the media and spying on domestic citizens. The technological progress created in the 1/3<sup>rd</sup> group of trading nations left the 2/3rds far behind, and eventually caused those inward-looking isolationist governments to pursue new policies.

### The Mobility of ideas

As long as the only way to transfer ideas was via person-to-person conversations, progress was measured in tens of centuries starting with the evolution of homo sapiens in 200,000 BC. Written language such as Egyptian hieroglyphs in 4000 BC was an important step forward since it allowed an innovator to express her ideas in writing and then be read by many others for as many years and viewings as the parchment and tablets could withstand. While this increased the mobility of ideas, hand-transcription was an expensive and error-ridden process, restricting access to the texts to a very few, and the literacy skills needed to decode these documents were likewise limited. Enter Johann Gutenberg, the most influential person of the millennium per the Arts and Entertainment Network<sup>7</sup>. Gutenberg's movable type and printing press allowed the mass printing of books, beginning with the Gutenberg Bible in 1455.<sup>8</sup> Without the printing press or an equivalently efficient system for passing ideas between people, it is hard to imagine that there could have been an Industrial Revolution in the 18<sup>th</sup> and 19<sup>th</sup> Centuries – no Renaissance, no Scientific Revolution, no steam engine, no electric motor, no internal combustion engine, no telegraph, no telephone..... At least not so soon.

But like tablets and parchment, printed books and physical documents have important limitations. There are still substantial fixed costs of going from author's text to printed document, and there are substantial distribution and storage costs to create the libraries of paper documents and books, and there are very substantial search costs to find the right

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<sup>7</sup> [http://en.wikipedia.org/wiki/A%26E%27s\\_Biography\\_of\\_the\\_Millennium](http://en.wikipedia.org/wiki/A%26E%27s_Biography_of_the_Millennium)

<sup>8</sup> “Block printing, whereby individual sheets of paper were pressed into wooden blocks with the text and illustrations carved in, was first recorded in Chinese history, and was in use in East Asia long before Gutenberg. By the 12th and 13th century many Arabic and Chinese libraries contained tens of thousands of printed books. The Koreans and Chinese knew about movable metal types at the time, but arising from the complexity of the Chinese writing system, movable type printing wasn't as widely used as that of Renaissance Europe.” [http://en.wikipedia.org/wiki/Johann\\_Gutenberg](http://en.wikipedia.org/wiki/Johann_Gutenberg)

pages of the right book at the right time. The Internet has changed all this and has done so virtually overnight. That contrasts greatly with the printing press. It took several centuries after Gutenberg for the needed infrastructure investments in presses, literacy and libraries to provide access to thoughts to large fractions of the global population.

The Internet is like the printing press in terms of its potential impact on the mobility of thoughts. The Internet gives access today to the thoughts you had just yesterday to every web-enabled person all of over the globe. You just have to post your thoughts on the web and hope that the search engines will point the relevant readers to your materials. The “publication” costs on the Internet are minimal, not even any pesky editors and publishers standing between you and your audience. The distribution costs are virtually zero, once the Internet and literacy infrastructure are in place. And digitalized electronic search is ever so much more efficient than the “analog” visual browsing that you and I used to conduct in the bowels of University libraries. Absent efficient search, the massive amounts of textual, numerical and visual information posted on the Web is a mountain of noise that completely covers the faint signal of valuable electrons. To turn that mountain first into information and later into wisdom and insight we need a filtering system that separates the signal from the noise, that sorts the important from the relevant and the relevant from the irrelevant. Thank you Google.

How can one be anything but optimistic about the impact that the Internet will have on progress? If you think of humans on Earth as a single thinking organism, then until the 1980s we have been using only about 1/3<sup>rd</sup> of our global brain because 2/3<sup>rd</sup>s of humanity were shut in closets where they couldn’t communicate with the rest of us. The liberalizations that have swept the globe have thus tripled the number of useable neurons in our collective brain. This has to be a good thing for all of us. Unlike the production of standard washing machines and toaster ovens, the innovative thoughts produced by the newly reintegrated 2/3rds do not necessarily compete with the innovative thoughts produced by our 1/3<sup>rd</sup>. It’s not a zero sum game. It’s a cumulative process with the innovators of today standing on the shoulders of the giants of yesterday. And add to that the power of the Internet that increases the effective size of our global brain by many multiplies. We are a heck of a lot smarter now than we were a couple of decades ago. The 21<sup>st</sup> Century is sure to have a pace of innovation that is unrivaled in human history.

## **Facts:**

That’s the theory. What about the facts?

Thomas Friedman and most journalists use what Dan Suits at the University of Michigan called “man-who” statistics, as in I know a man who... This book starts with an interview of Nandam Nailekani, CIA of Infosys Technologies, and then David Neeleman, CEO of JetBlue Airways Corp., and then General Richard Meyers, chairman of the Joint Chiefs of Staff, and then Colin Powell, and then Steven Holmes, UPS spokesman, and then David Glass, CEO of Walmart, and then and then and then an obscure economist or two (Robert Lawrence and Paul Romer) (another joke, of course.)

Economists create knowledge, or think they do, using an entirely different methodology that keeps them always very far from CEOs and any of the other actors in the drama they study. Some economists noodle away at the blackboard or on pads of paper. We call them theorists. Other economists stare at computer screens downloading data from various websites and organizing those data with econometric software packages. I am one of these. We look not at man-who statistics but rather population means, or the multivariate equivalent, estimated models.

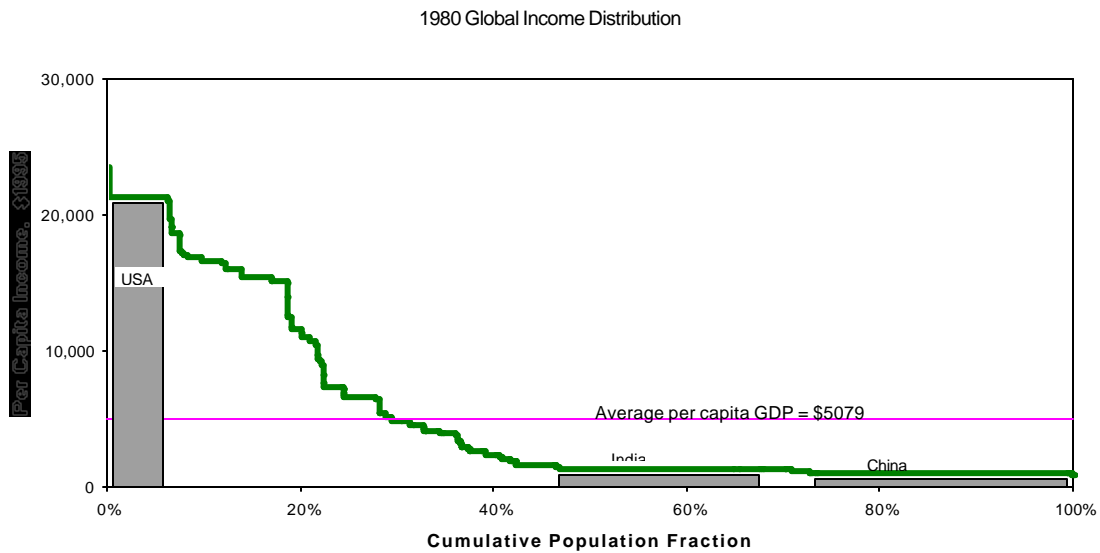
There is something we can learn from Friedman's methodology. He does an extraordinarily good job creating ideas, especially when you consider that he is not a card-carrying member of our Guild. But, I think, he could benefit from some theory and some evidence, put together the way we do.

We have already dipped into the theory. Now some evidence.

### **The Global Labor Pool: No Flattering Here**

Figure 4 illustrates the global income distribution in 1980. This figure ignores inequality *within* countries and merely assigns to each individual the per capita income of his or her country. The vertical axis is real GDP per capita in \$1995 using PPP exchange rates and the horizontal axis is the fraction of the global population. Each country in this figure is represented by a rectangle with height equal to per capita income, with width equal to the population fraction and with area representing total GDP (population times GDP per capita). Three rectangles are shaded: the USA on the left with a high per capita income and a large population fraction, and India and China on the right with low per capita incomes and very large population fractions.

Figure 4 The 1980 Global Labor Pool



Countries in this figure are sorted by per-capita incomes, left to right, with the wealthy countries on the left and the poor countries on the right. Call this the global labor “pool”, a very strange pool indeed, with the liquid piled up high on one end and hardly present at the other end. What could possibly be holding up the high end? A prevalent answer in 1980 was that the 2/3rds of humanity in the low-income part of the global labor pool lived in countries with governments that adopted inward-looking isolationist policies that prevented businesses from pursuing the obvious arbitrage opportunity of buying labor where it is cheap and selling the products where labor is dear. The liberalizations that swept the globe promised to unleash these arbitrage opportunities and to create a global labor market – a flat world per Friedman. Call it the *Great Equalization* in which wages and per capita incomes in the poorest parts of the globe would rise dramatically, but only by “draining” the high-income end of the pool. If the liquid in this pool were to find a common level it would leave every country with a per capita income equal to \$5079, a little less than 1/4<sup>th</sup> of the 1980 per capita income in the USA. That’s turning the clock back to 1910, when the USA last had a per capita income that low.<sup>9</sup>

Eight years ago, when I made comments like these at a conference at UCLA, a prominent political scientist whom I now consider a friend (Doug Hibbs) administered a public dressing-down, and announced that I was thinking like a sociologist. Oh, shudder! He explained to all within earshot that global competition may equalize the compensation to identical factors of production, but much of the difference in GDP per capita among countries comes from the greater amounts of physical and human capital in the West,

<sup>9</sup> Maddison data, <http://english.historia.se/>.

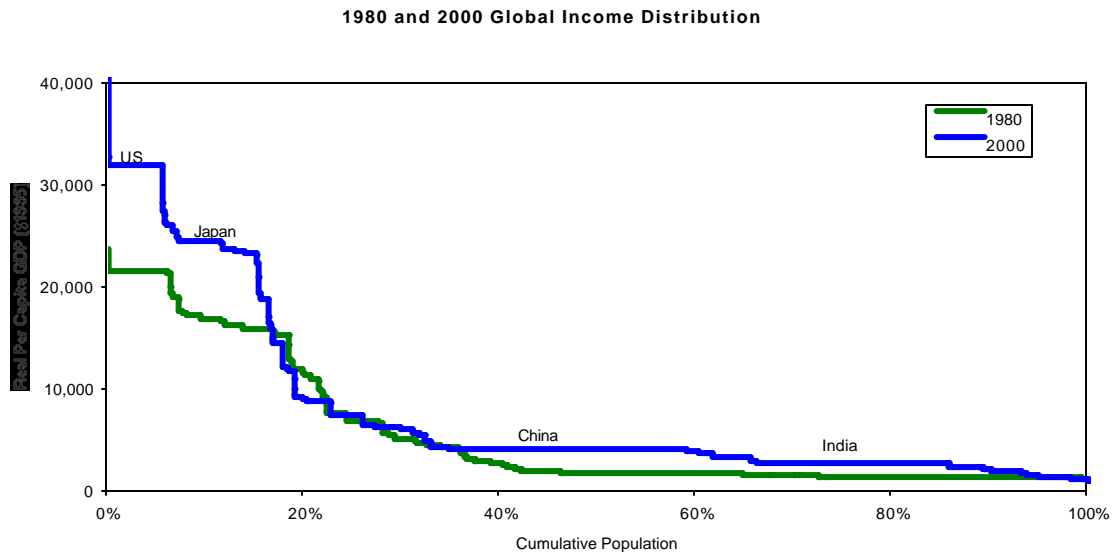
which isn't going to go away any time soon. Had Hibbs given me a minute or two more, I would have continued: A second view about the potential effect of these liberalizations focuses on the huge unskilled labor forces in China and India and Indonesia and the Soviet bloc and Africa and on and on. These liberalizations increased the effective global supply of unskilled workers enormously with no commensurate increase in human capital or physical capital or natural resources. Inevitably, this would mean a decline in the global wage rates of unskilled workers and their substitutes, but an increase in the global rate of compensation for complementary factors. Some serious econometric work is needed to determine which factors of production are complements and which are substitutes for unskilled labor, but you and I can guess. Both physical capital and semi-skilled workers are substitutes for unskilled workers in *some* activities. Think about construction. You can get that old concrete removed by hiring one semi-skilled worker operating a jackhammer or five unskilled workers using sledgehammers. Agriculture is the same thing. Workers on US farms operate extremely expensive equipment for planting, cultivating and harvesting. Elsewhere in the globe, much of this farm work is done by hand. But manufacturing is different. The standardized and mechanized methods of production in manufacturing leave little scope for the substitution of unskilled workers for capital and an increase in the global unskilled or semi-skilled workforce in manufacturing is likely to require more physical capital. Thus the huge increase in the effective global supply of unskilled workers seemed sure to lower the wage rates of workers without high school educations, and sure to increase the compensation for natural resources and for skilled workers with college educations and above, but would have ambiguous effects on the middle range of human skills (high school graduates or less) and on the return to physical capital. According to this view, countries well endowed in natural resources and human capital would benefit as the Chinese and Indians and Indonesians and Africans are integrated into the global economy but countries with large endowments of unskilled workers would suffer from the increased competition. That's overall. Within countries that are facing new competition from the third world, expect a rise of inequality, as the unskilled suffer from the hot breath of Chinese competition.

There is a third entirely optimistic view. According to these optimists, we should be expecting the global labor pool to be leveled mostly from below, with dramatic gains in incomes in the poor countries but no downward pressure on incomes among the rich. According to this view, the low incomes among the left-out 2/3rds came not from the absence of trading opportunities, but mostly from technological and institutional backwardness. It is not mobility of goods that matters most; it is the mobility of ideas. If one allows commercial exchanges between East and West, ideas would flow along with the goods. Then the Western way of living would move East, and North and South as well, and Western technology and Western market competition and Western business organizations would raise the living standards of all those who had been left-behind.

So what actually happened and why? Figure 5 compares the 1980 global income distribution with the year 2000 distribution. The year 2000 distribution isn't flatter at all. While it is true that there was substantial income growth in the shallow end of the pool, most importantly in India and China, there was also very substantial income growth at the

wealthy end. Indeed, half of global GDP growth in this period originated in four countries: two wealthy countries (USA and Japan) and two poor countries (China and India). But income growth didn't occur uniformly. The globe's middle class was left behind, with no income growth over those two difficult decades between the 17<sup>th</sup> percentile and the 36<sup>th</sup> percentile.

**Figure 5 Global Labor Pools in 1980 and 2000**



A Great Equalization thus did occur – it just didn't apply to the wealthiest 18% of countries. The wealthiest countries managed to prosper in the face of manufacturing jobs being tugged into the poor part of the globe while the middle class countries stagnated.

What is the difference between the wealthy and middle-income countries? I believe that the answer is that the wealthy and the poor countries have different “domains of competition.” Inside of manufacturing there is a segment of footloose mundane labor-intensive activities and a set of innovative and/or capital-intensive activities that are firmly rooted. The footloose standardized products can be accurately described in documents (blueprints and engineering specifications and words) and the finished products can be easily inspected to determine if they meet the specifications.

The footloose standardized products are sold in competitive global markets, which control the prices and the wages as well. But, because of market power, the prices of the innovative capital-intensive products are set by their manufacturers, who thus have considerable leeway in setting wages and working conditions. Think Ely Lilly or Ford Motor Company in 1965.

If your country's prosperity in 1980 depended on attracting the mundane footloose manufacturing activities most notably in apparel, footwear, textiles and consumer electronics, your best hope for economic growth was to begin in poverty. The global competition for these footloose jobs was and is hopelessly intense. That is the story of the globe's middle class. Their prosperity depended on attracting footloose manufacturing jobs from the high-wage countries but they couldn't compete successfully for those functions against China and other very-low-wage countries.

However, the high-income countries in 1980 prospered in the two subsequent decades because their domain of competition was mostly in the rooted functions and because they could derive substantial economic gains from transferring the relatively small numbers of footloose jobs to the low-wage countries. That is not to say that everyone in the high-income countries gained. On the contrary, those workers who found their jobs contested by low-wage far-away workers either had to find a way of escaping that competition through training and education, or they had to accept lower wages and harsher working conditions than they might otherwise have had.

In other words, we have been here before. Newspaper anecdotes regarding the "offshoring" of mundane service activities like call centers and not-so-mundane activities like writing software have raised again alarms about a Great Equalization. But we have heard "*The World is Flat*" before, and it didn't turn out that way. That doesn't mean to fall asleep at the switch. The liberalizations that created a global labor market for mundane manufacturing caused a massive change in the competitive landscape, and those countries and individuals who were prepared for the change prospered while those who did not had harder times. The vast improvements in telecommunications and the Internet have also caused a massive change in the competitive landscape, whose effects are just beginning to be evident. We would be wise to learn from the first Great non-Equalization to prepare for the next. The lesson of the first is that infrastructure and workforce quality can create deep roots that hold the best jobs firmly in place.

## Growing Inequality in the US

Though the US has grown exceptionally well and has avoided the collective tug downward from the Chinese and Indians and Indonesians, things the picture has not been so rosy at all levels of the income distribution. At the bottom, compensation has stagnated while at the top it has exploded. (references\*\*\*)

The capitalist free-enterprise system that has supported two centuries of unprecedented progress worked partly because it was able to obtain "buy-in" from folks at the bottom of the income distribution as well as at the top. The "buy-in" at the bottom was premised on two realities:

- In the 20<sup>th</sup> Century, social mobility made being at the bottom an impermanent condition, especially between generations in the same
- Economic growth raised living standards at the bottom as well as at the top.

## The gravity model :location, location, location

There is very little that we economists fully understand about global trade but there is one thing that we do know – commerce declines dramatically with the distance. *It's not a small world.* We don't know why. But we do know what.

The distance effect on international commerce is described by what is known as the gravity model, which is one of the first models estimated by economists<sup>10</sup>, and possibly the only important finding that has fully withstood the scrutiny of time and the onslaught of econometric technique. According to this empirical model, commerce between any two countries is proportional to the product of the masses (GDPs) divided by the distance between them raised to approximately 0.9.<sup>11</sup> The message of this gravity model is that the globe is not nearly as small as newspapers and business school curricula suggest.

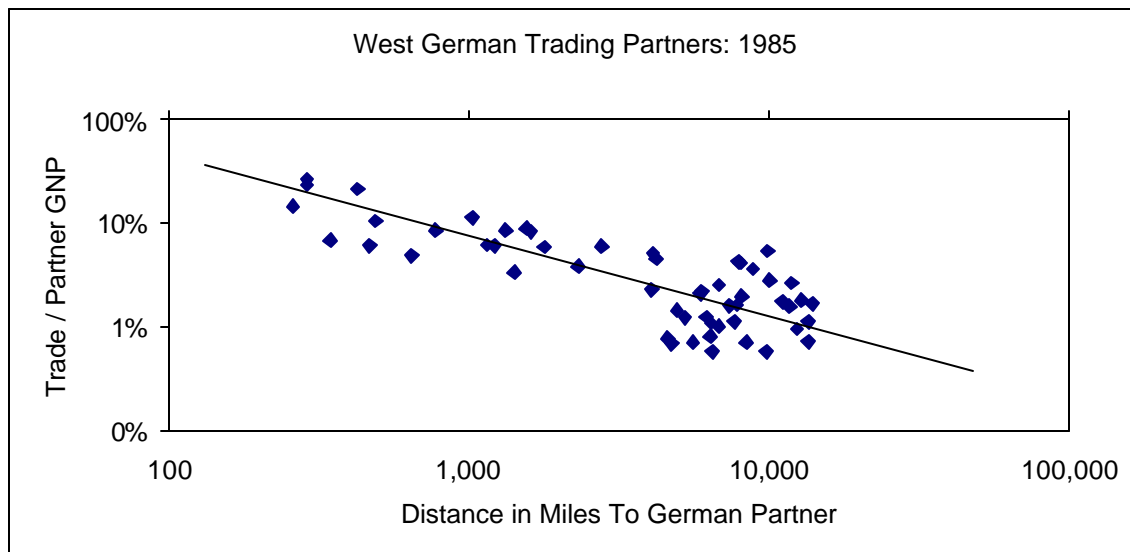
You can see the powerful reality of the gravity model in Figure 6, which is a scatter diagram comparing the intensity of West German trade in 1985 with the distance to its trading partner. On the vertical axis is a measure of trade intensity: trade with the partner divided by partner GNP. On the horizontal axis is the distance from Germany to the partner. Both scales are logarithmic. If you didn't think that distance matters much for international commerce, this figure should convince you otherwise. There is a remarkably clear log-linear relationship between trade and distance. An estimated distance elasticity of -0.9 means that each doubling of distance reduces trade by 90%. For example, the distance between Los Angeles and Tijuana is about 150 miles. If Tijuana were on the other side of the Pacific instead of across the border in Mexico and if this distance were increased to 10,000 miles, the amount of trade would drop by a factor of 44. Other things held constant, expect the amount of commerce between a Shanghai resident and an LA residence to be only about 2% of the commerce between Tijuana and LA.

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<sup>10</sup> See \*\*

<sup>11</sup> Per the meta-analysis of Disdier and Head (2005). The distance elasticity depends on the product. See Leamer(1994) and Rauch(1999), who offers an explanation in terms of trust and understanding by grouping products: "Organized Exchange Goods," "Reference Priced Goods," and "Differentiated Commodities."The elasticity is higher for some commodities and lower for others.

Figure 6 West German Trading Partners, 1985



But, you must be imagining, the force of gravity is getting less, much less. In 1997 Frances Cairncross, a journalist with the *Economist*, anticipated Friedman’s *The World is Flat* by proclaiming in her book title *The Death of Distance*<sup>12</sup>, and she followed that with *The Death of Distance 2.0* in 2001, a paperback version with 70% more material because “In the three years since the original *Death of Distance* was written, an extraordinary amount has changed in the world of communications and the Internet.”<sup>13</sup> The facts suggest otherwise. In my own (1993) study of OECD trade patterns I report that this distance elasticity changed very little between 1970 and 1985 even with the considerable reduction in transportation and communication costs that were occurring over that 15 year time period. Disdier and Head (2005) accurately title their meta-analysis of the multitude of estimates of the gravity model that have been made over the last half-century: “The Puzzling Persistence of the Distance Effect on International Trade.” They find “the estimated negative impact of distance on trade rose around the middle of the century and has remained persistently high since then. This result holds even after controlling for many important differences in samples and methods.”

The distance effect on trade has not diminished even as transportation costs and communication costs have fallen. “How can that be right?” shoppers may ask themselves, “There surely are a lot more Asian goods on the shelves and racks of stores in the US than there were a couple of decades ago. We have the impression that Shanghai is sitting just beyond the breakwater of the LA harbor.” Keep in mind that the gravity model doesn’t depend only on distance; it has trade proportional to the product of

<sup>12</sup> *The Death of Distance: How the Communications Revolution Is Changing our Lives*, by Frances Cairncross, (2.0 from Harvard Business School)

<sup>13</sup> <http://www.deathofdistance.com/>

the GDP's. It is the product of the GDPs that accounts for the increase in trans-Pacific trade, not a declining effect of distance. Clearly if all the economic mass of the globe were concentrated on a single location, there wouldn't be any trades across space. The greatest amount of global trade would occur if GDP were uniformly distributed over the surface of the earth. While it is true that Asian products are indeed crowding the shelves of stores in Los Angeles, according to the gravity model, that comes from economic growth in Asia, not a decline in the effect of distance. What is happening is that growth of the economies in Asia is creating trading opportunities that did not exist before. The globe is not shrinking. Economic activity is dispersing.

If you want to see the emerging economic mass in Asia I recommend William Nordhaus' spinning globe that illustrates by color-coding the locations from which global GDP originates:

<http://www.econ.yale.edu/~nordhaus/homepage/homepage.htm>

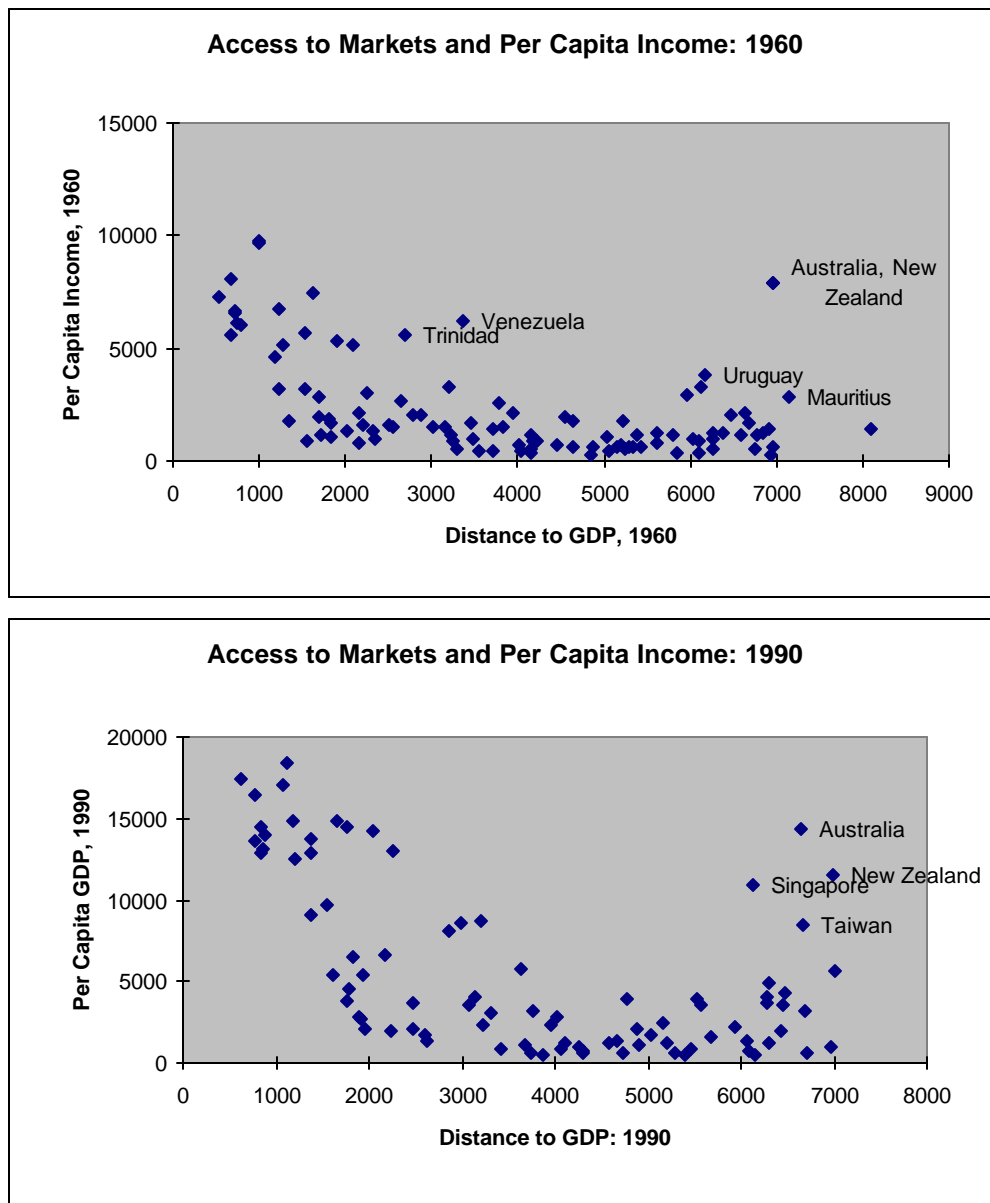
This spinning globe dramatically reveals the very strong clustering of economic activity. Even within the US there are distinct clusters of economic activity. My version of this clustering phenomenon is conveyed by Figure 7,<sup>14</sup> which says it matters who your neighbors are. On the horizontal axis is a measure of distance to global GDP suggested by the gravity model.<sup>15</sup> On the vertical axis is per capita GDP. This figure indicates that distance to markets has a dramatic effect on GDP per capita. The fall-off in income levels when distance goes from 1000 to 2000 miles is very great. After 3000 miles there is hardly a country with a decent per capita GDP.

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<sup>14</sup> From Leamer(1997)

<sup>15</sup> The measure of distance to markets is  $D_i = \left( \sum_j w_j D_{ij}^{-.6} \right)^{-1/.6}$ , where  $w_j = \text{GDP}_j / \sum \text{GDP}_j$ .

**Figure 7 Geographical Clustering of High Income Countries**



In 1960 only Australia and New Zealand were able to escape the curse of being far away. Maybe these English-speaking Commonwealth countries are closer to Britain and the US then geography suggests. By 1990, two other countries had escaped the force of gravity, namely Singapore and Taiwan. Part of the explanation for their ability to escape gravity may be gravity itself. There is scarcity value in being different and the gravity model suggests that scarcity needs to be measured locally. For that reason, capital accumulation has a bigger impact if your neighbors are capital-scarce. Indeed, studies of Asian growth by Young (1995) and Kim and Lau (1996) both argue that it was factor accumulation not growth in total-factor-productivity that accounts for the Asian miracles.

These countries have had relatively rapid capital accumulation and also relatively large elasticity of output with respect to capital, the former partly induced by the latter.

We know that geography has had a large and persistent effect on prosperity. We don't understand why. I am inclined to think that there are two possible explanations. One possibility is that the globe is not getting smaller at all. The contracts that are necessary to exchange most goods require trust and understanding, but there have been hardly any improvements in the technologies for creating trust and understanding over long distances. We are still animals, and like dogs that don't recognize the image of another dog on TV, we cannot feel fear and doubt and their opposites, trust and understanding unless we are in the same physical space.

Speaking of understanding and distance, in a remarkable paper, Blum and Goldfarb(2005) find that gravity applies even to the Internet– US surfers favor foreign websites close to the US.

For websites that do not involve a financial transaction, the distance effect is smaller than the average of the studies in Disdier and Head (2004), with the distance elasticity equal to 0.9%. For websites that involve a financial transaction, the distance elasticity is 1.8%, therefore larger than the average effect in the studies cited above. For taste-dependent websites, the distance elasticity is equal to 3.25%.

Blum and Goldfarb interpret this as a taste effect, with consumers clustered together with similar tastes and with far-away suppliers not really understanding what distant customers desire. “ North American music,for example, is very different from Indian music. Similar stories apply to games and pornography.”

The other possibility why the distance effect has been so persistent is that although the earth is has been getting smaller, that doesn't change much the geography of commerce. In the relentless search for the least-cost location, it doesn't matter if A is 50% better than B, or 5%, or 0.5%. Still A is the preferred location. Thus, as the cost of doing business over long distances diminish, the goods are delivered cheaper and faster, but from the same sources. Here we need again to make clear the important distinction between movement and mobility. With falling transportation costs the mobility changes but the movement does not. The gravity model measures movement, not mobility. But for wages it is mobility (contestability) that matters. As the globe shrinks, wages for footloose work converge because of contestability, even though the geography of commerce stays the same.<sup>16</sup>

There are many advantages that children can enter this world with including intelligence, physical power and agility, good looks and the right parents. It also matters where you live.

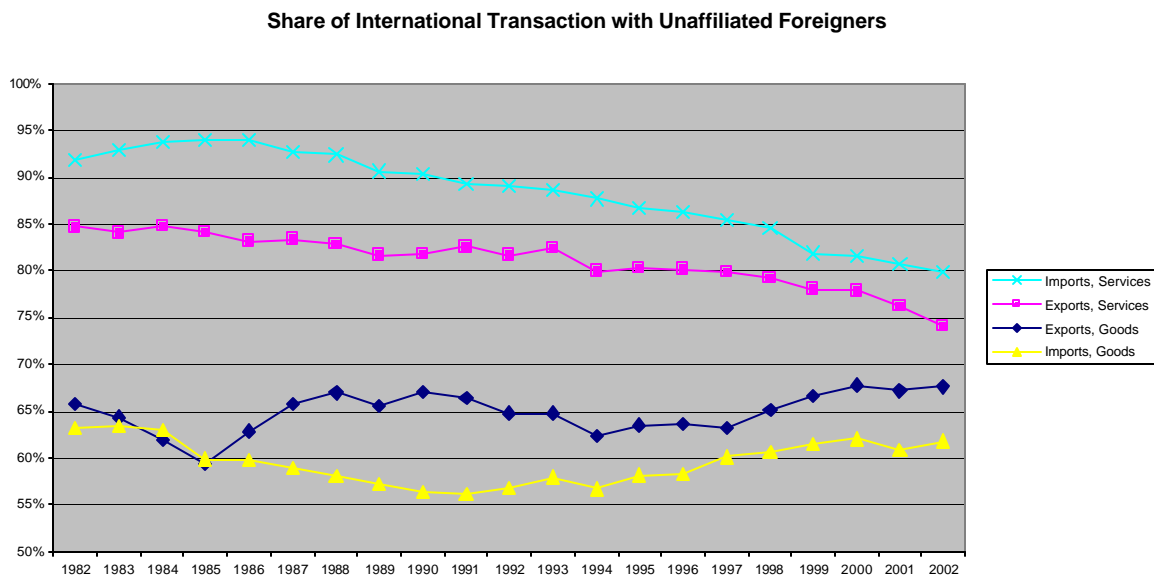
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<sup>16</sup> For more on the persistence of the distance effect see Didier and Head(2005). See also Hummels (2001) and Deardorff (2003) for discussion of the role of timeliness in trade patterns.

## A great amount of trade occurs internal to firms

The commoditization of global commerce that seems to lie behind Friedman’s fears should be evident in the fraction of transactions that are arm’s length between firms versus those that occur internal to firms. Figure 8 illustrates the shares of US imports and exports that involve an unaffiliated foreigner. Excluded are transfers of goods and services that occur with firms, US or foreign multinationals. About 60% of trade in goods is “arm’s length” and the remaining 40% occurs within multinational enterprises. There has not been a lot of change over time in these numbers and there is no evidence of flatness here. There has been a trend in service trade toward less between unaffiliated parties.

**Figure 8** Fraction of Trade with Unaffiliated Foreigners



## How important are “outsourcing” really?

Though there is a great deal of fuss in the media about the movement of US service jobs to India, the number of US workers affected outsourcing surely remains low.

In response to queries from Congress about the amount of outsourcing that the US has been experiencing, The GAO (2004) issued a first report with the not-very-promising title “Current Government Data Provide Limited Insight into Offshoring of Services” and followed that one up a year later, GAO(2005) with “U.S. and India Data on Offshoring Show Significant Differences.”

It may not be perfectly accurate, but here is what the GAO (2005) has to say (BPT = Business, Professional and Technical Services):

“The gap between U.S. and Indian data on trade in BPT services is significant. For example, data show that for 2003, the United States reported \$420 million in unaffiliated imports of BPT services from India, while India reported approximately \$8.7 billion in exports of affiliated and unaffiliated BPT services to the United States.”<sup>17</sup>

Compared with an \$11 trillion economy, those numbers are small potatoes, the Indian estimate being less than 0.1% of GDP, less than the measurement error by a wide margin. Dividing those two estimates by say, \$100,000 in revenue per job, that translates into a low of 4,200 jobs to a high of 87,000. That compares with the US economy that increases payroll jobs on average by almost 200,000 jobs per month.

No big problems here that I can see, though there is a difference between movement and mobility.

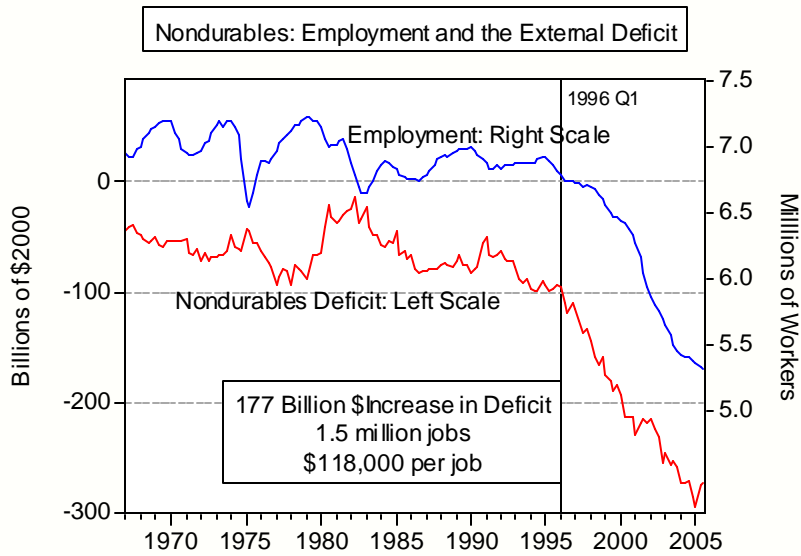
### **What's the Matter with Manufacturing Jobs? Demand, Productivity or International Trade?**

If not much in intellectual services, maybe we can find a lot of jobs lost to offshoring of manufacturing work. Figure 9 illustrates the employment level in durable manufacturing since the 1960s, and the corresponding trade deficit in durables. Figure 10 has the same for nondurables. Dividing those deficits by the average compensation per job gives an estimate of 1.5 millions jobs lost in nondurables and 2 million in nondurables. Large, evocative numbers.

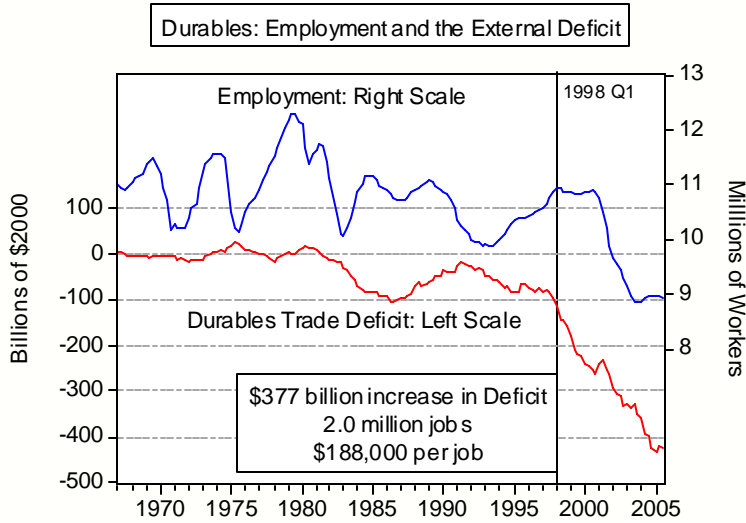
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<sup>17</sup> “ At least five definitional and methodological factors contribute to the difference between U.S. and Indian data on BPT services. First, India and the United States follow different practices in accounting for the earnings of temporary Indian workers residing in the United States. Second, India defines certain services, such as software embedded on computer hardware, differently than the United States. Third, India and the United States follow different practices for counting sales by India to U.S.-owned firms located outside of the United States. The United States follows International Monetary Fund standards for each of these factors. Fourth, BEA does not report country-specific data for particular types of services due to concerns about the quality of responses it receives from firms when they allocate their affiliated imports to detailed types of services. As a result, U.S. data on BPT services include only unaffiliated imports from India, while Indian data include both affiliated and unaffiliated exports. Fifth, other differences, such as identifying all services importers, may also contribute to the data gap.”

**Figure 9** Employment in Nondurables and the External Deficit in Nondurables



**Figure 10** Employment in Durables and the External Deficit in Durables



But before we jump to trade as the driver, better lay out all the possibilities. It could be that a burst in productivity is allowing the few to do the work of the many. And it could be that domestic demand is too weak to allow normal job formation. The level of employment is necessarily equal to domestic demand times the ratio of production to domestic demand divided by productivity (output per worker):

$$Wor\ ker\ s = DomesticDemand * \frac{GDP}{DomesticDemand} * \frac{1}{GDP / Wor\ ker}$$

where domestic demand is equal to GDP + Imports – Exports and the ratio of GDP to domestic demand measures the fraction of demand satisfied from local supply, which gets smaller as the external deficit widens. This is only an accounting identity, and we need to be a little careful in drawing causal conclusions in these numbers.

The trends since 1970 in employment and these three components of the employment identity are reported in Table 1. In durables, domestic demand has been growing smartly at the rate of 5.6% per year but the effect of this strong demand growth on employment has been largely offset by an improvement in productivity at the rate of 5.5% per year. Thus demand growth net of productivity improvement yields a potential growth in employment in durables of 0.1% per year. But from that number we need to subtract – 0.5% to account for the trend in the sourcing of supply from foreign locations, leaving a trend downward of employment in durables equal to –0.4% per year. One might be tempted from this to conclude that, but-for the trade deficit, there would have been some slight employment growth in durables but trade pulls that number into negative territory. But the larger story seems to me to be strong domestic demand growth offset by strong productivity growth.

The story of nondurables is rather different with weaker domestic demand growth (2.6%) and with productivity growth (3.0%) that outstrips domestic demand, leaving employment growth at –0.4% per year, absent any globalization effect. But the globalization effect subtracts another –0.1% from that number, leading to employment in nondurables declining at the trend rate of –0.5% per year, about the same as durables.

A continuation of these long-term trends implies job losses in manufacturing at roughly – 0.5% per year, but since the recession of 2001 we have lost fully 18% of payroll jobs. Whence comes that? Table 2 reports the change in the deviation from trend from 2000 Q1 to 2005Q2 for employment in durables and nondurables. This table indicates that since 2000 employment in durables has deteriorated by 17.2% relative to trend. That decline in employment is composed of 7.3% loss of work from weakness in demand, 6.8% from unusually strong productivity growth and 3.1% because of the rising trade deficit.

For nondurables, the big news is in the productivity number. Job loss in nondurables of 16.3% relative to trend is explainable by a surge in productivity, 17.6% relative to trend.

Some of the burst in productivity is a response to greater foreign competition and some of it the ripple effect of information technology investments made in the Internet Rush. The most recent trends may continue by the effect of foreign competition and the Internet investment boom are likely to recede.

**Table 1            Decomposition of Employment Trends**

Trends: 1970 to 2005

	Durables	Nondurables
Employment Growth Rate	-0.4%	-0.5%
Consisting of		
Domestic Demand	5.6%	2.6%
(-)Productivity	5.5%	3.0%
Trade (GDP/Domestic Demand)	-0.5%	-0.1%

**Table 2            Decomposition of Job Losses since 2000**

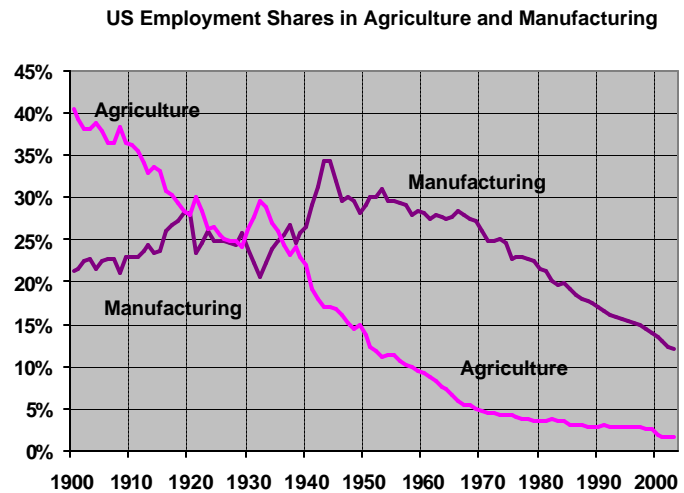
2000-2005 Change in Deviation from Trend

	Durables	Nondurables
Employment	-17.2%	-16.3%
Consisting of		
Domestic Demand	-7.3%	2.6%
(-)Productivity	6.8%	17.6%
Trade (GDP/Domestic Demand)	-3.1%	-1.3%

## The Coming of the Post-Industrial Age

The US is in the midst of a radical transformation from industrial to post-industrial society. Some of this transition is associated with the movement of mundane manufacturing jobs to low-wage foreign locations, but much of it comes from the dramatic changes in technology in the intellectual services sectors. The policy response to the globalization force is pretty straightforward: we need to invest in our childrens' education so that they don't find themselves competing with the Chinese and the Indians.

The US transition from an agrarian to an industrial economy that began in the 18<sup>th</sup> Century was put on hold during the Great Depression but accelerated during both WWI and WWII. Excluding the war years of 1942-45, the transition to an industrial society reached its zenith in the 1950s with 30% of our workforce in manufacturing and 10% in agriculture. The high-growth Kennedy/Johnson expansion of the 1960s kept the jobs in manufacturing at 28%, but the transition to a post-industrial society began in earnest in the 1970s. While jobs in agriculture continued to decline throughout the century, dropping now to only about 1% of our workforce, there has also been a sharp drop in employment in manufacturing in the last three decades, falling in the most recent data (2005) to only 11% of our workforce. The speed of this decline after 1970 from a 28% share to a 11% share in manufacturing is every bit as rapid as the speed in the decline of agricultural jobs in the first seven decades of the 20<sup>th</sup> Century.



This transition to the post-industrial age has consequences that are at least as profound as the transition from agriculture to industry. This will alter the way wealth is created and all that flows from the “means of production,” including politics and social structures.

### Marx and The Transition from Agriculture to Industry

Studies of the transition from agrarian age to industrial age hint at what the next transition might entail. Nathan Rosenberg, **Inside the Black Box**, page 42, offers a cogent view of technology and production in the industrial age:

“Although, therefore, the manufacturing system achieved a growth in productivity through the exploitation of a new and more extensive division of labor, a rigid ceiling to the growth in productivity continued to be imposed by limitations of *human strength, speed and accuracy*. Marx’s point, indeed, is more

general: Science itself can never be extensively applied to the productive process so long a that process continues to be dependent upon forces the behavior of which cannot be predicted and controlled with the strictest accuracy. Science, in other words, must incorporate its principles in impersonal machinery. Such machinery may be relied upon to behave in accordance with scientifically established physical relationships. Science, however, cannot be incorporated into technologies dominated by large-scale human interventions, for human action involves too much that is subjective and capricious. More generally, *human beings have wills of their own and are therefore too refractory to constitute reliable, that is, controllable inputs in complex and interdependent productive processes.*” (My italics.)

“Relics of by-gone instruments of labor possess the same importance for the investigation of extinct economical forms of society, as do fossil bones for the determination of extinct species of animals. *It is not the articles made, but how they are made, and by what instruments, that enables us to distinguish different economical epochs.*” Marx, *Capital*, quoted by Rosenberg, page 40.

### **Not all tasks can be embodied in equipment**

Thus, per Marx, we are what we operate, and what was essential about the industrial age is not what we produced but how we produced it. During the industrial age, Science and Industry collaborated to embody in equipment those tasks that are repetitive, codifiable and programmable, thus freeing the productive process from the caprice of human intervention. Mechanization of work was not limited to manufacturing and occurred also on the farm. But mechanization of services was much more limited. Getting a haircut in 2005 is not much different from getting a haircut in 1850. And having a will drawn up in 1970 was about the same as having a will drawn up in 1900.

The mundane physical tasks that have been left to humans require a degree of dexterity that is difficult (expensive) to achieve with a machine, but year after year advances in Science transfer more and more of these functions to machines. Meanwhile, the economic liberalizations over the last three decades have added to the global workforce an enormous number of workers in Mexico, and Brazil and China and India and so on, offering to do the mundane physical tasks at rates of pay that are barely subsistent. Thus globalization and technology have ganged up after 1970 to rapidly reduce the demand for mundane physical labor in the US.

Most of the innovations of the Industrial age have made very little encroachment on intellectual tasks, mundane or otherwise. An attorney, an architect, a teacher all did about the same work in 1970 as they did in 1800. Absent innovations in production and communication, one might image a globalized post-industrial US in which mundane physical tasks like cutting hair would remain only in the local non-traded sector, and the rest of the jobs would be mixtures of mundane-intellectual tasks (clerks), creative-

intellectual tasks (designers and researchers and repairmen) and social/organizing/motivating tasks (managers).

But the microprocessor has changed the future of intellectual work, eliminating the mundane-intellectual tasks. Think about an architect. In 1970 the time of a creative architect was partly consumed by the task of rendering the drawings. Some of this work could be done by assistants, but the communication costs were often so high that it made more sense to have the master do the drawings. The personal computer, however, allowed the architect to render the drawings with great efficiency, thus freeing up time to do the creative tasks that the computer cannot ever perform. While for mundane programmable tasks, it is true that *“human beings have wills of their own and are therefore too refractory to constitute reliable, that is, controllable inputs in complex and interdependent productive processes,”* the opposite is true for creative tasks. It is machines that lack wills of their own and are therefore too obedient to constitute reliable, that is, innovative inputs in complex and interdependent creative processes. Indeed, when I teach data analysis I emphasize the constant struggle between machine and man for control of the process. We data analysts really want to be able to press a button and have the computer do the work, but the creative task of drawing inferences from data always requires a heavy human input, and if, through laziness and seduction, we come to imagine that the computer can think, we will surely be making major misinterpretations of the data. When one starts to lose control and not know if one button on the computer is any different from another, it is wise to shut the computer down and go play a round of golf. The human will be better able to maintain control after a little time off.

### **Is a computer a forklift or a microphone?**



Education may be a solution to the temporary and permanent income inequality problems caused by the increased supply of Microprocessors. We just need to teach everyone how to write computer code. This might work, but it might not. I like to raise some doubts by posing the rhetorical

question; “Is a computer more like a forklift or more like a microphone?” It doesn’t matter much who drives the forklift, but it matters a lot who sings into the microphone. Think about the forklift first. You might be a lot stronger than I, but with a little bit of training, I can operate a forklift and lift just as much as you or any other forklift operator. Thus the forklift is a force for income equality, eliminating your strength advantage over me. That is decidedly not the case for a microphone. We cannot all operate a microphone with anywhere near the same level of proficiency. Indeed, I venture the guess that I would have to pay you to listen to me sing, not the other way round. And I seriously doubt that a lifetime of training would allow me to compete with Springsteen, or Pavarotti.



The effect of the microphone and mass media have been to allow a single talented entertainer to serve a huge customer base and accordingly to command enormous earnings. This creates an earnings distribution with a few extremely highly paid talented and trained individuals and with the vast group of slightly less talented working in LA restaurants, hoping someday to hit it big. Thus, opposite to the forklift, the microphone creates a powerful force for inequality. Think Silicon Valley, with extraordinary riches accruing to some, but with the manual service workers living in their cars.

A computer is both a forklift and a microphone. Clerks in MacDonaldis no longer have to be able to read or to compute - they only have to recognize the picture of a hamburger on the cash register. That's the forklift. It doesn't much matter who punches the buttons. Thus your intelligence advantage over me is eliminated by the computer, just as your strength advantage was eliminated by the forklift. But for many other operations it matters enormously who types on the computer. One example is computer programming. The vast majority of people are incapable of producing commercially viable computer code. That's the microphone. It amplifies your natural advantages. Without a computer, an architect's time is partly consumed by mundane tasks such as rendering drawings. A lawyer's time is consumed writing and checking sentences in wills. An economist's time is consumed making data displays. These mundane tasks are now transferred to computer assistants, who listen infinitely more attentively and who carry out the tasks with much greater precision than any human assistant. A talented architect with a computer assistant can serve a much enlarged customer base. A talented attorney, or a talented economist, or a talented radiologist, with computer assistants, can serve much enlarged customer bases. These talented individuals command high wages while the less talented struggle for customers.

Computer technology seems therefore to be taking us into a future where there are a few very talented very well-paid people, and the rest of us are doing the mundane computer-assisted tasks which don't require us to read, write or even think very much. Just push the right button now and then.

In other words, the information revolution may be a powerful force for income inequality by raising the compensation for natural talents and also the interaction between talent and training. It is the interaction between talent and training that is particularly difficult to deal with. If talent and training had additive effects on earnings, then compensatory education for the disadvantaged could be a low-cost solution for income inequality problems. But if training is much more effective for the talented, the talented will naturally receive more of it, and the amount of compensatory training that is needed to equalize incomes may be enormous and a great social waste - think of me and Pavarotti again.

## **Conclusion**

I think this is a terrific book that is full of anecdotes, interpretations and insight. It's an eye-opener methodologically because of the clear progress Friedman makes on this set of issues, without benefit of the union card we call the Ph.D. in Economics.

And Friedman gets the policy response right, though there isn't much debate on this:

“And it requires a Great Society that commits our government to building the infrastructure, safety nets, and institutions that will help every American become more employable in an age when no one can be guaranteed lifetime employment”  
p. 277

“My vision is to put every American man or woman on a campus” p. 290

But when he calls this program “compassionate flatism” that is the flat that broke this camel's back. Worse still, this nonsense metaphor is becoming altogether commonplace, filtering into classrooms and boardrooms. We should take better care of our language.

The final third of Friedman's book is an insightful and lucid discussion of the stress points between the Muslim and the Judea-Christian world. (You are free to object that I am not competent to review that material.)

But: Physically, culturally, and economically the world is not flat.

I am sorry to say it that way. It's not an apt metaphor, even though it is a powerful one.

'When *I* use a word,' Humpty Dumpty said in rather a scornful tone, 'it means just what I choose it to mean--neither more nor less.'

'The question is,' said Alice, 'whether you CAN make words mean so many different things.'

'The question is,' said Humpty Dumpty, 'which is to be master— that's all.'

Lewis Carroll, *Through the Looking Glass*, Chapter 6

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