Woodrow Wilson International Center for Scholars
Science, Technology, America, and the Global Economy

New Thinking in International Trade: Global Competition and Comparative Advantage

Edited by Lynn Sha and Kent H. Hughes

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WOODROW WILSON INTERNATIONAL CENTER FOR SCHOLARS

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Introduction
by Kent Hughes

In the world where policy mixes with politics, international trade has become an increasingly contentious topic. Recently, new ideas about trade and comparative advantage have created new challenges for policy analysts and policymakers alike. With that in mind, the Woodrow Wilson Center's Program on Science, Technology, America, and the Global Economy on June 13, 2006 held a conference on global competition and comparative advantage to explore the nature and policy implications of new thinking on international trade.

TRADE, IDEAS, AND HISTORY: When President Reagan sought negotiating authority for the Uruguay Round of Trade Negotiations, the Congress responded with the Omnibus Trade and Competitiveness Act of 1988. Many of the articles of the Act triggered considerable debate—but not the basic idea of trade negotiating authority. With relatively little opposition, the President was granted fast track authority, allowing him to submit trade agreements to the Congress under rules that provided for no amendments, limited time for debate, and only an up or down vote.

President Bush was granted similar authority (also referred to as Trade Promotion Authority) in the Trade Act of 2002. In this case, however, there was considerable debate and the President's proposal survived three votes in the House of Representatives, twice by a single vote and once by three votes.

The economic policy community was dismayed. Free trade has stood for almost two hundred years as a powerful and distinctive insight first developed in the early 18th century by David Hume.[1] Economists viewed trade among nations as a universal win for all sides with each country being able to exploit its comparative advantage or to do more of what it did relatively best.

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1. David Hume (1711–1776), Scottish economist, philosopher, and historian, observed that the expansion of trade between societies is a stimulus to economic growth and enhances the growth of civil society.

Within a country, there could be specific sectors and individuals that lost as the country moved from protection to more open markets. The near universal view of the economics profession was that the gains from trade were so substantial that the losing individuals could be readily compensated. The idea of gains with compensation helped structure the Trade Expansion Act of 1962, which granted extensive tariff cutting authority to President John F. Kennedy coupled with a provision to extend adjustment assistance to individuals injured through expanded trade.

NEW THINKING ON COMPARATIVE ADVANTAGE: Senator Sarbanes opened the Wilson Center's conference on New Thinking in International Trade by emphasizing how much the world of trade had changed since David Ricardo initially formulated his theory of comparative advantage. In contrast to an era of relatively fixed factors of production, Sarbanes noted that governments or the investments of multinational companies can create a comparative advantage in a new region or country. He went on to stress the challenges posed by record current account deficits and the rise of new trading nations.

Sarbanes set the stage for the initial panel made up of Nobel Laureate Paul Samuelson, New York University Professor William Baumol, and Ralph Gomory, then President of the Alfred P. Sloan Foundation who discussed their distinctive perspectives on comparative advantage.

Samuelson drew on his 2004 article in the *Journal of Economic Perspectives*, which demonstrated that trading partners could reduce the U.S. gain from trade by developing a comparative advantage that was similar to our own. In Samuelson's article, there is still a win-win from trade but the gains had been reduced.

Gomory and Baumol, in their book, *Global Trade and Conflicting National Interests,* demonstrated the possibility of zones where trading partners gain and zones of conflict where productivity advances in one country come at the expense of the trade partner. In some cases, specific industries lost in one country could be gained by another.

Both Gomory and Baumol stressed the ability of countries to invest in ways that would shape and change their comparative advantage. In contrast to the 19th century world where factors of production—often land and labor—were relatively fixed and did not flow easily between countries, 21st century national policies could guide the development of new comparative strengths based on investment, research and development, and education.

Panelists added their own perspective. While agreeing with the theoretical point made by Samuelson, Phillip Swagel of the American Enterprise Institute (later the Assistant Secretary for Policy at the U.S. Department of the Treasury)

argued that, in practice, the rise of China has not led to a decline in the U.S. gains from trade but rather has been a significant benefit to the U.S. consumer through lower prices for a variety of manufactured goods.

Edward Graham of the Peterson Institute for International Economics did not specifically disagree with the findings of Gomory and Baumol. Instead, he drew an analogy from the world of science to demonstrate that theories in one era are refined in another. In effect, he was expressing caution about basing new policy on the Gomory-Baumol insights because they might be superseded by new theories in the future. Other panelists and the audience had a variety of views. While accepting the work of Gomory and Baumol, some wondered if, in practice, there were any zones of conflict. Still others thought that we were not only in a zone of conflict but were already experiencing significant losses.

THE MACROECONOMIC CONTEXT: Stephen Roach, chief economist of Morgan Stanley, noted that the actual or potential losses from shifting comparative advantage had to be seen in the context of fiscal, trade, and current account deficits. In his view, the dominant trade realities of 2005 and 2006 were trade deficits in excess of $700 billion dollars and current account deficits in the $800 billion dollar range.

There were two distinct views of the causes of the trade deficit. Roach stressed the impact of the fiscal deficit in reducing national savings. To meet domestic demand for consumption and investment, the country turned to international capital and generated a trade deficit. For Roach, the answer to dealing with a dangerously large trade deficit starts with fiscal restraint.

From the audience, Robert Aliber, emeritus professor of business from the University of Chicago, argued that the United States was driving the global economy by absorbing the excess savings of China, Japan, and other parts of Asia. [After the rise in oil prices, major oil producers would be added to the excess savers list]. In Aliber's view, Asian capital lending drove up the value of U.S. assets, including housing. With the value of their assets rising, Americans felt richer and consumed more. Aliber saw the need for fiscal restraint but coupled it with the need for a balanced shift from savings to domestic consumption in Asia.

Other Dimensions: The new thinking on comparative advantage and the impact of large trade and current account deficits led the panelists and questioners in the audience to touch on a number of related subjects.

There was considerable concern about the impact of trade and globalization on average wages in the United States and other advanced economies.

With China, India, and the former Soviet Union adding billions of new workers to the world economy, might there be downward pressure on wages and, if so, how much and for how long? How would Americans vote if trade promised large gains but the gains were concentrated in a relatively small proportion of the population?

In the past, countries attempting to catch up had the advantage of drawing on the technology and savings of more advanced countries. Would that pertain to today's emerging market countries and would they be the major beneficiaries of the international flow of technology and capital?

CONCLUSION: The conference suggested some conclusions, some policy steps, and a host of still unanswered questions. In theory, one can no longer think of trade as a simple win-win, but needs to assess the actual flows of trade and the related changes in the comparative strengths of a country's trading partners.

In addition to potential changes in comparative advantage, the current tensions over international trade have to include the large U.S. trade deficit. Dealing with trade deficits in a manner that will maintain global growth will require adjustments in the saving and investing pattern in the United States, Asia, and the oil producing world.

The growing focus on innovation in Europe, China, India, and much of the rest of the world points to a 21st century in which the comparative advantage of a country will continue to change. To remain a world leader, the United States will need to strengthen its own innovation system and sharply improve its K-12 education system.

There were many questions raised but not fully answered. What has been the impact of trade on U.S. wages and income distribution in the United States? How will the spread of digital commerce affect an array of professional services in the advanced economies? How can the real and potential gains from globalization be spread more evenly?

How much are other countries adopting policies to become more innovative? How are countries harnessing their education systems to support innovation? How effective have they been?

What are the economic and geopolitical effects of continuing to run large trade deficits? How are trade deficits affecting the U.S. industrial base? Will changes in the industrial base affect the innovative capacity of the United States? What policies should the United States adopt to move toward balanced trade?

It leaves the Wilson Center and the policy community with much work for future research and future conferences.

Opening Remarks
by Senator Paul S. Sarbanes

The subject of this conference is new thinking on global competition and comparative advantage. It is extremely important and long overdue. It constitutes yet another major contribution from the Woodrow Wilson Center to the continuing debate over a highly complex and increasingly urgent subject.

When Ricardo set out his theory of comparative advantage almost two centuries ago, he used wine and wool to illustrate his point.[1] Those industries were, at that time, tied to specific geographic locations. That's hardly the case now. Comparative advantage is no longer fixed; it has been overtaken by fundamental changes in the world economy. It has become, as Paul Samuelson has memorably put it, "the popular polemical untruth."

Today intense competition takes place on a global basis amid the ongoing development of new products and production technologies at an ever quicker pace. Not long ago, economies with half of the world's population—China, India, the former Soviet Union—were relatively isolated. Now they are all rapidly integrating into world markets with conscious policies to promote specific industries that increasingly compete with our major industries. Because a determined government or multinational corporation can easily create comparative advantage in a new location, the United States can no longer blithely assume that everything will work out to our advantage in the end.

We have long assumed, for example, that we would move up the technology ladder as other countries sold us less advanced products such as toys or apparel.

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1. David Ricardo (1772–1823), a British economist who first enunciated economic principles in practice today: the theory of diminishing returns, which he illustrated by the production of bread and wine; the theory of rents, which favors the holders of property over the production earned from the property; and most prominently, the theory of comparative advantage that emphasized the gains from trade where each country produced what it did relatively best.

For many years, the United States enjoyed a sizeable trade surplus in advanced technology goods. Regrettably, that is no longer the case. The United States now runs a trade deficit in advanced technology products, and the trade deficit in this category with China alone more than accounts for our deficit.

The members of the first panel are eminently qualified to address these questions, and I want to say just a few words about them. Paul Samuelson, the 1970 Nobel Laureate in Economics, is widely considered to be the founder of modern economics in this country. His introductory economics textbook became the gold standard of economics textbooks, and a generation of American students were raised on it. In fact, I always referred to Samuelson's *Economics* every time I ran into some sort of difficult problem. He has done path-breaking research in many areas of economics, including the subject of today's session, international economics, and in his regular column in *Newsweek*, he has made complex economic issues accessible to the vast majority of Americans who are not trained economists. I can also attest personally to the fact that he's been an extremely effective witness before Congressional committees.

The conclusions that Paul Samuelson has drawn from his analysis of trade over many years merit careful attention by policymakers. Sixty-five years ago, he co-authored the seminal paper showing that even when trade raises national income, it tends to lower the income of specific economic groups within the country. Trade can hurt not only those directly displaced by imports, but also those with similar skills throughout the economy. That insight has important policy implications. It is often argued, and rightly, in my view, that trade expansion policies should be accompanied by policies that compensate those directly displaced by trade. But we should also be considering as well the broader population that is harmed. Regrettably, for some time, changes in government tax and spending policies have moved in the opposite direction, giving more to the winners and taking from the losers.

In September of 2004, Professor Samuelson published an article on outsourcing that attracted national attention. He took issue with economists' blanket statements in the popular media that developments in trade always raise the nation's income and pointed out that under very plausible conditions, trade developments can not only lower the income of specific groups but even the nation's total income. If our trading partners become more efficient in making the kinds of products that we export, we can lose some of the gains from trade. This applies to outsourcing when our companies shift work abroad in areas that we export, such as software.

Paul Samuelson's ninetieth birthday was celebrated a year ago with, among other things, a series of panels on economic issues of particular interest to him. One panel discussed the significance and likely consequences of imbalances in global trade. Today's current account deficit has reached almost nine hundred billion dollars a year, or seven percent of our GDP. That is much higher than anyone thinks can be sustained indefinitely. Future generations will be paying the price for all this borrowing, and in hearing after hearing up on the Hill, the policymakers and analysts agree, "It cannot go on forever. It cannot be sustained indefinitely. There will be a time of reckoning at some point." But we continue to let the deficit grow, and the trend lines continue to move in a direction that sharpens the crisis.

One consequence of this unprecedented borrowing is that it enables our creditors to expand their traded goods and services exports. While our housing and medical care industries have continued to grow strongly, our traded goods and services industries are struggling. This should be of deep concern to us all.

Ralph Gomory and William Baumol's book, *Global Trade and Conflicting National Interests,* demonstrates that the United States pays a price when other countries expand their industries while U.S. industries lose market share. They conclude that:

> "the theory shows that there are inherent conflicts in international trade. This means that it is often true that improvements in one country's productive capabilities is attainable only at the expense of another country's general welfare."

They go on to say, "The developed country's interest requires it to compete as vigorously as it can against other nations that are in anything like a comparable stage of development in order to avoid being hurt by their progress."

Before coming to the Sloan Foundation, Ralph Gomory had a distinguished career on the mathematics faculty at Princeton and as Director of Research and Vice President for Science and Technology at IBM. At Sloan, he has promoted research that deepened our understanding of important U.S. industries, technology, and trade. We have also heard him give very persuasive testimony on Capitol Hill, and it is that expertise that has moved him to push Washington to wake up and to pay more attention to our eroding position in many industries.

Dr. Baumol is a professor at New York University and a professor emeritus at Princeton. He has had a long and distinguished professional career that has included the presidency of the American Economics Association.

The conference panelists include widely recognized experts on our current economic challenges. They may differ in their policy recommendations, but I am certain that they will present a solid foundation for a serious reconsideration of these questions.

We have for too long ignored the challenges we face in an increasingly competitive world economy. The United States is no longer able to afford the simple confident assumption that it will automatically emerge as the beneficiary of increased trade.

Again, I want to welcome all the panelists as we begin this exploration of a very important and complex issue, and I want to again congratulate the Wilson Center for being in the forefront of stimulating thinking and rethinking of our old assumptions.

PANEL I

Global Trade, Conflicting National Interests, and Comparative Advantage

Kent Hughes: Today's conference is the first in a series of conferences focused on the changing nature of the global economy, the new forces in international trade, the interplay of trade and technology, and a host of related subjects that merit serious consideration. In the fall, we will hold a second conference in this series that will focus on the national strategies around the world that are targeted at changing national comparative advantage.

Ralph Gomory: We hope to clarify the basis on which any sort of policy could be made. In this area you never know with certainty. It is not like mathematics. On the other hand, people pay more attention to it than they do the mathematics.

William Baumol: We are in a difficult position. First of all, Senator Sarbanes has virtually stolen our thunder by giving a very accurate report of what our presentations will cover. The second point is that we are extremists. We are extreme in our moderate position. This is important because we are dealing with an arena where there are precarious assertions that free trade can take care of itself and shower benefits on all of us, no matter what course it takes. This point of view argues that outsourcing and all the other suspect phenomena are misleading in that they are virtues dressed in the cloak of vice. That is one extreme view claiming that free trade cannot fail to promote growth and development, and policymakers must do nothing to hamper its own ways and operations.

The opposite extreme is the view that outsourcing, in particular, and globalization more generally, threatens the livelihood and the general way of life of American workers. This tenuous argument claims that the United States must

rapidly end its free trade policies or use tariffs and quotas because without them the American way of life cannot be saved.

I think my fellow speakers will forgive me if I speak for all three of us in saying that we reject both those points of view and that the story is something very much in between. It calls for measures to defend the welfare of U.S. citizens, but not for the destruction of trade.

The fallacy underlying these two extreme positions is the view that the principle of comparative advantage, which was discovered almost 200 years ago by the great classical economist David Ricardo, says that as long as there is free trade, whatever happens will be for the general good. In fact the principle of comparative advantage makes no such nonsensical claim. Instead, the principle asserts that **under proper circumstances**, trade will provide benefits to all parties. But the comparative advantage theory carefully abstains from saying how those gains will be shared. Certain developments may enhance the share of one party, diminish the share of the other party, and indeed, may result in the losing party ending up much worse than it would have been otherwise. That is precisely the conclusion that Paul Samuelson, Ralph Gomory, and I have written about.

Outsourcing reduces the share of the benefits of trade enjoyed by those who lose their jobs, by those who suffer a direct decrease in wages and, possibly, by those average Americans who are not immediately affected. Outsourcing can make Americans worse off than they would have been otherwise. What, if anything, can be done to ameliorate those affects?

Many of our "dismal scientist" colleagues discuss free trade unguardedly and without qualification as if they agree that free trade is a sacred entity and cannot fail to benefit everyone. Throughout the years, however, there have been others who recognized that trade can have mixed consequences; Paul Samuelson is one of the earlier ones. We are not suggesting that we should go back into isolation, which can be the worst of all possible choices. Outsourcing and similar processes, however, may very well end up causing the United States to give up a very substantial share of the gains from trade.

Ralph Gomory: Comparative advantage does not tell us that new capabilities abroad are necessarily good for the United States. While we are very much on the side of free trade and its many advantages, a good free trade outcome is not inevitable. In fact, many different outcomes are possible, including ones in which the United States receives significantly fewer gains from trade.

Paul Samuelson: Let me explain how I joined this debate. I shot off my mouth at some faculty club and the editor of the *Journal of Economic Perspectives* invited me to submit a paper to them. The young, confident editors did not understand the subject. Without my permission, they put the most important part of the article into a web site similar to a black hole that few have even learned about. Some of the people who have disagreed with my article have not cited it nor have they shown any awareness of it.

Unlike my fellow panelists, I am not an extremist. I have never been an extremist. I am an eclectic. I do not try to be optimistic and I do not try to be pessimistic. I try, and it is not easy, to be realistic. Thomas Carlyle[2] called my subject, economics, "the dismal science." My view of modern economics is that it is a potentially very cheerful science. The reason why economics is, in this century and in the century to come, so potentially cheerful is that sometime before Joseph Schumpeter[3] but not too long after Isaac Newton, the world changed. The most interesting and important diagram in my textbook shows that in 1250, China was equal in per capita GDP with Europe. There were fluctuations in GDP that followed major events such as little ice ages, bubonic plague and so forth. But after the time of Newton, there is a one-way upward movement.

The drama of global economics is a race between the law of diminishing returns and the ingenuity and innovation of new scientists. I suspect that the scientists are going to keep ahead of the bugs. However, to be realistic, David Ricardo and John Stuart Mill did not prove that trade creates universal winners. I had developed a new 21st century mechanism—called the "Master Function"—for estimating how large the winnings of winners were, and how large the losings of losers were. When I applied that approach to different economic historical periods, my attempt to be realistic showed that there have been very important periods where the existence of trade was harmful to one region. For example, the opening of the West was to the detriment of farmers in Vermont and New Hampshire. I am, of course, conditioned by having

2. Thomas Carlyle (1795–1881), a Scottish essayist who opposed the analytic reasoning of social questions by political economists in favor of a more intuitive approach.
3. Joseph Alois Schumpeter (1883–1950), a Austria-Hungarian-born economist and political scientist who elaborated a theory of business cycles and the role of the entrepreneur in development; Isaac Newton (1643–1727), a British physicist and mathematician famed for his discovery of gravity, also served as Master of the Royal Mint in London.

taught for sixty or more years in New England where I could see the trek of industry—shoe industry, spinning, weaving—to the South.

I once was invited to give a talk by the board of the Ford Motor Company. I asked them, "Can you imagine a day when the center of gravity of automobile production may not be Dearborn, Michigan?" Grown men were crying and showing white fingernails just at the thought. Economic history suggested that between 1880 and 1920, the Victorian and Edwardian eras for Britain, the burst of U.S. innovation lowered the real English standard of living. That has not been the case with regard to the explosion of development in Japan and the Pacific Basin which has not lowered the American standard of living. By my measure, the larger fraction of the benefit to the world of innovation and geographical specialization did not go to the most advanced country but went to the catch-up people. In 1948, Europe and Japan were still in shambles. The United States probably had between forty and fifty percent of real GDP. But the United States' fraction slowly went down until today, when it represents arguably a little over a fifth, between twenty and twenty-four percent, of the world's economy.

This was not because America was not innovating. It was not because we were going down. It is just that the lead bicycle rider breaks the wind for the followers. I suspected that someday, some of those catch-up bicyclists would reach parity with us and, why not, maybe go ahead of us. That has not happened so I am a little less pessimistic than my two esteemed colleagues.

I got considerable embarrassment from the article in the *Journal of Economic Perspectives* because terrible protectionists, the kind of people that I love to hate, (when I mention their names my dog growls on order), began to write to me and try to drag me into their camp. My article applies to outsourcing and more generally to globalization. It deduces that when Toyota goes from very low production to higher production, it reduces the winnings of the winners in America and it intensifies the losings of the losers in America. That is the most common phenomena of our time. Unfortunately, you have to go to the black hole of the web site to see the mathematical proof.[4] (http://www.ejep.org./Vol.18, No.3, Summer 2004). [Please see Appendix II for the mathematical evidence referred to by Paul Samuelson.]

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4. Paul A. Samuelson, "Where Ricardo and Mill Rebut and Confirm Arguments of Mainstream Economists Supporting Globalization," *Journal of Economic Perspectives* 18, no.3 (Summer 2004): 135-146, available at http://www.jstor.org/stable/3216810.

Ralph Gomory: When Paul referred to the degree of pessimism or optimism among the three of us and said that he is more optimistic, he was referring to an earlier part of his talk in which he noted that the general progress of science and technology will manage to lift progress more than the mess we could make out of other things.

We also heard something of the two contrasting views of off shoring. One is that it is all terrible and the other is that it cannot help but be good. We have also shown you our basic message. It is interesting to note that the economic literature does not say what most economists seem to believe, which is that free trade is uniformly benign.

The reason that this has become of interest is because of the changes in global trade. In the time of Ricardo, England had a choice between having lots of cloth and some very poor wine, while in Portugal it was the other way around. They could also trade. Trade obviously comes out way ahead. The situation is no longer so simple; it has changed enormously because countries no longer trade on the basis of primarily natural advantage, as they did for most of history.

Countries can now create competitive advantages. They can create the ability to make sneakers in Indonesia and silicon chips in Taiwan or in Korea. Their success is not driven by natural resources or advantages; instead, they create the know-how and make the enormous investments to be able to build fabs [computer chip fabrication plants] that are globally competitive. Depending on which of these potentials is actualized, there lies the possibility for all sorts of hundreds, thousands, or even a continuum of equilibria.

A country wants to do what it can to make sure that it gets a good outcome through its actions. There is quite a range of potential outcomes. Trade is better than no trade, but among the thousands of possible outcomes from free trade, there are some that are much better and some that are much worse for each country.

For example, there are three goods in the economy: cloth, kippers, and wine. The nice thing about kippers is that basically the English like them and practically no one else does. In the beginning, the English have high productivity in cloth, reasonable productivity in kippers, and they are importing Portuguese wine. Kippers are only made and consumed by the British; they are a domestic good. In this example, the technology for refrigeration does not allow Portugal to catch, process, and ship kippers to England. Furthermore, Portugal is only interested in wine and cloth, spending half its income on each good. England splits income evenly among cloth, kippers, and wine. The productivity numbers are high for

cloth in England, high for wine in Portugal, and somewhere in between for kippers. England produces more than half of the world's output and with a productive edge, has a favorable exchange rate. One worker hour in England is worth roughly one and a third Portuguese hours. Then the productivities change. There is a change in the technology. (Technology should get its proper credit as being the "villain" that has brought India and China next door—digital technology for Indian services and the container ships for Chinese manufacturing.)

What happens if there is a technological change so that the Portuguese workers start to make kippers and ship them to England? What is the impact on England? The result is that the British go on making cloth, the Portuguese continue to make wine, but now the market for kippers is split. The good that is being off shored is kippers. So what is the new equilibrium? The British are still getting the same amount of cloth, which they are making at home. They are still in the kipper game; the price of kippers does not change in England. But England does get less wine because once the Portuguese are supplying kippers, as a result of the changed terms of trade, wine becomes more expensive in England.

This pattern is very important. When something is being off shored and replaced by a cheaper product from China, that is not the only effect. There is a second effect, as there was in the kipper case, which changes the terms of trade and makes the goods already imported, as in the examples from Portugal and China, more expensive. In much larger models that Will Baumol and I have developed, capturing the whole pattern of trade, you have results just like the simple three-goods model.

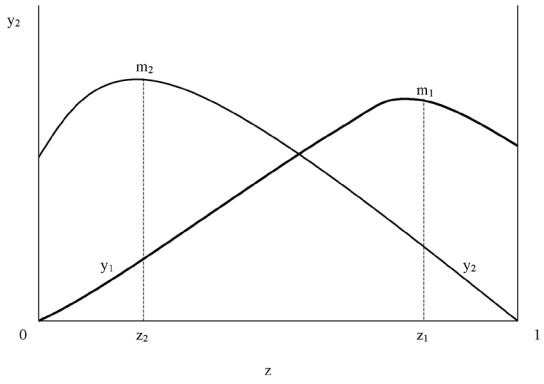
This is very important because when goods come in, the benefits of the inexpensive goods are visible, and the pain inflicted on the people who lose their jobs is also front and center. But largely unrecognized is the fact that the United States is usually not making as much as before. Part of the equation of equilibrium is that a country can only consume the *value* of what it makes. It does not consume what it makes, but it consumes the value of what it makes. Then with a change in the terms of trade, a country starts paying more for the things that it used to import. This is why the United States pays a price when it loses an industry.

William Baumol: On exactly what grounds do those who are careless say that such phenomena as outsourcing must benefit the United States? Outsourcing means that low-wage Indian or Chinese workers now produce a good or service more cheaply than it used to be produced by U.S. workers; therefore U.S.

consumers, as a group, can get more of those outsourced goods than they could when they were produced domestically. That implies that in general, the U.S. standard of living *must* be raised. The prices for everything else remain the same in this scenario and the outsourced goods cost half as much as they did before because low-wage Chinese workers make them for half the real income that the U.S. workers used to make them for. But this argument leaves out rising Chinese wages that make other goods, those previously purchased from China, more expensive. In other words, the United States gains from the lower prices of the outsourced commodities, but loses in the rising prices of the commodities that it bought from China before and continues to buy. Balancing out those two trends, it is clear that the United States could have gained in the process, as the optimists claim, or it could have lost from it, as the pessimists claim. In other words, either possibility is consistent with that scenario.

Ralph Gomory: This picture, properly interpreted, means that when all the possibilities and different equilibria are analyzed (which we did), they have a shape. There is a pattern and it comes out much like the kipper example. In other words, it is very common for a country to lose as a result of its trading partner's improvement. However, it is not uniformly so.

Properly interpreted the graph has areas of mutual gain and of conflict. It means that at one end of this graph, a trading partner's improvement helps you, and in the middle, where there is a "u" it hurts you. Depending on where a country is, improvement in trading partners always either helps, or, if the country is in the middle, hurts. The model is not complete. This picture represents the general pattern. Trade is always good but there can/will be gains or losses.



This graph represents trade in a world with two countries, 1 and 2. The bottom axis, read from left to right, is the share, z, of world exports by Country 1, while from right to left is the share of Country 2. The curve $0y_1m_1$ shows the benefits from trade of Country 1, with $z = z_1$ the share of world trade evidently most favorable to that country. Similarly, $z = z_2$ is the share most favorable to Country 2. We see that between points zero and z_2 both countries gain from a rise in country 1's share of exports (that is, when z increases) because then the benefit curve of each country goes uphill. The same is clearly true for any leftward move from the right hand end of the graph toward point z_1. But between points z_1 and z_2 any move, right or left, must benefit one country at the other's expense, because one country's benefit curve will go higher while the other's will go lower. So a shift of exports from either country to the other can clearly be damaging to the former.

The best outcome for one country out of many possible scenarios is almost invariably a bad one for its trading partner. There is not, "one that is best for both countries." Instead, there is inherent conflict. Here is a scenario that is good for country X, and that is bad for country Y. Here is one that is bad for country X and good for country Y. We have a lot of evidence that indicates this is the underlying picture.

Now we are in a totally different world. What needs to be done to ensure U.S. economic growth and gains from trade? Think in those terms for a moment and put aside the comforting notion that any improvement abroad will help the United States, it is a lovely thought, but untrue.

Something must be done to address this problem. For those who think there is nothing that can be done, I would point to several other countries that have changed their policies to deal with it, proof that something can happen. I had a lab in Japan and witnessed the transformation there firsthand. Singapore, Taiwan, Korea, and other countries attracted companies with many different incentives, including tax holidays and help with constructing their plants. These countries wanted high value-added jobs.

In responding to incentives, there can easily be conflict between what a corporation is bound to do, and what is good for its home country. The company could have a negative effect on its home country by building plants abroad in order to be profitable. In real life, the company has very little choice. If we are thinking about what can be done, we must realize that we can no longer assume, as former General Motors CEO Charlie Wilson did, that "What is good for America is good for General Motors, and vice versa."[5] It was probably true then, although not tactfully spoken. It is no longer true because the company can make profits by making things overseas. That may diminish the gross national product of its home country.

The strategies of other countries and how the United States should respond will be addressed more thoroughly in the second conference of this series.

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5. Charles Erwin Wilson (1890–1961), Chairman and CEO of General Motors from 1941–1953. His actual statement, often misquoted, "for years I thought what was good for the country was good for General Motors and vice versa," was made in response to a Senate Armed Forces Committee question during his nomination hearing to be Secretary of Defense, when asked if he could envision himself making any judgment contrary to the interests of General Motors. At the time, the corporation was the largest in the U.S. in terms of both revenue and workforce.

William Baumol: Paul Samuelson raised one very important point. All of this must be considered while keeping in mind the absolutely incredible rise in standard of living that has occurred in the past two centuries. Between the time of the fall of Rome and George Washington's lifetime, the average rate of growth of productivity was about zero. It went downhill at the beginning, uphill at an incredibly indiscernible pace after that, and then suddenly, estimates indicate in the 18th century, per capita income rose about 20 percent. In the 19th century, it rose about 200 or 300 percent, and Paul's colleague, William Nordhaus,[6] argues that the 800 percent increase estimated for the 20th century is much too low. These are absolutely incomprehensible figures and will probably put in the shade any losses we incur from trade developments. At the same time, this also suggests promising avenues for policy. After all, competing with cheap foreign wages is something we heard a lot about when we were children. I still remember the newspaper stories about the unfair, cheap, foreign labor produce that was coming into the United States.

How did we keep real wages rising until the Great Depression? It was by taking advantage of the sources of that incredible growth in per-capita income. So one of the things that we are looking towards for rescue from any ill-effects of a phenomena such as outsourcing may come from continued innovation, which does call for some policy. It calls for support of education, basic research, and those things that Adam Smith[7] pointed out as being good for the general welfare, even if they are not beneficial for any individual or individual institution to carry them out. There are promising directions that are not isolationist directions. They are not the building of tariff walls. They are measures that, incidentally, besides helping the United States, will help India and China as well, surely a good thing.

Ralph Gomory: Our thoughts on policy are in the direction of raising productivity or inducing companies to behave differently. They are certainly not in the direction of what Paul Samuelson every now and then calls "red-necked protectionism."

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6. William Nordhaus, Professor of Economics, Yale University. *See* http://nordhaus.econ. yale.edu/cv_current.htm
7. Adam Smith (1723–1790), Scottish philosopher, political economist, and author of *The Wealth of Nations*.

Stephen Roach: My employer, Morgan Stanley, has a large team of economists, a portion of whom are now outsourced to India. A few years ago, I decided I needed to go to India because I found out that we had hired an undetermined number of economists. I was not certain as to whether or not I had been replaced. I did meet the Indian team, and I still have a job. But I learned firsthand that now the information technology (IT)-enabled world of globalization is really very different from the globalization experienced by our predecessors.

Economists love to sit back and try to set recent trends in context. I would draw the contrast between two very different globalizations. The era of globalization from 1880 to roughly 1914 was mainly a tradable goods phenomenon that took a fairly long time to evolve. Ports had to be constructed along with transportation networks, ships, and the like. In this era of IT-enabled globalization, we have done in ten years what took fifty years a century ago.

This globalization is much more disruptive in terms of speed and scope, thereby breaking down the distinction between the tradable and the once sacrosanct, non-tradable sectors of the economy. If you were a knowledge worker toiling in the service sector, as sad as it was to see your blue collar neighbor lose his or her job, you could think that they had the opportunity to become like you, a knowledge worker, able to buy things cheaply from overseas. This is the win-win that Professor Samuelson alluded to earlier. The poor got rich by participating in global commerce, and the wealthy also saw their standards of living expand.

But in this IT-enabled globalization, the sense of job and income security that has long been taken for granted in sheltered, knowledge worker service industries no longer exists. Those are the disturbing trends that spark an awful lot of concern, angst, and hand-wringing over outsourcing.

Over the past decade, the United States has experienced a real anomaly in the macro-theoretic framework of globalization that we have been taught over the years. We have relatively stagnant real wages despite rapid productivity growth. The economists say that ultimately, workers are paid their just rewards, and in a period of sharply accelerating productivity the wages will follow. But they have not. Ten years is a long time to wait, so people are getting impatient. The President has not figured out why the economy is booming and he gets no credit for the boom. This may be why.

The stagnant real wage issue is tied to the phenomenon that we are talking about today. Equally important is something that the politicians argue about but they never really want to come to grips with: We have a boom, maybe, but

a boom for whom? There are huge income and inequality issues that are getting worse, not better, and trade, especially the blurring of the distinction between tradeables and non-tradeables, is certainly related to that problem.

We do need to think about what to do. Professor Baumol alluded to some long-term policies in terms of education and investment in basic research, but there is a macro policy point here that needs to be addressed.

Context is critical. Washington is currently running a policy that has left America in the worst position a major leading nation has ever been in with respect to national saving. In the second half of 2005, the net national savings rate in the United States, the combined saving of individuals, businesses, and the government sector adjusted for depreciation, was **zero**. When a country has no domestic savings and wants to grow, it has to import surplus savings from abroad and run massive current account and trade deficits to attract the capital.

This problem needs to be laid right at Washington's doorstep. Current U.S. macro policies, both fiscal and monetary, are recklessly spurring a regime of zero saving. If the United States had a higher savings rate, it would not have to run these current account and trade deficits to keep growing. Misaligned macro policies create the condition for these hugely contentious political debates where people will take an article like the one that Professor Samuelson wrote and distort it in the ways that disturb him. I worry about the quality of the public debate on these issues.

The current wave of China-bashing is especially worrisome. It has become the sport *du jour* in Washington. There are over 23 bills in the Congress to punish China for the huge bilateral trade and current account balance it has with the United States. China does need to recognize its responsibility on a number of trade issues, especially intellectual property rights. But we are playing a familiar scapegoat game. If trade with China is closed down in this zero national savings climate, who will the United States run deficits with? It is like a water balloon. The trade deficit has to go somewhere else, because we have to keep getting the capital from someone. The risk is that the deficit shifts to a higher cost foreign producer, and it will be a huge tax on the American consuming public. Instead of the win-win of globalization, this is a lose-lose situation. Washington policymakers do not want to look in the mirror, because in large part, they are responsible for fiscal and monetary policies and for capital and trade flows. The current situation could not be worse.

Paul Solman: In terms of the theoretical concerns presented earlier by Ralph Gomory, Will Baumol, and Paul Samuelson, how worried are you? Do you

think that world productivity is going to be so great that it will just keep outpacing the United States, leading to continuing losses in terms of trade? Could Gomory's kippers be blown away by increased productivity in the future? Is there nothing to worry about? Even with the dislocations within the United States that you have discussed, what do you think of the big picture? How worried are you?

Stephen Roach: There is a presumption here that because of the theory of comparative advantage, free trade can automatically shower the United States with benefits that outweigh some of these conflicts or frictions. But a decade of stagnant real wages in the United States and the outbreak of protectionist sentiment in Washington, despite a very low unemployment rate, suggests that we cannot blindly presume that the theories will take care of the problem. The world has changed since the theories were developed. Brilliant theoreticians are taking apart these theories and trying to explain the circumstances under which we need to rethink and reexamine them. The speed with which the world and globalization changed since the Internet really blossomed is very difficult to factor into these old theories, which are predicated on a much more sluggish pace of technological change.

Paul Solman: Are your clients worried? Is there a growing concern about outsourcing? You were apparently worried about India. When you talk to your clients, the people who read your newsletters, and so forth, how much more concerned are they becoming?

Stephen Roach: The issue of globalization is on everyone's mind, whether it is a businessman, a policymaker, or an investor. We are all interconnected. There is an outbreak of Euro nationalism that is resisting many of the very same forces we are talking about. In the United States, is it a coincidence that with gaping external imbalances and stagnant real wages, U.S. policymakers and workers are going after China? Is the restriction of the flow of foreign direct investment into this country, such as China's proposed acquisition of Unocal or Dubai Ports' acquisition of the service contracts for several East Coast ports, an anomaly? At the same time, the burning issue of our times in the United States is illegal immigration. We want to send National Guards to patrol the borders. The earlier period of globalization was followed by an outbreak of isolationism and nationalism that led the world into one of its darkest times. While history does not repeat itself,

sometimes it rhymes. This is one of the rhymes that disturbs me, and my clients are, understandably, worried about it as well. Professor Samuelson, what do you think of the Internet and the IT-enabled globalization moving rapidly into what used to be called a sheltered sector, or non-tradable services? Does this challenge the models you use to try to explain the way the world works?

Paul Samuelson: It is just more of the same. What is happening in services and outsourcing is not different from what happened when Toyota and Nissan took over the automobile industry. Dr. Gomory wanted to preserve the unity of the discussion and was a little bit discouraging when I wanted to talk about the adverse balance of payments that has been going on since 1980 and is accelerating over time. In effect, we are using the savings of poorer countries for ourselves. Partly, we get those savings not because individuals in poor countries are sure that investments in the United States are better, but because their governments are actually putting their savings in the worst investments in the world—the lowest yielding, the safest U.S. treasury bills.

The old-fashioned, conventional wisdom would be that China should appreciate its currency. The best way to do that would be for China to pull the plug on its tremendous holdings at the Treasury. If this yuan appreciation can be combined with *enhanced U.S. domestic saving*, maybe problems for my six baby boomer future retirees will not be so acute. If not, they will have to depend upon a smaller skilled U.S. labor force and upon smaller U.S.-owned capital in America's tax base. We cannot tax the capital of foreigners whose savings we have used. That is their asset. When I try to weigh the quantitative effects, I doubt that a moderate, orderly depreciation of the dollar, which means a modest appreciation of the yuan and other currencies, will do the job. People tell me, and I read it all the time in the journals, that this process cannot go on forever. I have models, generalized multi-country Frank Ramsey models, which can go on forever. What is happening is that more and more U.S. properties and plant and equipment are owned by foreigners. The only limit to foreign ownership is 100 percent. But when going on forever, that betokens a downward trend on the U.S. growth rate for well-being.

When I read Roach's writing and other articles, I learn of the tremendous stock buybacks. The United States now has more favorable tax treatment of dividends, so there is an encouragement for companies to pay dividends instead of making new investments. But companies are also buying back their stocks to goose up their stock prices. That is corporate dis-savings and this is an important problem.

In 1998, the United States had a large budget surplus. These were all the good things that former Secretary of the Treasury Robert Rubin created. Do we really think that the new Henry Paulson, if he is confirmed,[8] will be allowed to go back to that sort of good thing? At the very least, U.S. policymakers could do something about the public dis-savings and the fiscal deficit. Now, it is very hard in any kind of a free market economy, a mixed economy, to change the average propensity to save. Nobody predicted that Chairman Greenspan's clever, timely 13 reductions of interest rates, in the backwash of the burst of the dot.com bubble, would have its major effect on increased consumption. All of our macroeconomic textbooks said it is investment which is more responsive to interest rates. But as soon as people learned that for the same monthly mortgage payment, they could afford that SUV or a two-month trip to the Caribbean, it went directly into consumption. We do not know whether we are beginning to move into the reverse direction. It will not be easy for government, by methods that will not fall afoul of the law of unintended consequences, to change those habits.

Stephen Roach: I want to go back to the point I made at the outset when I said that there is a fiscal issue, which is the budget deficit, and a monetary issue. The overly-accommodative monetary policy that Professor Samuelson just described was central in allowing an equity bubble, to be followed by the bond bubble, and then the bubble in property.

Paul Samuelson: By the way, the equity bubble that Chairman Greenspan purposely did nothing about.

Stephen Roach: Some have gone even further than that. He is still an icon in this town. But the United States has had one bubble after another, and right now, the markets are digesting what appears to be the bursting of yet another one of these bubbles in emerging market, debt and equities, and commodities. When monetary policy is too accommodating, individuals then use asset bubbles as a substitute for old-fashioned income-based saving. That biases the personal savings rate down. A regime with a zero savings rate that has to run current account and trade deficits to balance out the economy tends to create the type of political backlash in this town that leads to wrong-footed public policies.

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8. Henry Paulson was confirmed as the U.S. Secretary of the Treasury June 28, 2006.

Paul Solman: Can you make explicit what the connection is between non-saving and the earlier discussion on trade? What is it about no savings that is so bad in terms of this current trade regime?

Stephen Roach: Without savings, the United States has to run trade deficits to get foreign capital to fund the investment that is needed for economic growth.

Paul Solman: The United States is unable to fund the investment it needs for economic growth that would make it productive so that the United States could be at one of those higher equilibrium points on the graph Ralph Gomory showed earlier?

Stephen Roach: So, as Professor Samuelson says, the United States borrows saving from poor people.

Paul Samuelson: It can come and is coming from other countries but then, instead of us, they own the assets.

Paul Solman: That is because they are buying U.S. bonds through their governments. The United States cannot, as you pointed out, tax them because the returns go to them. But most importantly, the United States is not investing in its own productive future, and therefore, it is going to be in that region of competition with other countries where the United States can experience losses?

Stephen Roach: As Professor Samuelson noted earlier, poor countries like China and India that are investing in U.S. treasuries are getting only five percent yields. These are poor countries that need high returns. The reason they have invested in dollar-based assets is to prevent their currencies from rising. These are export-led economies that need cheap currencies. But their currencies are rising now. Their policies aren't working.

Paul Solman: But I thought the implication of Ralph Gomory and Will Baumol's book was that we are in a period in which countries can make economic policy decisions that advantage them in the long run by allowing them to become more productive. One of their policies is buying U.S. treasuries to keep their products as cheap as they can.

Ralph Gomory: These things can be considered in separate ways. But one viewpoint is that they are deliberately suppressing internal consumption in order to develop their economies through investment and so forth.

Stephen Roach: The final chapter in the story is that the Chinas and Indias will wake up to the fact that this is dumb. In the last few months, there has been a lot of discussion in official circles in Asia suggesting it is time to take their massive reservoir of foreign exchange reserves and start putting it to better use internally. India could use foreign exchange reserves to invest in infrastructure. China could use foreign exchange reserves to recapitalize a state-owned banking system. That will call the U.S. bluff. How is the United States going to fund the current account deficit if the big surplus countries in the poor world say, "Wait a second, these foreign exchange reserves belong to us."

Paul Solman: Okay, but it was smart strategy for them to build up their industry and get more productive. I am trying to connect this to the policy implications from the earlier discussion.

William Baumol: But what China is doing in addition is buying assets in the United States rather than building them in China. What would be most useful to them is to build them in China.

Paul Solman: But it is good for us if China builds assets here.

William Baumol: That is right. It would be much worse for us if they built them in China. If they are here, they export the profits, but the wages stay in the United States.

Paul Solman: So this is the best of all possible worlds.

Paul Samuelson: It is very hard to argue plausibly that over the next ten years, this accelerating trend of the United States owing more to the rest of the world and the rest of the world owning more of the United States will go uninterrupted. A modest appreciation of their currencies will not do it. At some point, there will be a serious run against the dollar. When that happens, it will not be simply foreigners picking on the United States. All the cool money in the United States will be participating. The hedge fund world may be leading

the lynch mob. How can that not result in some kind of a serious financial panic? The panic certainly will not be confined to America; there will be global ramifications. It will not be the end of the world or the cosmos. At least temporarily capital controls will come back and so forth. It is a little bit scary, like falling from a very tall building where everything looks alright, but you get closer to the ground or that unknown time when there is a breaking trend.

Paul Solman: Stephen, are you asking: "How long are foreign countries going to hold onto U.S. dollar-denominated assets?" Do you agree with Paul Samuelson that the United States is unknowingly plummeting toward this catastrophic impact?

Stephen Roach: I am not suggesting that an Armageddon scenario is inevitable. But I am saying we cannot stay steeped in denial forever—maintaining that bad things never happen to us.

Paul Solman: You could have just been off by a few floors, right? You were talking about something like this a few years ago, but it could be that it is just taking a longer time for the United States to hit the ground.

Stephen Roach: It usually does. But the point is, as Senator Sarbanes noted, in the fourth quarter of last year, our current account deficit, at an annual rate, was $900 billion, seven percent of GDP. When I go to Australia, they say, "Mate, ours is a lot bigger than that so don't worry about it." I asked in return, "How big is your current account deficit? At eight percent of their GDP, their current account deficit was $42 billion last year. Scale is a big deal. Even at $800 billion dollars, our current account deficit is bigger than the GDP of all but eight countries in the world. We need three and a half billion dollars of capital inflows each business day of the year to fund our deficit. Paul Samuelson is absolutely correct. This is not a stable disequilibrium. The United States has not fixed the budget deficit and the personal savings deficit, so the external deficit will keep getting larger and larger, unless cyclically the United States goes into recession. Washington policymakers are going nowhere on this issue. They want to blame China or go after India instead.

Paul Solman: Professor Baumol, what floor are we on? Is there a safety net below that will allow us to bounce back?

William Baumol: No one is constructing a safety net at this point.

Paul Solman: Do you actually foresee a financial collapse or another kind of economic disaster?

William Baumol: My only prediction about the future is that it will surprise me. I am not forecasting; what was just described by Paul Samuelson and Stephen Roach is a very distinct possibility. But the United States is not doing anything about it. Instead, the United States is aggravating the situation.

Ralph Gomory: I do not think you can predict the future very well. With the Law of Unintended Consequences, sometimes things hinge on God knows what. But the United States cannot go on doing what it is doing, not to mention doing things to make the situation worse.

Paul Samuelson: I tell my students, "If you must forecast, forecast often. I will not attempt to forecast a date. But policymakers will be dealing with the mechanics of avalanches when a recession occurs. A village falls under snow because of a pistol shot. That pistol shot is not the real cause. It is because the snow was piling up in a more dangerous way for quite a long time.

Paul Solman: I bet there are many people in the audience who read Paul Krugman's column a few years ago that argued that the U.S. economic deficit could not continue and that the dollar will collapse. In fact the dollar went down against the yen, and particularly went down against the euro, then went back up some against both those currencies. Three or four years ago *The Economist* had a cover story depicting the Twin Monsters of Debt and noting how they could not continue; that is, the United States was doomed. Then nothing catastrophic happened. In fact, U.S. GDP kept growing despite all of these dire predictions. The dire warning from Stephen Roach on the U.S. deficit was widely castigated for being alarmist.

When people hear the warnings being issued today, you must realize that there is a collective doubt as to who knows what is really going to happen. None of the predictions have come true yet.

William Baumol: Paul Samuelson is right. The snow is piling up. The pistol may not have been shot, but the immense size of the snow accumulation should give us concern. Perhaps only a few villages will be buried. The world, a century later, may recover. I am not saying it is the end of the world. But the huge foreign deficit is a terrible threat, because it can cause at least a period of very damaging effects upon the U.S. and world economies.

Paul Solman: This is a problem in any case because if the United States is not investing in our future, it is not becoming more productive in ways that build a higher standard of living.

William Baumol: There are two threats here, and they must not be confused. You just described one threat: the world economies remain in equilibrium and there is no mass unemployment or burst of inflation. There is only a re-divison of benefits between the United States and China, with the United States going down relatively and even absolutely, and China going up. The second threat is a much more temporary but much more catastrophic affair for the period during which it lasts. The distinction is between the Great Depression and a country whose productivity is going down one percent a year, year after year, compounded. Those are two different, but both scary phenomena.

Paul Solman: Lester Thurow[9] once made the point that Argentina and the United States had the same GDP per capita in 1890, and then Argentina was only one percent per year less productive than the United States. Now the United States has four times the GDP per capita that Argentina does, which fits almost exactly with the one percent per year difference over 116 years.

Paul Samuelson: An old story was told around 1939. An old hand in the British Foreign Office was retiring and briefing his replacement. The trouble in this place is, he said, they are always getting the wind up. They are always worried about war breaking out and I always tell them it will be okay. So far, (this was 1939), I have only been wrong once.

Stephen Roach: The problem is that as each year passes with the United States continuing down this path of extraordinarily low saving and expanding

9. Lester Thurow is a former dean of the MIT Sloan School of Management and author of numerous books on economics.

balance of payments deficits, while avoiding the crisis, there is a growing presumption that everything is okay. Economists and others go so far as to invent new theories of the world to explain why the economy is fine. (There is a group of people who talk about a Bretton Woods II arrangement with China as the 51st state of the United States and there is an expanded dollar bloc.) The United States is at risk of deluding itself about the ability of this disequilibrium to sustain itself. At the same time, Washington policymakers have become too complacent. It is out of that complacency that the unexpected usually happens.

We are discussing trade, comparative advantage, and outsourcing. This discussion should not occur in isolation from the broader macroeconomic framework of the savings shortage in a U.S. economy that is compelled to run massive current account and trade deficits to grow. Those deficits have huge and important consequences, today's discussion being one of them.

AUDIENCE QUESTIONS AND DISCUSSION

Will Reed, Professor of Economics, George Mason University: What if we start this discussion from a different point? Foreign countries, for a variety of reasons, pursue strategies that prompt them to buy U.S. government assets for financial security. This prompts U.S. citizens to stop saving, because they are getting such a free ride, favoring consumption. Whenever the countries change their strategies, the U.S. devalues its currency, which seems to be the policy solution of the new Goldman Sachs Treasury Secretary. How do you know your scenario, Mr. Roach, that the United States is forced to run a deficit to fund capital investment here, is correct? Right now, foreign countries are giving it to us, and we should take it.

Stephen Roach: We are taking it. What I pick up in talking to them is that they are beginning to rethink whether or not it is in their best interest to "give it to us."

This is a wake-up call. Orthodox economic theories suggest that when a country has big external deficits, its currency will go down enough to take care of the imbalance. But look at the U.S. external imbalance. In particular, look at the trade piece of it, which is about 93 percent of the U.S. current account deficit. It is mainly due to excess imports. Imports for tradable goods, for example, are running at about 93 percent higher than U.S. exports of tradables. That is traceable to

excess consumption. The consumption share of U.S. GDP is at a record at about 71 percent of GDP. How has the United States gotten there? The United States has had weak income because of relatively jobless recoveries and now stagnant wages. It is just a property-induced wealth effect that has closed the circle. The United States has a zero, or actually a negative savings rate, for the first time since 1933, which was, of course, not one of the better years in U.S. history. The United States has rising debt service. The U.S. consumer is in trouble.

Again, this is part of my personal credibility problem. I have been warning of the consequences of these pressures for a while. The longer I warn and the longer nothing happens, I'm like the boy who cried wolf—I lose credibility. While nothing terrible has happened yet, I have never seen the stars in such poor alignment for the U.S. consumer. I am not sure this is the year the consumer is going to stumble, but I think the only way the United States could fix the balance of payments and trade deficit is through lower consumption. The currency correction that would be required to prompt the needed drop in consumption would be enormous, and probably not manageable in the broader context of the world economy.

Paul Samuelson: Currency depreciation was extremely important during the Great Depression, and the countries that did it first got immediate relief because it brought down their excessive wage costs. When Belgium did the same, it benefited, and when France did not do it, France was hurt.

That is not exactly our problem today. Unemployment numbers in the United States are very low. Will a massive depreciation bring higher real wage rates for the poorer half of the U.S. population? Part of the malaise today is that the kind of prosperity the United States is experiencing is not widely shared by the classes below the median of the middle class. A massive dollar depreciation might help lower our trend of foreign borrowing, but not necessarily at the same time raise wage rates for our poorest unskilled.

Paul Solman: What does the United States do exactly to have a depreciation?

Paul Samuelson: Well, the United States could injudiciously cut interest rates and encourage inflation rates above chairman Bernanke's[10] 2+ percent per year.

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10. Ben S. Bernanke was sworn in as Chairman of the Board of Governors of the Federal Reserve System on February 1, 2006.

Paul Solman: Do you mean that the Federal Reserve should literally reverse policy and just let the dollar inflate?

Robert Blecker, Professor of Economics, American University: I actually have seen the diagram from Ralph Gomory and William Baumol before. I teach it to the graduate students who might have some hope of comprehending it. Suppose the United States is in the middle region, the zone of conflict. The implication seems to be that when other countries take efforts to develop themselves, there is a sort of beggar-thy-neighbor process because it can make the United States poorer even though it makes the other countries richer. Unfortunately, some people might infer from this, "Well, let's just beggar them back." I do not think that is what you intend. How do we go about improving ourselves without beggaring them back, both in terms of domestic policies and perhaps some kind of new global arrangements?

Ralph Gomory: It is mostly increasing U.S. productivity. If there are two countries in the zone of conflict, and each one would like to get out of the zone of conflict, they will both invest, educate, and learn to do things better. They might just go straight up together.

Shift your focus to a ground's eye view of economic change. I am not an economist; my background is in science and technology. But I have spent a lot of time in companies and I see people making decisions about where they are going to locate their plants; boards of directors deciding where they are going to invest money; people coming out of the Indian Institute of Technology very well trained; and fabs [fabrication plants] in Taiwan where they make huge [silicon] wafers. These forces have a life of their own. They all interact to drive economies as well as policies and taxes.

We should remember, in the course of these discussions, that these real processes, real trainings, real building of factories, real setting up of phone answering and other services 5,000 miles away from where the calls are coming from are going on and increasing.

William Baumol: You suggest that if the United States wants to be as high as it can be on a stable hill of welfare, which is what the diagram shows, the other country will suffer and that is an unfortunate position to be in. But the alternative is to make both hills higher, and that is the direction Ralph and I have been urging as the way to deal with the problem. Do not move along

the existing hills. Make them both higher by increasing productivity in both countries simultaneously. Then we are all better off. But if the other countries increase their productivity and U.S. productivity remains the same (I'm taking an extreme example), then they are moving up their own hills and in fact the United States may well be driven lower in the process.

Robert Aliber, Graduate School of Business, University of Chicago, former Woodrow Wilson Center Fellow: With deference to William Baumol and Paul Samuelson, may I make a plea for general equilibrium-type statements? For example, I am David Ricardo and I increase my demand for Chinese cottons. That pushes the wage rate up in China. As a result, China presumably has some dollars. What does China do with its new export proceeds?

It is a very interesting exercise to try to find a country in the world that has invested more in the United States than it has wished. Since we know that global savings are given, I could ask the rhetorical question: does Norway and does Mexico have a large trade surplus because we have a savings deficiency? Alternatively, have the value of U.S. assets and the U.S. savings rate, in a general equilibrium sense, adjusted to the autonomous inflow of foreign savings?

William Baumol: There is no question that when citizens of foreign countries prefer to invest in the United States instead of their own country, they are doing it voluntarily in response to incentives. Part of the incentive may be better engineers, more ingenious inventors, etcetera in the United States, and if that is the reason, we should be very happy. But if they are doing it because of insane fiscal policies in the United States, it is still considered voluntary, but like a drowning man voluntarily swimming toward shore.

In reality, foreign investors are choosing the United States because of a combination of good and bad incentives. It is true that the United States would still get foreign investments if it did not have these bad fiscal policies. In other areas, for example, U.S. rates of patents and technical progress, the country still does very well in comparison with most other countries. The Japanese are the only ones who come close in terms of patents, and that is partly an artifact of their patent laws which prevents an inventor from patenting the bicycle; he/she has to patent the spokes of the wheel separately, etcetera. It is more complicated than I can possibly explain in this time. The United States is still an attractive place for foreign investment, and would be even if we had no crazy fiscal policy.

However, the snow is still piling up.

Robert Aliber: I certainly believe the snow is piling up, but let me leave you with one more rhetorical question. To what extent is our fiscal deficit a result of the autonomous trade deficit? Or alternatively, if Secretary Snow[11] in his wisdom, or his successor, were to seek a balanced budget tomorrow, what would happen to our trade deficit, and what would happen to the domestic level of unemployment?

Paul Samuelson: If the 2000 election had gone the other way and the United States had a continuation of Rubinesque[12] fiscal policy, dynamic China would still be generating an export-led boom for themselves and investing to some degree in Treasury bills in order to keep up that good access to our market. But Bush's anti-Rubin fiscal policies have made our dis-savings—domestic and foreign—intensified.

Much of what we are talking about is intensified by very bad government policies. But it goes on anyway. According to Franco Modigliani's theories of savings that so sensitively depend upon the rate of growth of the society, there is nothing anomalous about a rich country like us using the savings of poorer countries. But the non-savers must fear the future consequences therefrom.

That still leaves us with the problem that there is a pretty serious demographic turnaround, almost a revolution, and U.S. workers are not saving for it. Maybe a lot of the Social Security programs and the Medicare programs could have been a devilish sting operation to lower the perceived need for personal savings, but they have a momentum that is beyond the taxable capacity, not of the nation, but of the electorate. Voters cannot be disbanded for a new set of voters.

Thea Lee, Policy Director, American Federation of Labor and Congress of Industrial Organizations: You mentioned the problem of the distribution of income and the gap between productivity growth and real wage growth. Please focus a little bit more on the implications of that for policy. We all agree that there can be national gains from trade but that they are maldistributed. Not only does the United States avoid using domestic economic policy to redistribute those gains,

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11. John W. Snow, U.S. Secretary of the Treasury (January 2003 – July 2006).
12. Robert E. Rubin, U.S. Secretary of the Treasury (January 1995 – July 1999).

but domestic economic policy is going in the opposite direction by exacerbating the inequality through fiscal and other policies. Given that context, is it unreasonable to ask about the extent to which current trade policies exacerbate existing inequalities?

In other words, is trade always good? You said there is no such thing as the United States, or any country, benefiting uniformly from trade policy. You have winners and losers inside countries and winners and losers between countries. Is additional trade liberalization always good for the poor, for working people, or for a majority of citizens? What should be done to change the balance of bargaining power?

One of the things that I hear from all of you is anxiety in your voices and the distaste when you talk about protectionists and isolationists. But the truth is that in 2006, the globalization and trade policy debate did not have two choices. You were a free-trader or a protectionist; you were pro-globalization or anti-globalization. We are fighting about the rules and about whether we have the right balance of protections for corporate interests, for worker's rights, for environmental standards, and what the impact is on the ability of government to regulate trade in the public interest. Given that, could you talk about more than your opposition to protectionism? What does that mean in the context of the current trade policy debate if we have a real concern for the distributional impact of trade liberalization? Do we have to be for all the free trade agreements that are on the table? Does being against some of them or some of their rules make us protectionists? Could it be that they got the balance wrong?

Ralph Gomory: I do not know the ins and outs of the current trade agreements being negotiated, but certain things are clear at a gross level. If engineers can be hired for one fourth of the wage in Asia versus the United States, then the bargaining power and position of engineers, or anyone who is in that situation, is sharply reduced. Corporations have become global and they will cheerfully go ahead and pursue the lower wage workers. All of these developments fundamentally tend to weaken the position of working people.

As a result, U.S. policymakers must address inequality, and issues which are not discussed in any detail, such as the impact on people's lives of disruption and change, selling the house, moving to somewhere else. All of these effects must be thoroughly considered and addressed.

Paul Samuelson: In my lifetime as a professor of economics, globalization has almost completely emasculated trade unionism. When I used to be invited to speak to trade union people I would say, "You really should not have invited me, because what I am going to have to tell you is that unionization is extremely important," in determining how fast industry leaves the north for the south and how fast plants relocate. It was localization—negative globalism—that enabled unions to use all the legal instruments of unionization, including the strike.

The United States now has a cowed labor force. Jobs do not really disappear; but our new jobs offer as much as 30 percent lower wages than the previous ones. There are exceptions. Government workers, for example, still have a union because government cannot be outsourced. There is also a certain degree of localization in businesses like the United Parcel Service. This situation has kind of a Greek tragedy inevitability; it just takes France and Germany a longer time to get the punishment that grinds out that fact.

The other problem with globalization is the uncertainty and anxiety it causes in modern life. Life used to be, for most of the population, a pretty certain thing. If a person graduated, (not necessarily from the Ivy League or Harvard Business School), he could go down the typical path, getting increases in pay as he got older and more capable, then he could retire. That was a matter of certainty then but this is not true at all now. If Darwin gave a reason why executives are paid so much, it is because job stability has become almost farcical. CEOs remain at one company for barely 13 months sometimes so they had better have a big severance package. Life is very uncertain. Part of that uncertainty is a cost of efficiency, but part of it is not included in the GDP as usually measured one way or the other.

Paul Solman: In the world you just described, with more instability in employment and income, what policies could be adopted by the United States to mitigate against the competition from, for example, the Chinese workers, who do not belong to a union or work under poor conditions for little or no pay? To what extent is fighting against allegedly abysmal working conditions in China protectionism?

William Baumol: Part of my answer is to imagine a case in which those economists who say trade is always beneficial are right, so that the average

American income, even as a result of globalization, would go up. If one-tenth of the workforce nevertheless were then severely injured, it is clearly a crime against humanity not to take measures to compensate them adequately.

Paul Solman: That is not stopping the juggernaut. That is just sharing some of the bigger pie with the losers.

Paul Samuelson: Some people ask, "How can you go to Wal-Mart and buy something that you know is being produced by an underage person at a wage rate that not even *Tobacco Road* would contemplate?" But Wal-Mart's supplier is *raising* the local wage. This is improving the conditions of work in those regions, compared to what they otherwise were.

William Baumol: Even if the United States buys from China and the wages are disgraceful, the fact that they are getting jobs with rising wages is a benefit to them. But what if it is lowering the wages of all American workers?

Paul Solman: If ten percent are getting hurt, but the average wage is rising, we share with the ten percent.

William Baumol: Suppose **all** workers' wages fall. No CEO is hurt, but all workers suffer. Suppose we are taking the case where our share of the gains from trade is so far decreased that the average U.S. worker's income is lowered relative to before the outsourcing event, particularly that of the low-income workers. What should be done to help them?

Paul Solman: What is so bad about trying to protect those people?

William Baumol: The answer we are inclined to give is that protection is the wrong path. Why? Because in our model, the more dismal possible prospect is that the gains from trade will have fallen for us so badly that the average worker is worse off than she was the year before. But if you give up trade, then the gains from trade are lost altogether and the average worker will be worse off still. In other words, the question is correct. But the answer is not necessarily that protection is the best way to defend those workers. That is where we are not clearly in agreement.

Paul Solman: But there are gradations. It is not just all or nothing. You are saying a governmental policy is something that is dictated by your model. Why not include in that package something that more literally or explicitly protects the people who are being so hurt?

Thea Lee: Let's say the gains are concentrated in the top one percent of the population and the bottom 60 percent of workers are being hurt. Is it necessary to go further down this road and take down the remaining trade barriers? I am not saying we should stop trading. That is not a reasonable option at this point in time. The relevant questions are whether we need to accelerate trade liberalization and what are the conditions that should underlie future trade liberalization? This is what the AFL-CIO has argued. If the United States goes further with trade liberalization, the core labor standards agreed to in trade agreements, (the rights of workers to form unions, to bargain collectively, prohibitions against child labor, forced labor, and discrimination in employment), must be upheld. In violation of these global standards, Wal-Mart makes money because Chinese workers cannot stand up for themselves and defend themselves at the workplace because their own government doesn't give them political or economic rights. U.S. workers should not have to compete with workers who do not have basic rights. U.S. workers want to be part of the global economy, but they do not want to do it on Wal-Mart's terms. They want to compete on terms that are fair to working people. Why is that protection?

William Baumol: It need not be. I certainly support the notion of doing what we can to get our trading partners not to interfere with unionism, to adopt safety standards, etcetera. We have not only a right to do so, but we have good motivation for doing so.

Policy objectives are not scientific. I believe strongly in egalitarianism, but it does not follow from any premise in formal economics. I do not know any mathematical way to say that egalitarianism is s a desirable thing, but the question becomes not, is that a good objective, but what is the most effective way to move in that direction?

PANEL II

Implications for Economic and Trade Policy

Paul Solman: If deterioration of trade is a problem, what would we do about it? What are we going to do about it?

Clyde Prestowitz: One of the issues raised in the previous panel dealt with why some countries buy or invest in low return U.S. assets. There are a number of causes, but one reason is that from their perspective, the exchange involves more than trade. They see an infusion of technology and skills. In other words, by maintaining an overvalued dollar or undervalued currencies, they not only export products, but they effectively import factories. I mention that because I want to use a recent incident that I've been involved with to illustrate how the earlier discussion ties into what we're talking about now.

Igor Khandros was recently here in Washington. Igor is a recent immigrant from Ukraine. He left the Ukraine in 1978 and wound up in New York. He had been trained in the Ukraine as a materials engineer, got a job in New York, and went to school at night at Stevens Institute of Technology. After earning a Ph.D. in materials engineering, he went to work for IBM. At IBM, he came up with a neat new idea for how to test semiconductor wafers that increased productivity three or four times and has become the dominant technology in the field.

Igor's wife, who worked for Citibank, served as his venture capitalist and funded his research. Eventually he raised enough money to start his company, Form Factor, in Silicon Valley, now located in Livermore, California. It has about 1,000 employees; the line workers there average three years of high school and earn a starting wage of $40,000 a year with full medical benefits, pensions, and other benefits. Form Factor is a $400 million company growing at 60 percent annually that exports 80 percent of its production. There could

not be a more American story: a poor immigrant dreams up new technology and starts a successful company out of his garage.

What does America get out of this? A comparative advantage. Before Khandros came along, these test methods and the equipment were made largely outside the United States in Asia. Suddenly the United States is the leader in this technology and industry, and has a trade surplus in wafer-testing.

Now into this very bright picture comes a cloud in the form of a company called FICOM, a Korean company closely related in a chaebol relationship with Hynix, the big Korean semiconductor manufacturer. Hynix, in conjunction with the Korean Ministry of Industry, encouraged FICOM to develop a similar kind of product, in fact so similar that it is copied directly from Form Factor's probe card. The copy is so good that Form Factor is frequently being sent FICOM probe cards to be repaired because the customer thinks it is a Form Factor card.

The obvious theft of intellectual property is resulting in the loss of Form Factor's sales in Korea and elsewhere. One might think, "Well, why not just go to court and sue them on intellectual property infringement?" But the problem is that so much of this industry has moved outside the United States that U.S. suits don't mean a thing. In other words, there's no effective retaliation through a U.S. legal suit. Similarly, Korea's legal system provides no help. On appeal to a special patent court, FICOM admits that they copied the product but argue the patent is invalid because the art is obvious; the Korean court agrees.

Form Factor is now appealing to the Supreme Court in a process that could go on for as many as 20 years, during which time their market share is declining.

Form Factor is now deciding where to put its next factory. Among the competing countries, Korea is putting a lot of pressure on them to put their next factory in Korea or to license the technology in Korea as a way of alleviating some of the problem with the intellectual property theft. Other countries are approaching Form Factor with attractive offers as well. Investing in Singapore, for example, might significantly lower Form Factor's base of cost because of their government's offer of a 20 year tax holiday, a capital grant, 50 percent free land, workers' training, thereby allowing them to spend more or out-invent their Korean competition.

The overall macroeconomic context is, as the previous panel noted, zero U.S. savings and a currency regime which is essentially managed. Korea and all of the other Asian countries intervene in the markets to keep their currencies undervalued vis-à-vis the dollar. I recently met with a high official in the Korean Ministry of Finance, who said the Korean won would not strengthen

any further because the government would not let it. Of course, the United States has a big trade deficit.

Igor came to Washington to enlist help from the federal government at the same time the United States is negotiating a free trade agreement with Korea. We went to visit U.S. officials at the Office of the U.S. Trade Representative, Commerce, State, and National Security Council to see if this could be added to the government agenda. We were negotiating a free trade agreement with Korea; the U.S. government surely would not want to sign a free trade deal while this is going on.

However, visits to all the likely suspects yielded little more than a perfunctory response: "Yeah, you're in the court. Do you have a good lawyer," and "Gee, have you thought of putting a plant in Korea?" or "Maybe you could actually go to Singapore. It would really reduce your cost basis."

The attitude of most U.S. policymakers is shaped by the paradigm that Ralph Gomory and William Baumol were talking about earlier; it is grounded by the belief that trade is always win-win. They argue that it doesn't matter where factories are located. While the current business and trade environment is unfortunate for companies like Form Factor, and the United States would prefer that Korean companies didn't rip off intellectual property, such developments are not considered really important for U.S. trade negotiations. U.S. policymakers do not view it as a life or death matter. One official said, "Look, I've got 2,000 companies coming here, and everybody wants to make their issue the make or break for the trade negotiations. If we do it that way, we'll never get a free trade deal." His thinking is formed by the assumptions behind the paradigm that Ralph Gomory and William Baumol discussed earlier.

As a result, the next factory of Form Factor and other similar, rapidly growing companies moves abroad. If one of them takes the Singapore offer, a fair amount of technology moves offshore, thereby creating an alternative location of potential comparative advantage. Fewer American workers are getting paid $40,000 a year, and so even if they wanted to save, they cannot because they do not have the wages anymore. Form Factor is still making high profits, but many of those profits are off shore. They are not taxable, so the U.S. budget and trade deficits grow bigger. This is what flows from a conjunction of the context described by Steve Roach and the thinking that has grown out of the neoclassical comparative advantage/free trade fusion.

What should U.S. policymakers do about it? First of all, it is ridiculous that the United States acquiesces in willingly outsourcing the management

of the value of the dollar to its Asian trading partners. We have the ability to have some influence on it. Japan and Korea are intervening in the currency markets. Both Japan and Korea should float their currencies and play by the rules. Japan is committed in the OECD to floating its currency and they must meet that commitment.

Secondly, Singapore is not alone in using financial incentives to attract investment. Many countries around the world do the same thing. U.S. states also rely on financial incentives. The U.S. government, however, does not, which is significant because meaningful tax holidays come primarily from national governments.

The currency manipulation and use of financial subsidies present a huge distortion of market forces. In the WTO, we have negotiations to control export subsidies. These investment incentives are nothing more than indirect export subsidies. The United States should negotiate in the WTO or bilaterally with countries such as Singapore (with whom we have a bilateral free trade agreement) so that everybody follows the same rules. We should negotiate bilaterally so that either they do not manipulate the market or they do it in a less aggressive manner. Otherwise, we need to engage the market in a similar way to remain competitive.

It is worth noting that the Economic Development Boards in Singapore, Malaysia, Ireland, France, and China all know about Form Factor. The company is only worth $400 million yet they are all fully aware of it. In fact, they send representatives to Livermore every other day to talk to Igor about where he's going to make his next investment. On the other hand, U.S. government officials were not aware of Form Factor and effectively don't really care where the company puts its next factory. That must change.

Edward Graham: The new theory being discussed today is that of William Baumol and Ralph Gomory, and most of what Paul Samuelson was talking about is the classical theories applied to the current situation. Both are tremendously interesting. They talk about high, fixed sunk costs of entry and scale economies. They discuss cost barriers to entry, but these are of the same nature as sunk costs, and that actually makes quite a difference. I did not see an actual specification of how William Baumol and Ralph Gomory are modeling scale economies in their book, but there is an underlying model.

This afternoon's discussion began with the description of a new theory by William Baumol and Ralph Gomory; their theory changes assumptions and

makes things a bit different than they are in the classical theory. They look at industries that are essentially Ricardian, where costs are determined by labor. They also discuss differing productivities.

Gauss' law: $\nabla \bullet D = \rho_f$

Gauss' law for magnetism: $\nabla \bullet B = 0$

Maxwell-Faraday equation: $\nabla \times E = \frac{\partial B}{\partial t}$

Ampere's circuital law: $\nabla \times H = J_f + \frac{\partial D}{\partial t}$

These are James Clerk Maxwell's[13] equations for electromagnetics, easily recognizable by physicists. When I was reading Maxwell, I was a little surprised to learn that Maxwell did not create these equations. What is referred to as Maxwell's equations are actually a later refinement of some theoretical ideas that Maxwell presented in the 1870s. Maxwell's original work does not include them. There is something similar there, but it is not as clean and it is not as elegant. Perhaps even more notable is that a great deal of the original Maxwell is plain wrong. That is the nature of the way theories progress. Good ideas are often enmeshed with some rather bad or plain wrong ideas.

Reading William Baumol and Ralph Gomory's book gave me a little of the same impression as reading Maxwell's work. Some of this theory is very good but some of it may prove ultimately to be wrong. These theories are very important and I come back to these theoretical issues because we need to sort them out.

I want to point out something else using the view graph. [Please see page 15 with graph]. The key question is: does that zone of conflict, also just referred to by Clyde, really exist? Baumol and Gomory show that this zone of conflict occurs where per capita incomes are close to being equal. It does not occur where the per capita incomes are quite far apart.

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13. James Clerk Maxwell (1831–1879), a Scottish mathematician and theoretical physicist whose most significant achievement was the development of the classical electromagnetic theory. His set of equations demonstrated that electricity, magnetism and even light are all manifestations of the same phenomenon: the electromagnetic field.

China came up a lot in the past session. The per capita income of China on a real basis, and correcting for purchasing power parity, is about U.S. $4,000 a year, maybe as high as U.S. $6,000 in some estimates. Nominally, it would be about U.S. $2,000 a year. The average per capita income in the United States is pushing U.S. $40,000.[14] There is obviously a huge gap. Using this model, China is clearly in the mutual gains region. The zone of conflict is with countries that are of approximately equal income, such as the European Union and Japan. Paul Samuelson made a very interesting statement earlier when he said that during the Victorian and Edwardian eras, innovations in the United States almost surely caused incomes in the United Kingdom to go down, but he was not sure that the same trend occurred in the Post-World War II era.

A significant portion of my work focuses on Korea. I agree that the problem described by Clyde is very real. The question is the myriad efforts by the Koreans to overcome these problems of sunk-cost scale economies. In many industries, including semiconductors, Korea has managed to overcome the sunk-cost barrier and achieve scale economies, which has certainly helped to grow their economy. But does Korea's economic growth force incomes down in the United States? Clyde's anecdote might suggest that it does at least in certain special cases; however, I have my doubts, if for no other reason than what Paul Samuelson was saying, leaving aside for the moment the stagnant wage issue, which has more to do with distribution than anything else.

The United States is still a rising ship. Why? My colleagues at the Institute for International Economics (IIE) would point out that the United States has significant productivity advances occurring throughout the economy. Sooner or later, those advances have to translate into general wage increases. But in the meantime, is there a zone of conflict between the United States and Korea, and does the model apply in this particular case? I am not sure that the empirical evidence for such an argument is very strong.

We also do not know what the counterfactual would be. In other words, had Korea not overcome these sunk-costs scale economies types of issues, would U.S. incomes be even higher than they are now? Has the potential for income to grow been undercut by Korea's performance? The question is almost impossible to answer. This is the critical issue because it directly relates to whether

14. $41,800 by the 2005 CIA World Factbook estimate.

these zones of conflict exist. Econometricians are all over the map on this debate. Ed Leamer (University of California), for example, thinks that trade has very significantly affected the distribution of income in the United States, if not the absolute level. There are others who strongly disagree.

What difference does China make? Someone noted that absolute size and scale make a difference. China, on an absolute scale, is a very big country with one-sixth of the world's population. According to this model, they fall in the mutual gains category. As their income rises, given their rates of growth, the United States will go into a zone of conflict-type situation with China. If there is a zone of conflict with China, it will create a set of problems that are of an order of magnitude larger than those that we have with Korea, or had with Japan in the past. That is a very large issue on which I am going to remain agnostic for the moment. We really have to consider the current and potential influence of China.

One final point on Maxwell's theory. There were a series of empirical observations that occurred, mostly in the late nineteenth, early twentieth centuries, that suggested the theory was not quite correct. It was replaced by Schrödinger's[15] Equation, his quantum interpretation of electromagnetics, and it completely upset the apple cart. Is the theory posited by Baumol and Gomory going to upset the apple cart in the way that Schrödinger did, or will it—as was the case of much of Maxwell's writings, be shown to be incorrect? We have not yet answered that question.

Thomas Palley: Baumol and Gomory's theory is an important contribution that has unfortunately been largely dismissed by the economics profession. For instance, Avinash Dixit and Gene Grossman, two leading trade theorists, wrote an article in *The Journal of Economic Perspectives (JEP)*[16] dismissing Samuelson's ideas. That is disappointing.

Ralph Gomory, William Baumol, and Paul Samuelson (GBS) are dealing with a critical question: what will be the future impact of international trade on U.S.

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15. Schrödinger's Equation, developed in 1926 by the Austrian physicist Erwin Schrödinger, explains the wave-like behavior of atomic particles, used in physics and chemistry to deal with problems about the atomic structure of matter. Testing it revealed the energy levels of atoms and the atomic structure of matter.
16. Avinash Dixit and Gene Grossman, "The Limits of Free Trade: Comment," *The Journal of Economic Perspectives* 19, no.3 (Summer 2005): 241–242.

national income? What does trade in the future mean for the United States? They are looking forward instead of looking back.

This is not about protectionism. How could it be? Paul Samuelson is one of the contributors to the Heckscher-Ohlin-Samuelson[17] model and one of the developers of modern trade theory. GBS believe there always are gains for all in trade. The issue is how the gains from trade and their distribution change over time. Will the United States receive more of the gains from trade in the future, or less? That's the big question.

Their question defines a whole new policy agenda about how to maximize our share of gains from trade, and how to hold onto those gains. That is not how economists have approached the trade debate in the past. GBS break new theoretical ground, which is very important because trade policy will not be changed by another empirical study showing how trade adversely affects wages, destroys manufacturing jobs, or causes trade deficits. A new theoretical argument is the needed step for change, and GBS have provided that.

Before turning to what is new about GBS's argument, I want to take two issues off the table, because they often get confused. Their critique is not about income distribution and compensation for employment losses. Questions about income distribution are still relevant to trade discussions but they are supplementary to the GBS argument. GBS's contribution is not about trade-induced job losses, wage losses, or job dislocations. The Institute for International Economics,[18] Lori Kletzer, and Howard Rosen have rightly talked a lot about wage insurance, but that is not the issue addressed by the theories of GBS. GBS are concerned with a larger issue: what do the future patterns of economic growth, technological advancement, and trade mean for U.S. gains from trade? How is comparative advantage evolving and what is its impact on the distribution of gains from trade?

How are gains from trade distributed? All economists agree that gains from trade depend on global demand and supply conditions. Strong global demand for a country's exports will drive up the price of the exported product, thereby increasing the country's share of gains from trade. Hypothetically, an increase in a

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17. The Heckscher-Ohlin-Samuelson model, developed by Eli Heckscher, Bertil Ohlin and Paul Samuelson, incorporates distributional issues in the context of international trade.
18. The Institute for International Economics has recently been renamed the Peterson Institute for International Economics in honor of former Secretary of Commerce and co-founder of the The Blackstone Group, Peter G. Peterson.

country's productivity can potentially result in a decline in gains from trade because it adds to global supply, driving down the price of its exports so that its gains from trade decline. Harry Johnson,[19] in 1954 and 1955, wrote two great papers on this, and his argument was later echoed by Jagdish Baghwati in 1958. Johnson and Baghwati were focused on commodity trade, and the empirical work of Raul Prebisch and Hans Singer[20] demonstrated that this was a real concern for developing countries because increased productivity in mining and agriculture contributed to falling commodity prices.

In the post-World War II era, the United States did very well from trade because there was a strong demand for capital goods and only a few suppliers. The question is whether this condition will continue. To answer this question, Paul Samuelson examines the implications of economic catch-up overseas and determines that if the catch-up is concentrated in export industries, then it could reduce the U.S. share of gains from trade. However, Samuelson's Act II in his JEP paper also shows that trade still benefits the United States but the benefit is smaller. Once China catches up with the United States, the U.S. share of gains from trade becomes smaller. I think a part of the reason why economists object to Paul Samuelson's JEP paper may be a little bit of envy. The theory already exists, but he saw how to apply it to the new issue of manufacturing catch-up (rather than rising productivity in mines and agriculture).

The United States loses because when the global supply of the things it exports increases, the price decreases. Thus, the United States does not automatically benefit when foreign countries develop, even though world income rises. I had always thought that when developing countries became more productive, everybody did better because the global production possibility frontier expanded. But it turns out

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19. Harry G. Johnson (1923–1977), British economist. *See* "Increasing Productivity, Income-Price Trends and the Trade Balance," *The Economic Journal* 64, No. 255 (Sep., 1954): 462–485; and "The Transfer Problem: A Note on Criteria for Changes in the Terms of Trade**,"** *Economica*, New Series, Vol. 22, No. 86 (May, 1955): 113–121.
20. Raul Prebisch, "The Economic Development of Latin America and Its Principal Problems," New York: United Nations, May 1950, originally published without attribution; republished with Prebisch as author in *Economic Bulletin for Latin America* 7, no, 1 (February 1962); H. W. Singer, "The Distribution of Gains between Investing and Borrowing Countries," *The American Economic Review* 40, No. 2, Papers and Proceedings of the Sixty-second Annual Meeting of the American Economic Association, (May 1950): 473–485.

that although the global production possibility frontier expands, the United States does not necessarily do better.

Gomory and Baumol examine a more realistic world in which there are increasing returns to scale. In their model, multiple equilibria are possible and the U.S. share of gains from trade vary with each of them. Their models also highlight an important finding—the country that produces first gets a head start and a bigger share of the returns from trade. It moves down the average cost curve, and then becomes the global producer.

There are corollary propositions that come from this. First of all, only by chance does the actual equilibrium maximize world income. A very inefficient country could start first, get a lead, become the low-cost producer, and then stay that way. But global income and welfare would be increased if global production were rearranged so that the truly efficient producer took over. Thus, there is a distinction between comparative advantage and what I call ruling comparative advantage. Countries acquire ruling comparative advantage by being first. The second important proposition from Gomory and Baumol's theory is that when there are increasing returns, equilibria are very fragile and can be changed by policies that give firms a chance to move down their cost curve. This means that there are several ways for a latecomer such as China or India to get ahead of the first mover, move down their cost curves, and become the dominant producer.

Understanding theory is critical to dealing effectively with the policy implications. Only by telling a different story will trade policy be changed.

GBS's theory means that the United States must now adopt a much broader trade policy agenda that deals with far more than just tariffs, subsidies, quotas, export taxes, and so on. Far more is at stake. U.S. policymakers have to focus on competitiveness and the forces driving a country's industrial and technical development. Most importantly, there is now the possibility of national rivalries and strategic policy as countries push competitiveness agendas. If one country adopts such policies and the other does not, the passive country can be outgamed and suffer large economic losses. This is new.

What are the policy implications of these new ideas? Ralph Gomory raised one issue that I want to address, which is the deep conflict between company interests and national interests. Many companies now operate on a global basis. Their actions maximize company profits, and they also maximize global out-

put and income. Maximizing profits makes sense because this is the fiduciary duty of companies. But a global company's actions do not maximize national income. General Motors (GM) may be maximizing global income and GM profits, but they are not maximizing U.S. income. This is no longer the GM of the 1950s, when what was good for GM was good for the United States. In the 1950s GM's profit objectives and interests aligned with national interests, albeit by accident. GM was not being altruistic; it was just that it had not yet become a global company. U.S. policymakers do not understand the implications of the new conditions.

Chinese corporations are, by comparison, compelled to internalize Chinese national interests. A Chinese shareholder does not do as well as a U.S. shareholder, but Chinese citizens do better than U.S. citizens overall, because Chinese national interests are internalized by Chinese corporations. The United States needs an agenda for realigning corporate and national interests.

Outsourcing is another area of concern. Companies are happy to outsource because they earn profits that they can then repatriate. But this potentially reduces the gains from U.S. trade. Boeing, for example, invests in China and then makes large profits on production in China. This is not necessarily good for U.S. national income. Education, science, and innovation are not enough, because even if innovations are developed domestically, the company might still seek to apply them offshore, rather than in new U.S. factories as they would have done 30 years ago.

Strategic policy also needs to be included on the trade policy agenda. In a competitive world, countries can use undervalued exchange rates to lower costs internationally and thereby displace the existing global leader. Exchange rates are not neutral; they can change the equilibrium in today's world.

Labor standards also matter. In China, for example, companies can exploit workers to lower labor costs, thus shifting down the whole average cost curve and potentially allowing the company to become the global low cost producer. Such a situation is not good for workers, but it can enable a company to take over an industry.

Domestic procurement can also be used to favor domestic suppliers. A country can use procurement policies to increase production and move down the average cost curve, and thereby capture global leadership in the industry.

In the United States, the financing of health and social insurance costs is a job cost. If they are funded from federal revenues instead, then it is no longer a

job cost, which would give U.S. companies some additional advantages and help remove their incentive for offshoring. Such a system can even be partially paid for by taxing the profits that companies earn offshore.

The U.S. policy debate must be restructured to address the concerns I have just described. I like to think of policy in terms of "structure" and "atmosphere." This is not about industrial policies for picking winners. Structure refers to national and international laws and rules that create the right business incentives. Atmosphere refers to economic conditions such as full employment, strong domestic demand, low interest rates, and competitively valued exchange rates, which together promote robust business performance.

Finally, there is a macroeconomic parallel to the above discussion. Gomory, Baumol, and Samuelson present a microeconomic critique of trade policy based on pure trade theory. Their arguments are bolstered by macroeconomics. GBS assume full employment and balanced trade, yet even with these assumptions they identify interesting new trade policy concerns. Unemployment, trade deficits, financial instability or the possibility of financial instability only serve to reinforce the types of policies that come out of their microeconomic analysis.

Phillip Swagel: Looking at the chapters on trade in my father's third edition of Paul Samuelson's economics textbook, published in 1955, I realized that trade and comparative advantage has been a long-time subject for Professor Samuelson. In his discussion of trade in the principles text of 1955, he talks about how the dynamic economy poses important caveats to the general trade model and the general idea of free trade. In the third edition, for example, he talks about the infant industry argument and similar things, all with a clear intellectual connection to his 2004 paper in the *Journal of Economic Perspectives*. Again, the general idea is that a dynamic evolution of the economy has an important impact on trade.

The downside that Professor Samuelson points out in his 2004 paper is that if China becomes competitive in terms of current U.S. exports, then the terms of trade will go against the United States; that is, the price of our imports will rise, and the price of our exports will decline. This will lead to less trade, and the United States will lose some of the gains from trade.

Until today, however, this has not been much of a problem. The data suggest the opposite trend of falling prices of U.S. imports; our terms of trade have been

getting better with increased trade, not worse. I spent three and a half years at the White House across the Clinton and Bush administrations working on trade policy among other things, and generally problems occurred when the price of imports was too low, not too high. Greg Mankiw[21] and I have another paper on the anti-dumping laws that goes through some of that policy debate.

It is worthwhile to talk about the gains from trade. Low import prices are typically good for the United States. The price of apparel and clothing, for example, is down about 10 percent since the Uruguay Round trade agreement took effect in 1995. The overall CPI [Consumer Price Index] is up somewhere between 30 and 40 percent over the same time period. Gains from trade are evident when the price of tradeables goes down. Anyone who buys a new suit, or new clothing, can see the gain right away. Some of us at the Council of Economic Advisers wanted to put a chart to that effect in the Economic Report of the President, but were told that it would be impolitic.

Trade has been good for the United States. Many people are hurt by trade, but overall the nation has gained. Even if the idea that changes in the world economy could be to the detriment of the United States remains a theoretically curiosity so far, the future is what matters. For anyone who is interested in outsourcing, Alan Blinder has a nice paper on this in *Foreign Affairs*,[22] which also is very much forward looking and is a nice counterpoint, I thought, to the one that Mankiw and I did.

Is there danger, and what should the United States do about it? This echoes an earlier debate in which trade theorists speculated that the future world would involve diminished trade flows, because countries would grow similar as a result of similar technologies leading to a smaller scope for trade. But this turned out to be completely wrong, because there is so much intra-industry trade, or similar products going back and forth between apparently similar countries.

The rise of global sourcing has given way to new types of trade, and now the majority of global trade is conducted within the boundaries of multinational firms. Sometimes this is seen as a problem. But if a problem cannot be solved, it is no longer a problem, but a fact of life. Global sourcing is a fact of life.

With today's discussion and earlier debates of this nature in mind, and with

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21. N. Gregory Mankiw and Phillip Swagel, "The Politics and Economics of Offshore Outsourcing," Harvard Institute of Economic Research Working Papers 2120 (Harvard Institute of Economic Research, 2006).
22. Alan S. Blinder, "Offshoring: The Next Industrial Revolution?" *Foreign Affairs* 85, no. 2 (March/April 2006): 113–128.

humility that the future cannot be predicted, what policies should the United States put in place? Washington policymakers should focus on actual problems, and not get distracted by symbolic issues. The number one priority is to keep the economy strong. In the 1990s, IT-enabled globalization (which preceded outsourcing) ramped up substantially, and the United States had a strong economy and strong job creation. The current account deficit got wider, and yet, we managed to be okay. Obviously there is strong disagreement on how to keep the economy strong, but there is consensus on the goal.

The second priority would be to keep an open trading system at home and with other nations. The United States must avoid burdensome regulation inside our borders, and reduce harmful barriers outside of them.

The third priority is to recognize that there are losers from trade, and to do something about it. Both inside and outside of government, there is broad support for improved policies aimed at adjustment. Gene Sperling's book,[23] among many others, has a great section about adjustment assistance. But somehow the adjustment policies never come together. There is also virtually unanimous consent that policy should focus not just on trade, but on adjustment broadly.

The fourth priority is to deal with the government's role to provide appropriate public goods such as education, infrastructure, national defense, the rule of law, research and development, and basic R & D. There is always a gray line about what constitutes basic or commercial research, and that is a source of problems. Markets must be allowed to choose the winning technologies. For example, the U.S. energy problem is hugely significant and there are many possibilities for future sources of energy. I am skeptical that even the best government officials with the best intentions can look over the horizon and choose the right one.

The idea that there is the possibility of multiple equilibria (in the context of trade policy) is very interesting. But I take great caution at trying to choose policies to affect which equilibria we prefer, decades into the future. I would avoid this activist interpretation of the theories, even though it seems to work at times. A couple years ago Europeans would point to Airbus, and argue that they really got it right; now Airbus's prospects look less appealing.

The United States must avoid distractions, namely from outsourcing and China. There is a page of charts in our paper, showing that the United States has a large and growing surplus in trade in business, professional, and technical services. The United States is therefore very good at outsourcing, and we are getting

23. Sperling, Gene, *The Pro-growth Progressive: An Economic Strategy for Shared Prosperity* (New York: Simon & Schuster, 2005).

better over time. A cynic might say, well, the more the better. Obviously, that is from the perspective of the whole economy, but not from the perspective of individuals. The people who are the losers clearly lose a great deal from outsourcing.

On China, much of the focus on the exchange rate issue is something of a distraction. The real concerns are dealing with China's theft of U.S. intellectual property with getting the Chinese economy to open up; and with getting the Chinese government to establish a social safety net to catalyze spending by Chinese families.

The most important thing is for us to focus on the issues that matter for trade, and not to get distracted by issues that do not matter as much.

Paul Solman: We have heard about macro policy, its potential limits, and a number of other ideas here. The general way that Tom conceptualized his argument, both in terms of structure and atmosphere (an interesting and provocative word), was very helpful.

The discussion always returned to education. Clyde, should the United States be investing more in education?

Clyde Prestowitz: Education is certainly a huge problem. But the reason it comes up all the time is because it is an easy way to avoid addressing the larger issue. A better U.S. education system is critical but it is not going to address the issues that Ralph raised and that Tom explicated. It is a necessary, but insufficient condition.

Monty Graham: But the United States is significantly under-investing in education, a necessary condition. It is not a way of avoiding the problem, because it is a problem that requires a meaningful solution.

Paul Solman: But how does the United States address the trade problem by muscling with its trading partners?

Clyde Prestowitz: I do not think that is necessary or a logical next step. I discussed two things that are perfectly within the normal negotiating boundaries. They had nothing to do with muscle. They had to do with changing U.S. policies.

Capping Singapore's financial incentives is not being tough on them. Asking the Japanese to abide by their commitments in the OECD is fair and rules-driven.

Paul Solman: Is it really fair to Japan? It may not be mean or unfair but it would be tougher than we are currently being on them.

Clyde Prestowitz: In the mid 1990s, Mickey Kantor [first U.S. Trade Representative under President Clinton] threatened 301 sanctions on imports of Lexuses. That is being tough and I did not support that. But asking the Japanese to just do what they said they are going to do in the OECD is not being tough.

Phillip Swagel: Asking countries to live up to their agreements is the correct course.

Paul Solman: I do not disagree with that. Tom, what about education?

Thomas Palley: Yes, the United States has to do more on education, but there are many more areas that demand attention as well.

Phil Swagel: Training and education are another concern. The United States seems to have two education systems: preschool through high school, and the post-secondary school systems. The problem appears to be in the former.

Even community colleges are doing pretty well. The research that I am aware of is that spending a year or two at community college yields roughly the same return as spending a year or two at a four-year university.

Paul Solman: Right, in terms of the actual economic effect.

William Baumol: I have heterodox views on education. Most of the breakthroughs of innovation that we experienced in the past two centuries were made by Thomas Edisons who dropped out of school at twelve. The Wright brothers never went to high school. The world's education system threatens imagination and creativity.

The United States spends billions of dollars on education without conducting any controlled experiments to find out what works. I was once talked into teaching new math to high school teachers and it turned out to be a complete waste of time. We have fashion after fashion in education, irresponsibly not trying to find out what works.

Pouring more money into education without careful analysis and experimenting is a crime, not a desirable policy.

Ralph Gomory: The focus on the science scores in K through 12 is utter nonsense. Michael Teitelbaum[24] has noted, for example, that twelfth grade statistics are very questionable.

Obviously, everyone wants more education. But policymakers have to do a cost-benefit analysis and ask how much value is received for the value expended.

There is a lot of fuss about the United States falling behind scientifically. But that trend is not so clear. Furthermore, the notion that what students get from their high school education is the ability to score on facts is quite dangerous. Students ought to come out with their imaginations uninjured, a willingness to do things, and their interests still alive. If the government were really interested in doing something about training more scientists well, the time and place to do it is in the student's first and second years of college, which is when about sixty percent of the students drop out.

The federal government has enormous leverage on universities and colleges because many of them are significantly supported by the government. On the other hand, the government has no leverage except through legal action to deal with problems in the K through 12 system. But where there is the big drop out, no one is willing to act because that would be touching the universities.

Online learning is not being used even though it is particularly appropriate for the trade situation, where the American worker needs to be strengthened. Technology is simply ignored in this regard, even though it is about equal to, or maybe even a little better than, the classroom. In other words, college courses with the same pupil to professor ratio, whether in the classroom or online, get the same result. It is counter-intuitive, but true, and millions of people have done it.

Online learning is also a much cheaper form of education because it is less expensive to give the course, and because workers can go on working. They are not asked to give up everything for two or four years to be able to get a degree. There is enormous potential for educating the U .S. workforce, and the only thing the federal government has done so far is make sure that the grants available to full-time students are not available to part-time students, the exact reverse of what should be happening.

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24. Michael Teitelbaum is a prominent demographer and Vice President of the Alfred P. Sloan Foundation in New York.

Paul Solman: Ralph and Will, because of your book, you have obviously thought a great deal about the implications of the analysis. The key message that I got from the book is that the productivity of U.S. industries, and therefore of the United States as a whole, must go up. How do policymakers encourage these increases in productivity?

Ralph Gomory: Policymakers have to ask, "What do you get back for the money put in?" For now, they will get very little with most of the things that are proposed. In the case of education, we need a kind of GI bill that sends motivated people to college while they are working. In the competition against the rest of the world, our workers are the soldiers. If they are willing to put their time and energy into it, why doesn't the government help them? They can go on working, which makes it possible for them to improve their skills and productivity. There may be things imperfect with this idea, but it is the kind of departure from the ordinary that the government should be looking for.

William Baumol: There is also the great problem of at-risk children that come heavily from particular ethnic groups. There again, the government tosses money at the problem and develops policies in the same way medical cures were designed in the 18th century, without a shred of evidence as to what works. It is an absolute crime when there are so many millions of children at stake, the government does not begin to collect the relevant data to conduct controlled experiments to begin to find out what really constitutes education instead of just carrying them through school.

Focusing solely on macro policies is also misleading because growth is as much a matter of micro policy as macro policy. The Washington consensus is all about macro policy, which is one of the reasons it has failed so consistently. For example, the United States has a remarkable innovation record, demonstrated by several factors including the U.S. lead in patent production and the numbers of its Nobel Prizes, because for a large sector of the economy, the firm is faced with innovation as a matter of life and death. It has become what one economist called "a Red Queen game" in which a company has to run or improve as fast as it can in order to stand still. Measures that will enhance the power of that Red Queen game and force the firms to fight harder and harder to beat their competitors in the innovation game will be something that is a gain for them, but above all, a gain for the whole of the United States.

Paul Solman: Are you talking about things like Sematech, the semiconductor consortium in the 1980s, where the United States actually took steps towards trying to make companies in America more competitive?

William Baumol: Absolutely not. I am as against picking winners as just about everyone else because we fail at that game.

Paul Solman: How does the United States become more productive?

William Baumol: The easy entry of entrepreneurs is very important, and if the government wants to subsidize it, it should offer guarantees to banks and let the banks, not the government, pick the winners.

Paul Solman: By micro you are talking about both microeconomic and micro as in small.

William Baumol: Yes, but also in terms of the giant oligopoly firms, which are one of the great sources of innovative improvement. Look at how much Intel increased the speed of the computer chip over 30 years, with an approximately three million percent increase in speed by little innovative improvements, year after year. Why did Intel do it? I have spoken to more CEOs who tell me their nightmare is not better advertising by their competitor or lower pricing but rather failing to develop a better computer chip before their competitors do. That is the nature of a powerful Red Queen game. Make sure that those oligopolies compete in terms of innovation.

Thomas Palley: We need to get away from thinking in terms of either macro or micro policy. The United States needs both good micro policy and good macro policy. In a hierarchy of things, macroeconomic policy would take precedence. There's a famous saying by James Tobin, "It takes a heap of Harberger triangles to fill an Okun gap." Inefficiencies in microeconomics are much less costly to an economy than a business cycle downturn, a macroeconomic inefficiency. That same logic applies to the story of growth.

The United States needs investment to grow. That is what really drives growth. All studies show that productivity growth is closely tied to investment. Innovation comes with investment.

That raises the question of how a country promotes investment in its economy?

I completely disagree with what Stephen Roach said earlier about saving. There is no savings shortage in this economy. Corporate profits are at records and companies are buying back stock at unheard of levels. These companies are not short of money. The United States is coming off a period of the lowest interest rates in 40 years. According to the economic logic of savings shortage proponents, interest rates should have been far higher if there really were a savings shortage.

The real problem is the pattern of demand. There is a global shortage of demand, and the pattern of demand is also wrong. There is a lot of demand coming from the United States, but it is going for goods produced in China instead of goods produced domestically. The United States needs investment and that means it needs incentives that get U.S. companies to invest and put their factories in the United States. That means keeping interest rates low. But it also means, most critically, a change in exchange rates and a depreciation of the dollar. Moreover, such a depreciation cannot be a temporary reduction. It has to be permanent and credible so that business managers will believe that the exchange rate is going to remain stable and keep their investments competitive in the future, thereby justifying putting a plant here. If managers do not believe that, they will not invest in the U.S. even if the exchange rate comes down.

There is no savings shortage in the United States. Instead, the United States has to get its macroeconomic prices (interest rates and exchange rates) right. That is what really drives an economy. The country has done pretty well on interest rates—perhaps even too well as there are indications of a housing bubble in places and that can be very costly—but we have done terribly on exchange rates.

William Baumol: Macro policies are important, but you have the cart before the horse. During the Industrial Revolution, it was a young British student who described it as a wave of new gadgets, and look how little financial investment or education was involved in that process. The economy is driven by the flood of new inventions that was drawn to our attention by Bob Solow's investigations and those that followed. Investment and macro policies play a role, but

without the breakthroughs of ideas, the United States would have experienced the growth rates of the Renaissance, not those of the Industrial Revolution.

Thomas Palley: I completely agree. Innovations and engineering genius powered the Industrial Revolution. But that was 250 years ago. There is a different industrial structure today, defined by oligopolies, large companies, and R&D labs. That is where research and development occur today, and we need to encourage it in the United States. The current problem is the pattern of incentives. Because macro prices are poorly set, companies have an incentive to locate these activities offshore. As manufacturing is offshored, more and more R & D is following. What worked 250 years ago does not work today because it is a different world and that must be taken into account.

Monty Graham: I disagree quite strongly with Tom on the glut of savings argument. The reason interest rates are low and that there is so much savings is that the United States is importing all the savings from abroad. That was much of the point of this morning's discussion and it is a fact. Household savings are negative and corporate savings are not quite what they say.

The best single measure of whether Tom is correct about firms putting plants in the United States versus abroad is to look at direct investment figures. He is right by a tail. U.S. firms have been investing slightly more abroad than foreign firms have been investing in the United States, but the gap isn't very big.

Thomas Palley: Both of those points are dead wrong.

Monty Graham: The fact is not wrong. Maybe the interpretation is.

Thomas Palley: The reason interest rates were at 40-year lows three years ago was because of the Federal Reserve. It has nothing to do with China. In my view the major driving force behind interest rates in the U.S. economy is the Federal Reserve, and it is the Federal Reserve that pushed rates down. China's impact has been marginal, and it concerns the slope of the yield curve which they have lowered by buying long-term bonds.

With regard to foreign direct investment, foreigners are buying existing plants and equipment. The United States is interested in green field new plant construc-

tion. If Daimler-Benz buys Chrysler, it just takes over all the existing plants and does not add a single job or machine. It is only a change of ownership.

Monty Graham: Look at the new capital investment figures and see if it supports your point.

Paul Solman: I was going to stick up for Steve Roach and note that trade balance and current account are basically the same thing. It equals saving minus investment. Either the United States has more investment than saving, or less saving than investment. It is the same thing. So I am not sure how to interpret what was just said in the context of the accounting identity that governs all of us.

Monty Graham: We need a savings forum. Those are the two big issues today.

Kent Hughes: Today's program has usefully raised the question of savings and a number of other key concerns. The panelists and the presenters have challenged our current thinking about trade and added to our understanding of the shifting nature of comparative advantage and the multidimensional nature of the economic future. I am especially grateful to Paul Solman whose questions drew out key details but also helped us put individual pieces into an understandable whole.

The end of today's conference does not mean the end of today's discussion. We are going to continue the conversation on new thinking about the economic future in future conferences so that together, we can clarify the key choices that face today's decisionmakers.

Biographies

WILLIAM J. BAUMOL is the Harold Price Professor of Entrepreneurship and Academic Director of the Berkley Center for Entrepreneurial Studies in the Stern School of Business at New York University; and senior economist and professor emeritus at Princeton University.

He is past president of the American Economic Association, the Association of Environmental and Resource Economists, the Eastern Economic Association, and the Atlantic Economic Society. His honors and awards include eleven honorary degrees and membership in the U.S. National Academy of Sciences, the American Philosophical Society, the Accademia Nazionale Dei Lincei (Italy) and the British Academy.

Dr. Baumol is the author of more than 35 books and over 500 articles published in professional journals. Some of his relatively recent books include: *Contestable Markets and the Theory of Industry Structure* (with R.D. Willig and J.C. Panzar), 1982, 1987; *Productivity and American Leadership: The Long View* (with S.A. Batey Blackman and E.N. Wolff), 1989; *Entrepreneurship, Management and the Structure of Payoffs*, 1993; *Global Trade and Conflicting National Interests* (with Ralph E. Gomory), 2000. *The Free-Market Innovation Machine: Analyzing the Growth Miracle of Capitalism*, 2002; *Downsizing in America* (with Alan S. Blinder and Edward N. Wolff), 2003; *Growth, Industrial Organization and Economic Generalities*, 2003 (collected papers); *Economics: Principles and Policy*, 10th edition (with Alan S. Blinder), 2005.

Dr. Baumol received his B.S.S. at the College of the City of New York in 1942 and his Ph.D. at the University of London in 1949.

RALPH E. GOMORY has been President of the Alfred P. Sloan Foundation since June 1989.*

Dr. Gomory was Higgins Lecturer and Assistant Professor at Princeton University, 1957–1959. He joined the Research Division of IBM in 1959,

* In December 2007, Gomory became President Emeritus.

was named IBM Fellow in 1964, and became Director of the Mathematical Sciences Department in 1965. He was made IBM Director of Research in 1970 with line responsibility for IBM's Research Division. He held that position until 1986, becoming IBM Vice President in 1973 and Senior Vice President in 1985. In 1986 he became IBM Senior Vice President for Science and Technology. In 1989 he retired from IBM and became President of the Alfred P. Sloan Foundation.

Dr. Gomory has served in many capacities in academic, industrial and governmental organizations, and is a member of the National Academy of Science, the National Academy of Engineering, and the American Philosophical Society. He was elected to the Councils of the three societies. He was a Trustee of Hampshire College from 1977–1986 and of Princeton University from 1985–1989. He served on the President's Council of Advisors on Science and Technology (PCAST) from 1984 to 1992, and is presently a member of PCAST and of COSEPUP, the National Academies' Committee on Science, Engineering and Public Policy.

He has been awarded seven honorary degrees and many prizes including the Lanchester Prize in 1963, the John von Neumann Theory Prize in 1984, the IEEE Engineering Leadership Recognition Award in 1988, the National Medal of Science awarded by the President in 1988, the Arthur M. Bueche Award of the National Academy of Engineering in 1993, the Heinz Award for Technology, the Economy and Employment in 1998, the Madison Medal Award of Princeton University in 1999, and the Sheffield Fellowship Award of the Yale University Faculty of Engineering in 2000.

Dr. Gomory has been director of a number of companies including The Washington Post Company and the Bank of New York. He is currently a director of Lexmark International, Inc., and of two small start-up companies. He was named one of America's ten best directors by Director's Alert magazine in 2000.

Dr. Gomory's research interests include integer and linear programming, nonlinear differential equations, and computers. In recent years, while continuing his mathematical research, he has written on the nature of technology and product development, industrial competitiveness, technological change, and on economic models involving economies of scale. He is the author of a recent MIT Press book (with Professor William J. Baumol) on conflicts in international trade.

Dr. Gomory received his B.A. from Williams College in 1950, studied at Cambridge University and received his Ph.D. in mathematics from Princeton University in 1954. He served in the U.S. Navy from 1954 to 1957.

EDWARD M. GRAHAM is a Senior Fellow at the Institute for International Economics.*

Dr. Graham has been an adjunct professor at Columbia University in New York since 2002, where he teaches a course in international trade. Previously he was associate professor in the Fuqua School of Business at Duke University (1988–1990), associate professor at the University of North Carolina (1983–1988), principal administrator of the Planning and Evaluation Unit at the OECD (1981–1982), International Economist in the Office of International Investment Affairs at the US Treasury (1979–1980), and assistant professor at the Massachusetts Institute of Technology (1974–1978).

Dr. Graham is the author, co-author, or co-editor of a number of books, including *US National Security and Foreign Direct Investment* (2006), *Does Foreign Direct Investment Promote Development?* (2005), *Multinationals and Foreign Investment in Economic Development* (2005), *Reforming Korea's Industrial Conglomerates* (2003), *Fighting the Wrong Enemy: Antiglobal Activists and Multinational Enterprises* (2000), *Global Competition Policy* and *Competition Policies in the Global Economy* (1997) with J. David Richardson, *Global Corporations and National Governments* (1996), and *Foreign Direct Investment in the United States* (3d ed. 1995) with Paul R. Krugman. He is also author or coauthor of about 100 articles appearing in the academic and financial literature.

He holds degrees of Doctor of Business Administration (DBA) and Master of Business Administration (MBA) from Harvard University and SB (physics) from Massachusetts Institute of Technology. In his spare time, he currently is writing a history of quantum physics from Maxwell to Dirac.

KENT H. HUGHES is the Director of the Program on Science, Technology, America and the Global Economy (STAGE) at the Woodrow Wilson International Center for Scholars. Prior to joining the Center, Dr. Hughes served as the Associate Deputy Secretary at the U.S. Department of Commerce. At Commerce, he worked to define and implement a long-term competitiveness strategy emphasizing the close links among trade, technology and training.

Before joining the Clinton Administration, Dr. Hughes served as President of the Council on Competitiveness, an action-oriented leadership organization composed of chief executives from America's business, labor and academic

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communities. Under Dr. Hughes' leadership, the Council took the lead in putting technology policy on the national agenda.

Previously, Dr. Hughes held a number of senior positions with the U.S. Congress, where he focused on international economic issues and the question of long-term American economic strength. Among other positions, Dr. Hughes has served as Chief Economist to U.S. Senate Majority Leader Robert Byrd, Senior Economist of the Congressional Joint Economic Committee and Legislative and Policy Director in the office of U.S. Senator Gary Hart during the Senator's first presidential campaign. Prior to his congressional service, Dr. Hughes served as a staff attorney for the Urban Law Institute, a poverty law firm established to provide counsel to national and local groups. He was also an International Legal Center Fellow and Latin American Teaching Fellow in Brazil where he worked on a reform of Brazilian legal education.

Dr. Hughes holds a Ph.D. in economics from Washington University, a LL.B. from Harvard Law School and a B.A. in Political and Economic Institutions from Yale University. Dr. Hughes has written several articles and books, including: "View from Brazil: Ending Their Dependence on Foreign Oil," *TransAtlantic* (May/June 2006), "A View from America: Demography and Deficits: Cowboys and Pioneers," *TransAtlantic* (September/October 2005), "Facing the Global Competitiveness Challenge," *Issues in Science and Technology* (Summer 2005), *Building the Next American Century: The Past and Future of Economic Competitiveness* (Woodrow Wilson Center Press, 2005) and *Trade, Taxes, and Transnationals: International Economic Decision Making in Congress* (Praeger, 1979).

THOMAS PALLEY was formerly the Chief Economist with the U.S.–China Economic and Security Review Commission. Prior to joining the Commission he was Director of the Open Society Institute's Globalization Reform Project, and before that he was Assistant Director of Public Policy at the AFL-CIO.

Dr. Palley has recently started a project, Economics for Democratic & Open Societies. The goal of the project is to stimulate public discussion about what kinds of economic arrangements and conditions are needed to promote democracy and open society.

Dr. Palley is the author of *Plenty of Nothing: The Downsizing of the American Dream and the Case for Structural Keynesianism* (Princeton University Press, 1998) and *Post Keynesian Economics* (St. Martin's Press, 1996). He has also published articles in numerous academic journals, and written for *The Atlantic Monthly, American Prospect* and *Nation* magazines, including: "External Contradictions

of the Chinese Development Model" (*Journal of Contemporary China,* February 2006); "The Questionable Legacy of Alan Greenspan" (*Challenge*, November–December 2005); "The Economic Case for International Labor Standards" (*Cambridge Journal of Economics*, January 2004); and "Asset Price Bubbles and the Case for Asset-Based Reserve Requirements" (*Challenge*, 2003).

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Prior to founding ESI, Mr. Prestowitz served as counselor to the Secretary of Commerce in the Reagan Administration. There, he led many U.S. trade and investment negotiations with Japan, China, Latin America, and Europe. Before joining the Commerce Department, he was a senior businessman in the United States, Europe, Japan, and throughout Asia and Latin America. He has served as vice chairman of the President's Committee on Trade and Investment in the Pacific and sits on the Intel Policy Advisory Board and the U.S. Export-Import Bank Advisory Board. He is also an adviser to FedEx, a member of the American Management Association's International Advisory Board, and a member of Newsweek's Technology Advisory Board.

Mr. Prestowitz regularly writes for leading publications, including *The New York Times*, *Washington Post*, *Fortune*, and *Foreign Affairs*. He is the author of the best-selling books *Trading Places*, on U.S.-Japan relations, *Rogue Nation*, on American unilateralism, and *Three Billion New Capitalists: The Great Shift of Wealth and Power to the East*, which deals with the economic rise of Asia and the upcoming rebalancing of the world economic order, and its impact on the United States. He is also co-author and editor of several other books on international trade and business strategy including *Asia After the Miracle; Powernomics; Bit by Bit;* and *The New North American Trade Order.*

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Dr. Roach has been widely recognized as one of Wall Street's most influential economists. His published research has covered a broad range of topics, with recent emphasis on globalization, the emergence of China, productivity, and the capital market implications of global imbalances. He is widely quoted in the financial press and other media, and his work has appeared in academic journals, books, congressional testimony, and on the op-ed pages of the world's leading newspapers.

Before joining Morgan Stanley in 1982, Dr. Roach was Vice President for Economic Analysis for the Morgan Guaranty Trust Company in New York. He also served on the research staff of the Federal Reserve Board in Washington, D.C. from 1972–1979 where he supervised the preparation of the official Federal Reserve projections of the U.S. economy. Prior to that, Dr. Roach was a research fellow at the Brookings Institution in Washington, D.C.

Dr. Roach holds a Ph.D. in economics from New York University and a Bachelor's degree in economics from the University of Wisconsin.

PAUL A. SAMUELSON is Institute Professor Emeritus at the Massachusetts Institute of Technology. Dr. Samuelson was an economic advisor to Presidents Kennedy and Johnson, and has been a consultant to the Federal Reserve, U.S. Department of Treasury, and the Congressional Budget Office. He was an early contributor to the new modern theory of finance and received America's first Nobel Prize in Economics in 1970.

Dr. Samuelson now serves on the Finance Committee of the National Academy of Sciences. He has served as a Trustee of TIAA-CREF. He is a member of the American Academy of Arts and Sciences and a fellow of the American Philosophical Society and the British Academy. He is also a member and past President of the American Economic Association, the Econometric Society, and the International Economic Association.

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Dr. Samuelson was Professor of International Economic Relations at the Fletcher School of Law and Diplomacy at Tufts University in 1945. He was a Guggenheim Fellow from 1948–1949. He has received numerous honorary degrees, including from the University of Chicago, Harvard University, and many foreign universities. He was awarded the David A. Wells Prize by Harvard University and earned the first John Bates Clark Medal from the American Economic Association.

Aside from having authored a best-selling introductory economics textbook, *Economics* (1948, 2005), translated into more than forty languages, Dr. Samuelson wrote *Foundations of Economic Analysis* (1947; enlarged edition 1983). Five volumes of *The Collected Scientific Papers of Paul A. Samuelson* (1966-1986) have appeared and sixth and seventh volumes are in preparation. With Robert Solow and other joint authors he has also contributed to several dozen books on economic theory and policy, such as *Linear Programming and Economic Analysis*.

Dr. Samuelson has contributed over 200 columns in *Newsweek* magazine alone and his articles have also appeared in over twenty journals, newspapers, and magazines, including the *American Economic Review*, *Christian Science Monitor*, *Econometrica, Economica, Financial Times, Handelsblad, Journal of Economic Perspectives, Journal of Economic Theory, Journal of Political Economy, Quarterly Journal of Economics, Review of Economic Studies,* and *Review of Economics and Statistics.*

Dr. Samuelson received his B.A. from the University of Chicago and his M.A. and Ph.D. from Harvard University.

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Sen. Sarbanes first began his public service as a member of the Maryland House of Delegates. He then served as a Congressman from the Third Congressional District for three terms. He has served in the United States Senate since 1977, where he is the Ranking Member of the Senate Banking, Housing and Urban Affairs Committee, and is a senior member of the Foreign Relations, Budget and Joint Economic Committees. Elected to an unprecedented 5th term to the United States Senate in 2000, Sen. Sarbanes is Maryland's longest serving U.S. Senator.

In response to the failure of Enron Corporation in 2001, which at the time was the 7th largest public company in the United States, Sen. Sarbanes, in his capacity

* Senator Sarbanes retired from Congress at the end of his term in January 2007.

as Chairman of the Senate Banking, Housing, and Urban Affairs Committee, held a series of comprehensive hearings. The hearings resulted in the July 2002 passage of "The Public Company Accounting Reform and Investor Protection Act," better known as the Sarbanes-Oxley Act. This bi-partisan bill was designed to reform the accounting industry and restore the investor confidence that had been eroded following the collapse of Enron.

In June 2003, Sen. Sarbanes received the Paul H. Douglas Ethics in Government Award from the University of Illinois. He was also recipient of the "Rolfe Award for Extraordinary Impact on Policy in Economics, Business and Finance," from the Women's Economic Roundtable in November 2003, and the "Cox, Coleman, Richardson Award for Distinguished Public Service," from Harvard Law School in March 2004.

Sen. Sarbanes received his A.B. from Princeton University. As a Rhodes Scholar at Balliol College, Oxford, England, he received his First Class B.A. Sen. Sarbanes also has a J.D. from Harvard Law School.

PAUL SOLMAN is the Business and Economics Correspondent for The *NewsHour* with Jim Lehrer since 1985.

Mr. Solman is the founding editor of the alternative Boston weekly *The Real Paper* (1972). He began his career in business journalism as a Nieman Fellow, studying at the Harvard Business School in 1976. He has been a business reporter for public broadcasting since 1977 and was the co-originator and executive editor of PBS's business documentary series, *Enterprise*.

Mr. Solman's reporting has won Emmys for four decades, from the 1970s through the present. He has also received two Peabody awards, the most recent in 2004 for his reporting on the undercounting of unemployment.

Mr. Solman has also served on the Harvard Business School faculty, teaching media, finance and business history. He co-authored *Life and Death on the Corporate Battlefield* (1983), which appeared in Japanese, German, and a pirated Taiwanese edition. He lectures occasionally on college campuses and has written for numerous publications, including both *Forbes* and *Mother Jones*. Mr. Solman was named a member of *TV Guide*'s "Dream Team" of television reporters. A one-time cab driver, kindergarten teacher and management consultant, Paul is also the presenter for and author of "Discovering Economics with Paul Solman," a series of videos released in 2004 by McGraw-Hill to accompany the company's introductory economics textbooks.

PHILLIP L. SWAGEL* is a Resident Scholar at the American Enterprise Institute (AEI), where he focuses on international trade and financial policy. He joined AEI after more than two years as chief of staff at the White House Council of Economic Advisers. Dr. Swagel previously served as the senior economist for international trade at the Council, a visiting assistant professor at Northwestern University, and an economist at the Federal Reserve Board and the International Monetary Fund. He also teaches international finance and macroeconomics as an adjunct professor at the University of Chicago Graduate School of Business.

Dr. Swagel has published on a range of topics, including international trade policy, international finance, and the political economy of taxation and the welfare state. His articles have appeared in the *American Economic Review,* the *Journal of Political Economy, Foreign Affairs*, and the *Wall Street Journal*.

Dr. Swagel received his AB from Princeton University and his M.A. and Ph.D. from Harvard University.

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* In December 2006, he became Assistant Secretary for economic policy at the Treasury Department.

APPENDIX I

Global Trade and Conflicting National Interests

by Ralph Gomory and William Baumol

CHAPTER ONE – THE MODERN GLOBAL ECONOMY AND INHERENT TRADE RIVALRY: INTRODUCTION

Some of the truths most dear to the hearts of economists are those that clash with the practical intuition of those not trained in the field. It does not require special training to see that foreign competition can put some domestic jobs in danger, or that once vibrant home-grown industries sometimes succumb to foreign competitors who can make the goods they once produced more cheaply or better. International trade sometimes leads to the contraction or even loss of some industries, even significant ones such as automobiles or consumer electronics, and can therefore cause hardship and unemployment. But economists generally maintain that such localized pain is more than compensated for by the availability of better automobiles or compact disc players to the large consuming public.

This conclusion rests to a considerable extent on time-honored and simple models of international trade. These models map out a world in which, through the unrestrained exchange of goods with all the gain that entails, each nation ends up producing the goods at which it is *naturally* best, compared to the other countries and products, and all the nations participating in trade benefit from the exchange of the goods thus efficiently produced. While the simplicity of these models has often been attacked as a weakness, we must realize that no model of large-scale economic activity can encompass the true complexity of reality. Economics can offer valuable insights only by focusing on a few essential aspects of any situation it analyzes-those aspects that are most important for the matter that is being studied-and by disregarding the myriad other influences that are present but whose role is not vital for the subject.

However, it is also true that in the time since these basic models of international trade were first formulated, there have been major changes in the world economy. David Ricardo's world of agriculture, slow-moving technology, and tiny businesses have been replaced by a world dominated by manufactured goods, rapidly evolving technology, and huge firms. This calls for re-examination of those classical models, and such a re-examination has indeed been under way in the economic literature.

In this book we will show that the classical trade models, on which so much has been built, are quite resilient and adaptable to the new conditions of the world economy. The models can be modified in ways that preserve their essential simplicity, to reflect both the effect of largescale economic activity and the rapid diffusion of technology.

However, as modified by us, the theory shows that there are in fact *inherent conflicts in international trade.* This means that it is often true that improvement in one country's productive capabilities is attainable only at the expense of another country's general welfare. An improvement in the productive capability of a trading partner that allows it to compete effectively with a home-country industry, instead of benefiting the public as a whole, may come at the expense of that home country overall. And this harm is not the localized damage previously mentioned, loss of jobs in the immediately affected industry, but an adverse effect that is felt throughout the home country.

When does development abroad help and when does it harm? Put somewhat loosely, our central conclusion is that a developed country such as the United States can benefit in its global trade by assisting the substantially less developed to improve their productive capability. However, the developed country's interests also require it to compete as vigorously as it can against other nations that are in anything like a comparable stage of development to avoid being hurt by their progress.

More carefully put, we will show that an industrialized country will benefit if a *very underdeveloped* trading partner acquires new industries and generally improves its productivity. It will continue to benefit until that partner reaches a level of development that enables it to play a more substantial role in the global marketplace. Usually this level of development is still very substantially lower than that of the industrialized country, but it is nevertheless a significant turning point. After this point acquisition of more industries by the newly developing partner *becomes harmful* to the more industrialized country. That country's interests are then best served by competing vigorously to maintain undiminished its

still substantial advantage over the newly emerging rival. To the extent it fails to do so its economic prosperity will be diminished. Thus U.S. interests are served by progress in trading partners such as India or Indonesia, but the United States is better off staying as far ahead as possible, in terms of productivity, of trading partners like France, Germany, or Japan.

The underlying reason for these significant departures from the original model is that the modern free-trade world is so different from the original historical setting of the free-trade models. Today there is not one uniquely determined best economic outcome based on natural national advantages. Today's global economy does not single out a single best outcome, arrived at by international competition in which each country serves the world's best interests by producing just those goods that it can naturally turn out most efficiently. Rather, there are *many possible outcomes* that depend on what countries actually choose to do, what capabilities, natural or human-made, they actually develop.

These outcomes vary in their consequences for the economic wellbeing of the countries involved. Some of these outcomes are good for one country, some are good for the other, some are good for both. But it often is true that the outcomes that are the very best for one country tend to be poor outcomes for its trading partner. The existence of this range of outcomes, with such different consequences for the countries involved, implies that in a modern free-trade environment a country's welfare is critically dependent on the success of its industries in international trade. The country as a whole has a vital stake in the competitive success or failure of its industries.

1.1 MULTIPLE ECONOMIC OUTCOMES—LARGE-SCALE INDUSTRY AND HIGH START-UP COSTS

In the unmodified classical model the economic outcomes for trading countries tend to be unique. Free-market forces, including free international competition, will determine what goods are made where. From this unique outcome also flows a fixed and theoretically predictable degree of prosperity for each country. A country that ends up producing little of value will have little to consume at home and little to trade abroad, and will have a low standard of living.

A well-known and appropriately antique example, taught to generations of economics students by generations of economics professors, illustrates the point: If England and Portugal trade wine and cloth, Portugal, because of its natural advantages, will end up as the producer of wine, and England as

the producer of textiles. Matters *will* never go the other way around. England's relatively sunless slopes will not produce grapes in either the abundance or quality that will enable English winemakers to out-compete the Portuguese either in price or quality. As a result English winemakers will not be able to remain in business unless the demand for wine exceeds Portugal's capacity to produce it. But England's wooly sheep, and long-established clothmaking capabilities, give it a relative advantage in textiles that does enable it to succeed in that business.

As this example illustrates, which country makes what product is generally uniquely determined in the classical economic model of trade. And that outcome always serves the economic interests of the general public in all the countries involved because a country can be the prime supplier in an industry only if it is the best supplier of that product. "Best" can mean that it is the lower-cost supplier of the item at a fixed quality level or, alternatively, that at a given cost, it is the higher-quality supplier.

It is one of the most remarkable results of economic theory that this unique outcome will tend to be best for consumer welfare and productive efficiency in every one of the countries involved.

But today's world of industry contrasts sharply with the wine-wool example that is so typical of the past. Today, in many lines of business, efficiency, *or even the ability to make a product at all,* requires firms to operate on a large scale.

There was a time when anyone with a ten-person firm could enter the automobile industry and build competitive cars. Once, all automobile companies were small and experimental, and many of today's firms are the grown-up survivors of that era. But that time is long past. Today a competitive auto company must produce on a large scale, and must operate a huge dealer and support network. Any new competitive entrant industry in another country must start on something like that scale, and that is not easy to do against those who are already entrenched.

Just as in the automobile example, much of modern technology requires activities to be carried out on a very large scale in order to be economical and competitive. Consequently entry into one of these industries, against an entrenched competitor, is slow, expensive, and very much an uphill battle if left entirely to free-market forces.

In these modern industries patterns of industrial dominance can occur simply as the result of the vagaries of historical accident. A war may force some country to invest heavily in some military product, like aircraft, or to develop a chemical industry because the country is cut off from its traditional supplier.

Or a single, farseeing entrepreneur can start a company that inaugurates an industry. Such historical accidents, which can be quite divorced from any natural advantage, can give a country an edge in plants, knowledge and personnel that allows it to dominate an industry for many years.

In many of today's industries, with large-scale operations required, with difficulties of entry, and with acquired advantages rather than natural ones playing a more decisive role, the situation is basically different from the wine and wool example-*there* is *no single clear-cut and natural outcome.* If the United States and Japan trade in semiconductors, automobiles, and aircraft, it is easy to imagine circumstances in which the United States dominates in aircraft and semiconductors and Japan in automobiles, but it is also eminently possible for the United States to have evolved into an entrenched position in automobiles and semiconductors while Japan dominates in the production of aircraft. Or, for that matter, almost any other combination can emerge.

Any such position once arrived at, whether deliberately or by the purest accident of historical events, does not break down overnight. Market forces will preserve it because of the difficulty of entry for new competitors in such an industry. In the wine-wool world, market forces, driven by demand and natural advantages, led the world to a single outcome. In today's world, market forces do not select a single, predetermined outcome, instead they tend to preserve the established pattern, whatever that pattern may be.

As a result modern international trade analyses must deal with many possible outcomes. If many assignments of industries among countries once established are possible stable outcomes in the world economy-if Japan can be the producer of good X and Germany of good Y, but the opposite assignment is also equally viable once established-then, since there are hundreds of industries, there are an enormous number of possible combinations of production assignments that can establish themselves as the entrenched state of affairs. And all of these permutations are consistent with the free play of market forces.

Furthermore, if these disparate industry-country combinations differ in their economic consequences for each trading country-some being good for a particular country and some not so good-why should a country necessarily be satisfied with the position it currently holds? Clearly, that position is not the inevitable and optimal outcome of the working of the market mechanism. It is more a historical accident that is currently maintained by market forces. Why should a country be satisfied with the current state of affairs if it can see a way to do better?

And there are things a country can do to change its position in the global balance. A home market closed off to foreign competition is one traditional *way* to shelter an industry while it is growing up to a reasonable size. Such closure of the market can be natural if there is something special about the home market that the home producer exploits, or it can be the result of deliberate government action intended to foster the home industry. Either circumstance can transform the almost insurmountable entry problem into one that is merely difficult. And there is a long list of other things that can be attempted for this purpose.

While it made little sense for England to attempt to produce wine, it may make sense for a modern nation to enter the automobile industry or some other industry and establish a new and better position in the global balance that is then maintained by market forces. But this requires someone to know something about which outcomes are better. In this book we will study which of the possible outcomes are better for a given country, and we will also describe the effect on that country's trading partners.

Analyzing all these different outcomes and their effects on countries and their trading partners may seem like a daunting task. There are hundreds of industries and a large number of countries capable of entering into those industries. Do we have to consider each and every one of the conceivable matchups of industry and country? Fortunately, we are rescued from the enormous task of dealing with this truly vast array of possibilities by the fact that all these outcomes obey certain simple rules. We will describe these rules and their consequences in the succeeding chapters.

These rules *will* show us, however, that among the multitude of stable outcomes, *those that are best for one country tend to be disadvantageous for its trading partner.* And we mean that it is disadvantageous for its trading partner in a very wide sense. It is a sense that takes into account not only the local effects on individual industries but also the wider effects on the entire national population. It is in this sense that we find that there is inherent conflict in international trade.

So far we have discussed the different stable outcomes made possible by the difficulty of entering an industry. However, there is a second and equally important source of multiple outcomes. That second source is change in a country's ability to produce.

1.2 MULTIPLE ECONOMIC OUTCOMES-CAPTURING THE LEAD THROUGH PRODUCTIVITY GROWTH

In the modern world countries can change their productive capabilities rather rapidly. We will consider the possibility of a country learning how to become good at producing something, perhaps a simple assembly process, say, shirt-making, or the manufacture of artificial Christmas trees. In contrast to our earlier discussion, we will now consider things that can be done on a small scale just as well as on a large scale and that do not necessarily have high entry costs. Nevertheless, in this case, too, we will reach the same conclusions about international trade as we reached under the assumption of high entry cost. We will again see inherent conflict in international trade.

In the world of the classical trade model, with its emphasis on natural advantage derived from climate or natural resources, it was difficult, for example, for England to become a substantial presence in wine production. However, in the modern world it is possible for many countries to learn the skills involved in making a product, and then to practice those skills until they approach the capability of the world's productivity leaders.

The skills and know-how of large, multinational corporations enable them to set up shop-making athletic shoes, for example-almost anywhere in the world. The company's present employees, both management and labor, know the techniques for making athletic shoes rapidly and effectively, and they can teach new workers in other countries the assembly and other skills required to make athletic shoes rapidly and effectively in a new location. If the new workers learn to perform these skills as productively as the world leaders, and if their wages are lower than those in other countries, then the unit cost of athletic shoes *will* be lower in the new assembly plant than elsewhere. And its ability to compete at low cost can change the course of world trade in that industry.

The same outcome can occur by means other than the stimulus of multinational corporations. Any means of learning will do. Workers or managers can be hired from the firms that are already skilled, or people can go abroad to participate in the leading industries and learn from the leading firms. The only thing that matters is that the skills can be acquired or developed and that the resulting unit cost of production is low. If, by any of these means, the new plant becomes one of the world's low-cost producers, then market forces will keep it going, and we will have a new pattern of international trade and new national outcomes.

Thus countries today can change their circumstances and can acquire (or lose) industries through rapid alterations of their capabilities in industries that do not have high entry costs. This can lead to a new outcome in international trade. The possibility of such changes and such new outcomes is another and different source of multiple outcomes.

Remarkably enough, the resulting different outcomes obey the same simple laws as those that govern the case of high entry cost and largescale operations. Once again, we will find inherent conflict in the countrywide interests of trading partners. Once again, the outcome that is best for one country tends not to be good for another. Once again, a multitude of possible outcomes become a possible source of conflict in international trade.

1.3 CONCLUDING COMMENTS

The central conclusion of this chapter is the profound contrast between the single, determinate outcome that tends to result from international trade in the classical world of small-scale industries, in which advantage is based on fixed natural capabilities, and the great and rich set of possibilities that opens up in the presence of high startup costs of entry into a large-scale industry. That same abundant set of possibilities exists even in the case of small-scale operations if it is possible for skills to be acquired, and in the modern world they can be. A grapevine cannot learn to flourish in England as well as in Portugal, but an assembler of radios can learn to assemble about equally well in many different countries.

In the classical trade model, market forces-Adam Smith's Invisible Hand-could arrive at only one outcome. In contrast, either high startup cost or learning provide the Invisible Hand with a vast array of options. This raises the possibility of attempting to modify the outcome through private acts or by public policy. History has brought us to where we are today. But people can act in the present to change the accidental outcome of history.

APPENDIX II

Where Ricardo and Mill Rebut and Confirm Arguments of Mainstream Economists Supporting Globalization

by Paul A. Samuelson

Most noneconomists are fearful when an emerging China or India, helped by their still low real wage rates, outsourcing and miracle export-led developments, cause layoffs from good American jobs. This is a hot issue now, and in the coming decade, it will not go away.

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.

> Yes, good jobs may be lost here in the short run. But still total U.S. net national product *must, by the economic laws of comparative advantage, be raised in the long run (and in China, too)*. The gains of the winners from free trade, properly measured, work out to exceed the losses of the losers. This is not by mysterious fuzzy magic, but rather comes from a sharing of the trade-induced rise in total global vectors of the goods and services that people in a democracy want. Never forget to tally the real gains of consumers alongside admitted possible losses of some producers in this working out of what Schumpeter called "creative capitalist destruction."
>
> 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.

This last paragraph can be only an innuendo. For it is dead wrong about *necessary* surplus of winnings over losings—as I proved in my "Little Nobel Lecture of 1972" (1972b) and elsewhere in references here cited (see also Johnson and Stafford, 1993; Gomory and Baumol, 2000). The present paper provides explication of the popular polemical untruth.

Here Ricardian equilibrium analysis will presuppose no permanent loss of jobs either in China or America. Instead, it focuses on the vital question, "Will inventions A or B lower or raise the new market-clearing real wage rates that sustain high-to-full employment in both places?"

Act I(a) of the present paper first rigorously investigates by twenty-first century Ricardo-Mill analysis the following contrived scenario: In the autarky absence of any trade at all, China's precisely measured real income per capita is set at *one-tenth* of U.S. autarky real income. This for the reason that China's labor productivities are specified here to average out to only *one-tenth* those of the United States. Quasi-realistically, China's total labor population is posited here to be *ten* times that of the United States—so that in autarky any biasing effects of differences in total regional *size* can be kept out of the analysis. In this example, only a good 1 and a good 2 are involved. And, à la the young J. S. Mill, demand tastes are everywhere assumed to be the same: more precisely, consumers even-handedly always spend their disposable incomes 50-50 on good 1 and on good 2.

Despite the initial overall 10-to-1 superiority of the United States in *absolute* productivity, my example stipulates that in good 1, China's inferiority of productivity is much worse than one-tenth; in good 2 China's inferiority vis-à-vis the United States is not as bad as one-tenth. Differences in opinion make for horse-race bets. Differences in *relative* (!) geographical productivities between good 1 and good 2 explain the bounties from specialization and trade. *Vive les différences*!

In Act I(a)'s first part, geographical specialization and fair free trade are shown to happen to double exactly each place's measurable autarky real income. So far, a big brownie point for the economist debaters.

Act I(b) goes on to address how the United States and China will fare when Schumpeterian technical improvement in China has quadrupled her labor's productivity in good 2, which is the good that China has been exporting to the United States. In my stipulated example, China's average productivity still

remains far below that of the United States. But, remember that so too are China's real wages far below the United States'.

In a nutshell, the new free trade equilibrium must definitely create for the United States a better real net national product—better because we can buy our imports cheaper now. China's good 2 elevated productivity does also in my Mill-Ricardo scenario raise *her* real net national product; and it happens to do so equally with the United States—even though China's terms of trade do deteriorate somewhat, albeit not enough to lower China's per capita net national product when demand elasticity is Mill-like. Acts I(a) and I(b)'s valid numerical deductions are pluses for the economist proglobalization debaters.

Act II, however, deals some weighty blows *against* economists' oversimple complacencies about globalization. It shifts focus to a new and different kind of Chinese technical innovation. In Act II, China's progress takes place (by imitation or home ingenuity or …) in good 1, in which the United States has previously had a comparative advantage. (High I.Q. secondary school graduates in South Dakota, who had been receiving from my New York Bank wages one-and-a-half times the U.S. minimum wage for handling phone calls about my credit card, have been laid off since 1990; a Bombay outsourcing unit has come to handle my inquiries. Their Bombay wage rate falls far short of South Dakota's, but in India their wage far exceeds what their uncles and aunts used to earn.) What does Ricardo-Mill arithmetic tell us about realistic U.S. long-run effects from such outsourcings? In Act II, the new Ricardian productivities imply that, this invention abroad that gives to China some of the comparative advantage that had belonged to the United States can induce for the United States permanent *lost* per capita real income—an Act II loss even equal to *all* of Act I(a)'s 100 percent gain over autarky. And, mind well, this would not be a short run impact effect. *Ceteris paribus* it can be a *permanent* hurt. ("Permanent" means for as long as the postinvention technologies still apply.)

In Ricardian equilibrium analysis, there is never any longest run unemployment. So it is not that U.S. jobs are ever lost in the long run; it is that the new labor-market clearing real wage has been lowered by this version of dynamic fair free trade. (Does Act II forget about how the United States benefits from cheaper imports? No. There are no such neat *net* benefits, but rather there are now new net harmful U.S. terms of trade.)

Finally, the Epilogue will comment on the robustness and relevance of the spelled out analyses in the two Acts. Qualitatively my Ricardian theorems do for the most part remain relevant.

ACT I(A): HOW FREE TRADE BENEFITS BOTH NATIONS' REAL PER CAPITA INCOMES COMPARED TO AUTARKY

Analytical proof trumps mere talk about economic law. Here we begin with China possessed of average productivity only a tenth of the U.S. level. To remove complicating differences in the two places' total outputs and labor force, China's workforce is set at *ten* times that of the United States: say that the total U.S. workforce is 100, while China's total workforce is 1,000.

Four Ricardian productivity parameters are exogenously given in my initial two-good scenarios. For the United States, the respective labor productivities are $\prod_1 = 2$ and $\prod_2 = \frac{1}{2}$; for China they are $\pi_1 = \frac{1}{20}$ and $\pi_2 = \frac{2}{10}$. (Notationally, capital letters denote U.S. variables; lower case denote Chinese variables.) Readers will observe that U.S. productivities average out to ten times China's. But the U.S. superiority is more than ten in good 1; and China's inferiority in good 2 is not as bad as one-tenth. Before any trade, China's autarky per capita real income is contrived to work out to precisely one-tenth of U.S. autarky per capita real income; before trade, good 2 is relatively cheap in China while good 1 is cheap in the United States. Here are the details.

AUTARKY'S "BEFORE" EQUILIBRIUM

In autarky, if the United States devotes 50 of its 100 workers to good 1, it can produce a quantity of 100; if it devotes the other 50 workers to good 2, it can produce 25. A parallel calculation holds for China's 1,000 workers: 500 produce only 25 of good 2; and the other 500 produce 100 of good 2. Because people all spend their incomes 50–50 on the two goods, competition will assure that, in autarky, each place must allocate its labor supply 50–50 between goods 1 and 2.

In this autarky example, the opportunity cost of producing a unit of good 2 in the United States is 4 units of good 1. However, in China, the opportunity cost of producing a unit of good 2 is $\frac{1}{4}$ unit of good 1. These differences in relative geographic productivities and in autarky price ratios provide the basis for comparative advantage-induced geographical specialization that will amplify world productivity!

My twenty-first century advance over nineteenth-century Ricardo-Mill is to recognize that Mill's assumption of 50-50 expenditures on the two goods gives us a firm measuring rod for an exact index of real national incomes and for real world income. This index is the *geometric mean* of consumption.[1] Thus, in the

United States, autarky real income can be measured as the geometric mean of producing 100 of good 1 and 25 of good 2, which is the square root of 100 multiplied by the square root of 25, or 50. Dividing by the assumed U.S. population of 100, U.S. per capita real income will then be 0.5. In China, autarky real income is the geometric mean of producing 25 of good 1 and 100 of good 2, which is the square root of 25 multiplied by the square root of 100, or also 50. Dividing by China's population of 1,000, we calculate per capita autarky real income in China as 0.05.

There is a second, equivalent way of measuring these various real national outputs. It is especially useful because it involves the geometric mean, not of quantities produced or consumed, but of *the real wage rates* of the two goods in each place. In autarky, the U.S. real wage rates are respectively precisely, for W/P_1 and W/P_2, the $\prod_1 = 2$ and $\prod_2 = \frac{1}{2}$ Ricardian productivities. U.S. real per capita autarky income of 0.5 as computed in the previous paragraph is (*for Mill*) also given by the duality formula:

$$0.5 = \tfrac{1}{2}\sqrt{(W/P_1)\,(W/P_2)} = \tfrac{1}{2}\sqrt{\prod_1 \prod_2} = \tfrac{1}{2}\sqrt{2 \cdot \tfrac{1}{2}}.$$

Likewise, for China, its real net national product per capita of 0.05 is given also by

$$\tfrac{1}{2}\sqrt{\pi_1 \pi_2} = \tfrac{1}{2}\sqrt{\tfrac{1}{20} \cdot \tfrac{2}{10}} = \tfrac{1}{2}\left(\tfrac{1}{10}\right).$$

The above exact equality of U.S. and Chinese total outputs results only from my contrived simplifying example. We now replace autarky by free trade, thereby deducing a substantial gain in real per capita welfare in both places.

FREE TRADE'S "AFTER" EQUILIBRIUM

The present model puts capital movements at zero. In free trade equilibrium, the trade balance is here always zero. With no tariffs, quotas or transport costs, in free trade relative price ratios will end up everywhere equalized. Of course, real wage rates will still diverge after free trade has raised them in both places.

The first step in analyzing free trade is to deduce the qualitative pattern of specialization. Because the opportunity cost of producing good 1, expressed in terms of good 2, is lower in the United States, competition will impel the United States to specialize on good 1. Because the opportunity cost of producing good 2, expressed in terms of good 1, is lower in China, China's competitors will

specialize on good 2. Indeed, avaricious U.S. Darwinian competition will concentrate on producing good 1 only; so that its 100 workers with a productivity level of 2 will produce 200 of good 2. China's comparative advantage will impel her competitors to produce good 2 only, and the 1,000 Chinese workers with productivity of two-tenths will produce 200 units of good 2. This free trade geographical specialization can thus vastly raise world income as compared to autarky. Each good's autarky global outputs of 125 are raised 60 percent by free trade's specializations.

Each place imports some of the good it does not produce, and does so at the market clearing prices that equate international supply and demand. The combination of geographical specializations, which use the regions' respective labors to produce only what they can produce *relatively* (!) best, and then trade, does iron out the huge autarky price ratio divergences.

Using Mill's assumption about income being evenly divided in both countries between both goods, and the fact that global production with specialization will equal a quantity of 200 for both goods, then the free trade price ratio, $P_2 / P_1 = p_2 / p_1$, equalized in both places by frictionless auctioneer exchange, becomes 200/200 or 1. At this balanced price configuration (which is a contrived artifact from my example's cunning skew symmetries whose purpose was to simplify readers' quick understanding), it is self-evident that both nations will share *equally* (not per capita equally) half-and-half in world total real outputs. When each country consumes 100 of each good—half of the 200 world outputs—their free trade geometric mean will be twice their autarky geometric mean. (Without my symmetries, each place's relative gain over autarky will still be positive but will not necessarily be equal.)

Many realistic asymmetries could negate the exact equality of percentage benefits in this example. Most important is the counterintuitive truth that a reduction of China's population relative to the United States will *raise* China's per capita real income at the expense of lowering the U.S. gain from free trade! Noneconomists and Marxian economists guess otherwise, but that is their 180° wrong error.

ACT I(B): WHEN CHINA'S TECHNICAL PROGRESS IN ITS EXPORT SECTOR MUST RAISE U.S. PER CAPITA REAL INCOME, BUT WHEN IT MIGHT LOWER CHINA'S

Here our thought experiment has China exogenously experiencing a quadrupling of productivity in her export sector: that is, the initial productivity of $\pi_2 = \frac{2}{10}$ in good 2 becomes postinvention $\pi_{2'} = \frac{8}{10}$. All other productivities remain the same.

Both before invention and after, the Ricardian inequalities of comparative advantage continue to compel the United States to specialize only on good 1 and China to specialize only on good 2. When all 100 U.S. workers produce good 1, they still produce a total of 200 only; when all 100 Chinese workers produce good 2, with the higher productivity level, they now produce 800. World output is clearly increased by this improvement in China's productivity.

Always the United States garners some part of the world gain in measured net global product. Why? Because the new superabundance of China's q_2 relative to unchanged U.S. Q_1 necessarily lowers P_2/P_1 to us as consumers.

Under Millian demand, China also gains in measurable well being. Suppose, however, that empirically demands are much more *inelastic* than in Mill's demand structure. Then the quadrupled supply of China's good 2 output could so much lower China's export terms of trade p_2/p_1 as to plunge postinvention per capita income painfully below preinvention per capita income. (Postinvention, China's share of world net national product drops all the way down to only one-fifth, no longer staying at one-half.) Self-immiseration by a nation is a well-known phenomenon in the economic literature, and it does crop up here in the debate over globalization.[2]

ACT II: PROOF THAT THE UNITED STATES SUFFERS PERMANENT MEASURABLE LOSS IN PER CAPITA REAL INCOME WHEN CHINA ENJOYS EXOGENOUS PRODUCTIVITY GAIN IN GOOD 1 LARGE ENOUGH TO CUT SOME U.S. PRODUCTION OF IT

By contrast with Act I's proof of U.S. benefit from Chinese technical progress in her export sector, Act II's analysis will rebut any mainstream economist's claims that the United States cannot suffer *long*-term harm from innovation abroad in a world of free trade.

I begin with the same initial two-good Ricardian productivities as in Act I. Before the invention, $\prod_1 = 2$ and $\prod_2 = \frac{1}{2}$; $\pi_1 = \frac{1}{20}$ and $\pi_2 = \frac{2}{10}$. But now, for dramatic emphasis, I expand China's labor productivity in good 1 mightily, from $\pi_1 = \frac{1}{20}$ to $\pi_{1'} = \frac{8}{10}$. The rest of the productivities remain unchanged. (Note: Despite the great increase in China's labor productivity for good 1 to above the U.S. level of labor productivity for good 1, China still remains poorer in autarky than the United States—and still with a lower average real wage.)

Before the invention, just as in Act I, the United States produces only 200 units of good 1, while China produces only 200 units of good 2. But now, after

the invention, world output potential has markedly grown. However, all comparative advantages have been emasculated—for the reason that now, in every place, $\prod_1 / \prod_2$ and π_1 / π_2 both now equal 4. Each place can do as well in its new autarky as it can do under free trade. (Indeed under free trade rules, no one is any longer motivated to specialize geographically; there is no need or advantage in doing either exporting or importing.) So this example's whole story can be easily told. To appraise U.S. postinvention well being, ignore Ricardo and Mill; just simply compare the United States' postinvention autarky geometric mean with its preinvention free trade geometric mean.

We've seen that the preinvention free trade elicited 200 of good 1 from the United States and 200 of good 2 from China. Also, these balanced numbers mandated $(P_2/P_1)' = (p_2/p_1)'$ of unity. Such a nice balance meant that both places shared one-half of world national income, measured with the geometric mean as $\sqrt{200 \cdot 200} = 200$. Focusing on U.S. per capita welfare, that meant preinvention free trade per capita net national product had been $\frac{1}{2}(200)/100=1.0$. Query: Can postinvention U.S. autarky per capita geometric mean ever reattain that earlier level? The answer is a surprising "no." Forced into autarky by China's invention, the United States with its unchanging technology in our crucial thought experiment again divides its 100 workers evenly between producing goods 1 and 2. Producing $50 \cdot 2 = 100$ of good 1, $50 \cdot \frac{1}{2} = 25$ and of good 2, then U.S. real per capita income can be measured by the geometric mean as $\sqrt{100 \cdot 25}/100 = 50/100 = 0.5$. Assuredly that does fall short of her initial per capita national income with free trade, which was 1.0. The new winds of free trade have blown well for China. But in my overdramatic example, they have blown away *all* of the United States' previous enjoyments from free trade. (Test question: Could there be any pattern of future inventions abroad that would repeatedly reduce absolutely per capita U.S. benefits from free trade and globalization? Correct answer: Yes—however unlikely *that* dramatic pattern would be.)

One example can sometimes be "too clever by half." In this one it is free trade's own spontaneous killing off of all trade that does harm to the United States.[3]

Again my reported numerical results are not mere numbers drawn from a mysterious black box. In every case, it is terms of trade changes in $(P_2/P_1; W/P_1, W/P_2; w/p_1, w/p_2)$—changes in those variables mandated by exogenous changes in relative scarcities—that have had their intuitively expected effects on supply-demand equilibrium price ratios under competitive free trade.

Economic history is replete with Act II examples, first insidiously and later decisively: in the United States, farming moved from east to west two centuries ago;

textiles, shoes and manufacturers moved from New England to the low-wage South early in the last century; Victorian manufacturing hegemony became replaced by Yankee inroads after 1850. Even where the leaders continued to progress in absolute growth, their rate of growth tended often to be attenuated by an adverse headwind generated from low-wage competitors and technical imitators.

EPILOGUE

Acts I and II have demonstrated that sometimes free trade globalization can convert a technical change abroad into a benefit for both regions; but sometimes a productivity gain in one country can benefit that country alone, while permanently hurting the other country by reducing the gains from trade that are possible between the two countries.[4] All of this constitutes long-run Schumpeterian effects, quite aside from and different from transitory short-run harms traceable to short-run adjustment costs or to temporary rents from patents and from eroding monopolies on knowledge.

It does not follow from my corrections and emendations that nations should or should not introduce selective protectionisms. Even where a genuine harm is dealt out by the roulette wheel of evolving comparative advantage in a world of free trade, what a democracy tries to do in self defense may often amount to gratuitously shooting itself in the foot. A pragmatic and scientifically more correct brief for globalization might go as follows.

> If the past and the future bring both Type B inventions that *hurt* your country and Type A inventions that help—and when both *add* to world real net national product welfare—then free trade may turn out pragmatically to be still best for each region in comparison with lobbyist-induced tariffs and quotas which involve both perversion of democracy and nonsubtle deadweight distortion losses. In 1900 free traders proclaimed, "Tariffs are the Mother of trusts." In this millennium a more pregnant truth may be: "Tariffs are the breeder of economic arteriosclerosis."

A few words are needed to judge how robust my simplified Ricardo-Mill paradigm is to real-world complexities.

1. Adding *non*tradable goods or other realistic impediments to international exchange, analytic reflection deduces will not negate my fundamental findings.

2. My qualitative conclusions also remain valid after adding to Ricardo's labor-only technologies the post-1930 *multifactor* trade models pioneered by

Heckscher, Ohlin, Viner, Haberler, Lerner, Stolper-Samuelson, McKenzie, Jones, and others, to say nothing of earlier Marshall and Edgeworth *multifactor* trade models. Just as multifactor Dornbusch-Fischer-Samuelson (1980) nicely generalized the Dornbusch-Fischer-Samuelson (1977) Ricardian labor-only paradigm, so will it be found that the qualitative results of Acts I and II do apply as well to multifactor as to labor-only scenarios.

3. In this paper, along classical lines, all my free trade equilibria are analyzed under the assumptions of zero *net capital movements*. In this epoch of chronic long-term cumulative U.S. net foreign indebtedness, such simple Ricardo-Mill smacks of Hamlet without the Gloomy Dane. Noneconomists like Warren Buffett—the world's richest and most successful investor is one—in November (2003) *Fortune* magazine blamed the chronic U.S. international payments deficit on free trade and therefore proposed auction taxes that would enforce zero U.S. borrowing-and-lending net. This paper's techniques could deduce the measurable self-imposed harm America would bring down on itself by following the Buffett philosophy. But one-way U.S. balance-of-payment deficits need another paper to do that topic justice.

4. What holds in a two-country, two- or three-good model can be shown to essentially hold in an *N*-country, *M*-good Ricardo-Mill paradigm.

5. Smith-Allyn Young-Ohlin-Krugman trade paradigms based squarely on the imperfections of competition inseparable from increasing returns to scale technologies are not well analyzed by classical competitive Ricardianisms. However, Gomory-Baumol (2000) have reported findings similar to mine for various increasing returns to scale scenarios. I should add that it has been globalization's enlargement of market size that has done much to elevate the competitive model to greater policy relevance than the competitive model possessed in the 1890–1950 epoch.

6. My most important omission, for realism and for policy, is treating all people in each region as different *homogeneous* Ricardian laborers. That inhibits our grappling with the realistic cases where some Americans (capitalists and skilled computer experts) may be being helped by what is decimating the real free-trade wage rates of the semi-skilled or of the blue-collar factory workers. My geometric mean approach can fortunately be adapted to handle just such problems.

Instead of attenuating this paper's theses, heterogeneity amplifies its importance. Contemplate a scenario where Schumpeter's fruitful capitalist destruction harms a really sizeable fraction of the future U.S. population and, say, improves welfare of another group and does that so much as to justify a calculation that

the winners could be made to transfer some of their gains and thereby leave *no* substantial U.S. group net losers from free trade. Should noneconomists accept *this* as cogent rebuttal if there is no evidence that compensating fiscal transfers have been made or will be made? Marie Antoinette said, "Let them eat cake." But history records no transfer of sugar and flour to her peasant subjects. Even the sage Dr. Greenspan sometimes sounds Antoinette-ish. The economists' literature of the 1930s—Hicks, Lerner, Kaldor, Scitovsky and others, to say nothing of earlier writings by J.S. Mill, Edgeworth, Pareto and Viner—perpetuates something of a shell game in ethical debates about the conflict between efficiency and greater inequality.

Policy aside and ethical judgements aside, mainstream trade economists have insufficiently noticed the drastic change in mean U.S. incomes and in equalities among different U.S. classes. As in any other society, perhaps a third of Americans are not highly educated and not energetic enough to qualify for skilled professional jobs. If mass immigration into the United States of similar workers to them had been permitted to actually take place, mainstream economists could not avoid predicting a substantial drop in wages of this native group while the new immigrants were earning a substantial rise over what their old-country real wages had been.

Therefore, as a result of my 1948–1949 revival and perfecting of the 1919–1933 Heckscher-Ohlin argumentation of *factor price quasi-equalization by trade in goods alone*, one could have foreseen the following at World War II's end. Historically, U.S. workers used to have kind of a *de facto* monopoly access to the superlative capitals and know-hows (scientific, engineering and managerial) of the United States. All of us Yankees, so to speak, were born with silver spoons in our mouths—and that importantly explained the historically high U.S. market-clearing real wage rates for (among others) janitors, house helpers, small business owners and so forth. However, after World War II, this U.S. know-how and capital began to spread faster away from the United States. That meant that in a real sense foreign educable masses—first in western Europe, then throughout the Pacific Rim—could and did genuinely provide the same kind of competitive pressures on U.S. lower middle class wage earnings that mass migration would have threatened to do.

Post-2000 outsourcing is just what ought to have been predictable as far back as 1950. And in accordance with basic economic law, this will only grow in the future 2004–2050 period. Other authors could add, to my presented Acts I and II, additional Acts explaining why there took place a historical drop in the U.S.

share of total global output from almost 50 percent at 1945 war's end (with Europe and Japan in temporary chaos) down to 40 percent, down to 30 percent and, according to the Penn World Tables of purchasing-power-corrected per capita incomes, now down to perhaps only one-fifth to one-quarter. Although these trends did not mean an absolute decline in U.S. affluence, they arguably did reflect a head wind slowing down the U.S. post-Keynes rate of real growth in the last half of the twentieth century.

Not surprisingly, successful developing nations—such as Japan, Hong Kong, Singapore, Taiwan, South Korea, even Thailand, Indonesia and the Philippines—were able at the end of the twentieth century to reduce America's lead over their own per capita real incomes. The same thing happened for western Europe in the 1950–1980 period. One wondered whether one or more of these trailing bicycle riders would fully catch up with the U.S. bicycle and then maybe even forge ahead of it. The Penn World Tables and Angus Maddison's similar estimates seem not to report that happening as yet. Could that be a sign that the United States' original innovations, as they spread abroad, have been the important factors in explaining America's diminishing lead?

One hesitates to say. Actually there is some suggestive evidence that French or German per-hour productivity does surpass the U.S. per-hour productivity. If only the French and Germans would match U.S. weekly and monthly average number of total hours of work, their bicycles would be running ahead of the U.S. frontrunner. Evidently subjective tastes can modify technological Ricardo-like parameters in explaining dynamic patterns of contemporary global and domestic economics.

Even if my hypotheses are exaggerated, they are what both Ricardo-Mill and more general Ricardo models would seem to be suggesting.

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NOTES

1. The use of the geometric mean and the harmonic mean as money-metric utilities, and how they can be derived from indifference curves, is explained in Appendix 2, which is appended to the paper at the journal's website <http://www.e-jep.org>.
2. In concluding Act I's brief in favor of globalization, I remind readers of my Appendix 2's discussion of how replacing Mill demand by realistic inelastic demand will actually cause China to be hurt by her own invention. Appendix 2, which offers detailed proofs, is appended to this article at the journal website <http://www.e-jep.org>.
3. To avoid breeding misunderstanding, my Appendix 1, which is appended to this article at the journal's website <http://www.e-jep.org>, analyzes a more realistic three-good scenario. Add to goods 1 and 2, with their original productivities in the two countries, a good 3, which begins with $\prod_3 = 1$ and $\pi_3 = \frac{1}{10}$. The example therefore happens to force initial equal sharing by both places of world total output of good 3: that is, shared comparative advantages. Then, exogenously, let China's productivity in good 3 double to $\pi_3 = \frac{2}{10}$, which is just enough to kill off *all* U.S. production of good 3. Does that hurt us permanently *ceteris paribus* net? *Yes, indeed it does.* But this time the hurt to us comes from an *increase* in foreign trade—from initial zero trade in good 3, all of U.S. consumption of good 3 comes after China's π_3 invention from imports alone.
4. Some past scholars have wondered whether cheapening of transport costs and speedier spreading of knowledge across national boundaries might in the future decimate comparative advantages and foreign trade. They have also wondered whether, when all peoples are as productive as Americans, some of their new benefit might come out of reduced U.S. well-being. So far, economic history has reported gain rather than loss in the ratio between Total Foreign Trade ÷ Total World Output. If trade were ever to cease spontaneously under competition, since shipping goods back and forth for no good reason makes no sense, humanity ought to deem such a result to be good rather than bad, even if it exacts some price from the erstwhile most productive geographical place.

2008 APPENDIX 1 THREE-GOOD U.S.-CHINA TRADE WHERE TECHNOLOGY RISE IN CHINA PROBABLY HURTS U.S. NET

BY ERKKO ETULA AND PAUL A. SAMUELSON

This abbreviates the 2004 Samuelson Appendix I that had been wrongfully confined to the website of the *Journal of Economic Perspectives.* Samuelson's intuitions are analyzed and confirmed here by our use of rigorous Kuhn-Tucker (1950) non-linear programming. The *after* China innovation story is compared qualitatively to the *before* story in the case of the Ricardo (1817)-J.S. Mill(1848) three-good comparative advantage labor-only model.

As expected, a new *ceteris paribus* innovation in only one of two regions, analysis confirms, will raise world (i.e., two-country) real net national product (properly measured.) But in this present numerical example, China's pace of NNP growth is greater than the world's rate. Bottom line: U.S. NNP is made definitely to decline by almost 20% by China's technical advance.

Notationally, U.S. variables are denoted by a single prime, as in (Q', C', P'). China variables require double primes, as in (Q'', C'', P''). To focus on an asymmetric innovation, we posit an equal supply of labor in both places. And in the before story, both places do have the same total NNP and same real wage. The 2004 use of exact money metric utilities permits the analyst to measure precisely whether the gains to U.S. consumers from being able to enjoy cheaper imports are outweighed by the real wage losses induced under free trade.

Tersely, the following math(s) should be virtually self-explanatory.

Initial Free Trade

Balanced population size, before and after:

(A1-1.1) $$[L_1' + L_2' + L_3' = 300 = L_1'' + L_2'' + L_3'']$$

Ricardian comparative advantage productivities:

(A1-1.2a) $$[Q_1'/L_1' = 2', Q_2'/L_2' = \tfrac{1}{2}', Q_3'/L_3' = 1']: \text{U.S.}$$

(A1-1.2b) $[Q_1''/L_1'' = \frac{1}{2}'', Q_2''/L_2'' = 2'', Q_3''/L_3'' = 1'']$: China

J.S. Mill equal constant-fractional spending on goods holds for everyone:

(A1-1.3) $P_1C_1 = P_2C_2 = P_3C_3 = \frac{1}{3}\sum_1^3 P_jC_j$

Fierce avaricious competitors will ensure that the U.S. will produce zero of good 2 where it lacks comparative advantage. Also, China will produce zero of good 1 in which it lacks comparative advantage. Because good 3 is of *neutral* comparative advantage, each place will end producing its own consumption needs for good 3.

Millian demand ensures that one-third of global L will be devoted to each of the three goods. Hence, Equations (1.1)-(1.2) imply that free trade global specialized allocation of the L^{world}=600, will have to be as follows:

(A1-1.4) $[L_1' = 200', L_2' = 0', L_3' = 100'; L_1'' = 0'', L_2'' = 200'', L_3'' = 100'']$.

Apply Equation (1.2)'s technological productivities to Equation (1.4)'s labor allocations to deduce that geographical outputs in free trade will initially be:

(A1-1.5a) $Q_1' = 2'(200') = 400', Q_2' = 0', Q_3' = 1'(100) = 100'$

(A1-1.5b) $Q_1'' = 0'', Q_2'' = 2''(200'') = 400'', Q_3'' = 1''(100) = 100''$

Global outputs are therefore

$[Q_1' + Q_2'' = 400' + 0'', Q_2' + Q_2'' = 0' + 400'', Q_3' + Q_3'' = 100' + 100'']$

(A1-1.6) $= [400^{world}\ 400^{world}\ 200^{world}]$

Under free trade, P_i/P_j price ratios must be exactly the same in both places. From Mill's (1.3), one deduces that

(A1-2.1) $(P_2/P_1)^{world} = (Q_1/Q_2)^{world} = 400^{world}/400^{world} = 1^{world}$

(A1-2.2) $(P_3/P_1)^{world} = (Q_1/Q_3)^{world} = 400^{world}/200^{world} = 2^{world}$

As explained in the 2004 Appendix II (modified here and on the JEP website), real net national product can, from Mill's (1.3), be *exactly*(!) calculated by the following *geometric* mean of outputs:

$$\text{(A1-3.1)} \qquad \text{NNP}^{\text{world}} = \sqrt[3]{400 \cdot 400 \cdot 200} = \sqrt[3]{100^3 \cdot 4 \cdot 4 \cdot 2} = 100 \cdot \sqrt[3]{32} = 317.5^{\text{world}}$$

Because earlier equations' postulated (singular) geographical *symmetries,* we realize that each of the two regions will get equal halves of free trade global NNP:

$$\text{NNP}' = \tfrac{1}{2}(317.5)^{\text{world}} = 158.75'$$

$$\text{(A1-3.2)} \qquad = \text{NNP}'' = 158.75''$$

To check their understanding, readers could work out how, under zero-trade autarky, Equation (1.4)'s free trade [200,200,100] consumptions in both places would get replaced by [200′ 50′ 100′] and [50″ 200″ 100″]. Therefore, under autarky,

$$(\text{NNP}')^{\text{au}} = [200' \cdot 50' \cdot 100']^{\frac{1}{3}} = 100'[2 \cdot \tfrac{1}{2} \cdot 1]^{\frac{1}{3}} = (100')^{\text{au}} = (100'')^{\text{au}}$$

$$\text{(A1-4)} \qquad < (\text{NNP}')^{\text{f.t.}} = 158.75 = 100^{\text{au}}\ (1 + .5875)$$

This initial free trade thought experiment illustrates the important story wherein as compared to 100 in autarky, free trade adds almost 60% to overall welfare! Take that, protectionists!

Free Trade After China's Innovation in Good 3

Now leave all as before except that China somehow doubles its productivity in Q_3'' alone while at the same time U.S. and other China technologies remain exactly as before:

[2′, $\frac{1}{2}'$,1′; $\frac{1}{2}''$,2″,1″] changes to

$$\text{(A1-5)} \qquad [2',\ \tfrac{1}{2}',1';\tfrac{1}{2}'',2'',2'' > 1'']$$

What will be the newest NNP′, NNP″, NNP^{world}? We think Samuelson's great teachers—Viner, Haberler, Ohlin, Frank Graham,…—could have solved this before story. We doubt that even Graham's wizardry with N good trade problems could have cogently calculated the asymmetric after story, where China's invention has raised NNP^{world} from previous 317.5 up to 378.0, which is more than a 19% increase in World NNP.

No one should be surprised with this positive global effect from a new effective Schumpeterian invention. However, why would the new NNP^{world} *still be divided equally* between dynamic China and static America? Maybe China under competitive free trade might get all of the gain? Or more than all?

Etula-Samuelson (forthcoming 2009) will explore cogent cases where China's NNP″ *loses* (!) from its own ingenuity, as can happen when Mill's unitary elasticities of demand have been made irrelevant by quite possible different scenarios of *inelastic* demand. (When China then loses, America's new NNP′ gain will exceed the world's percentage gain in NNP^{world}!)

Actually, here and now we confirm the 2004 Appendix I's (*JEP* website) intuitive guesses that doubling Toyota's productivity could condemn the U.S. to produce no autos at all. And, since the U.S. certainly could never be induced to produce any of the good 2 for which it clearly "enjoys" competitive *dis*advantage, the U.S. is left devoting all 300 of its L′ to producing $600=Q_1'$ only! This might amaze Haberler and Viner both.

The mathematics of linear programming was launched publicly around 1945 when World War II ended. Samuelson wrote then that Ricardo had already been there. But 1817 Ricardo didn't have a clue on how to solve complex inequality-equality numerical problems. George Dantzig was the first to perfect the *simplex* algorithm to effectuate that problem. Cf. 1963 Dantzig's summing up.

The mysteries deepen. When young Mill innovated by postulating his definite demand functions, late twentieth century trade theorists had to study beyond linear programming: moving on, at least, to *non-linear programming* à la Kuhn-Tucker (1950).

Here, with the use of standard numerical optimization, we do test the Samuelson guesses. Here are the exact 2008 results.

(A1-6.1a) $[L_1' = 200', L_2' = 0', L_3' = 100'; L_1'' = 0'', L_2'' = 200'', L_3'' = 100'']$

is replaced after the innovation by

(A1-6.1b) [$L_1^* = 300^*$, $L_2^* = 0^*$, $L_3^* = 0^*$; $L_1^{**} = 0^{**}$, $L_2^{**} = 150^{**}$, $L_3^{**} = 150^{**}$]

The prime and double prime of the before story are replaced for the after story by the * and ** notations.

Using the new technical productivities of Equations (6), the free trade geographic output outcomes now become:

(A1-7.1) [$Q_1^* = 2 \cdot 300 = 600^*$, $Q_2^* = 0$, $Q_3^* = 0$]: U.S.

(A1-7.2) [$Q_1^{**} = 0^{**}$, $Q_2^{**} = 300^{**}$, $Q_3^{**} = 300^{**}$]: China

(A1-7.3) [600^*, 300^{**}, 300^{**}]: World

(A1-7.4) $P_2/P_1 = P_3/P_1 = (600^*/300^{**}) = 2^{world}$

(A1-7.5) $NNP^{world} = 100\sqrt[3]{6 \cdot 3 \cdot 3} = 100\sqrt[3]{54} = 378.0$

World NNP has been raised by more than 19% by China's doubled productivity in good 3. Edgeworth, Viner and Haberler would not be surprised by that.

But now that the U.S. is forced to produce good 1 only, its extra 50% output of that good will by itself so much cheapen its own price and American workers' real wage, so that in the after story the U.S. share of NNP^{world} drops from *one-half* down to only *one-third*! We believe that fact would raise the eyebrows of both Jacob Viner and Gottfried Haberler.

One-third of 378.0 definitely does fall short of one-half of 317.5. When President George Bush's chief economist from Harvard commented publicly on Samuelson (2004), it was clear that he had not done due diligence with respect to the 2004 Appendix. He labored under the misapprehension that its only demonstrated harm to the U.S. resulted from the 2-good case where total trade was lessened under free trade by the innovation inside China. A rose is a rose. And definite harm is harm, however caused.

Wrap-up

1. Competitive free trade can be expected generally to raise global NNP (properly measured).

2. However, just as "the monsoons giveth and the monsoons taketh away," it is equally true that the changing winds of free trade can give to some and from some take away.

3. Even when a society does gain net from a change in free trade, some groups within it will be losers and some gainers. Only sometimes can J.S. Mill's ancient conjecture be justified—that *free trade winners in a country could always bribe losers so that all could end up new winners.*

4. Free international trade, like free internal competitive markets, often does exacerbate inequalities between persons of varying education, skills, and family advantage. Even where gainers could tithe to those less advantaged, human nature is such that any such feasible (at most partial) transfer will have to be done through the operations of government.

5. Finally, the genius of Schumpeterian "creative capitalist destruction" inevitably brings along with itself an increase in anxious uncertainty. The "serfdom" that Hayek, Friedman, and libertarian Mt. Pelerin members warned against, is *de facto* the *centrist* mixed economies of twenty-first century America, which, in particular, seems most near to the limited Scandinavian middle way.

The gloomy citizenry of northern Europe—driven by dark seasons into becoming binge drinkers prone to high suicide rates—turn out in modern times to report high degrees of subjective "happiness." The long-time merits of free trade are such that, as Rome was not built in a day, some democratic majorities might vote for only a limited measured pace of benevolent capitalist destruction.

Etula and Samuelson in 2009 will considerably expand both examples and counter examples within classical and neoclassical competitive theory. "Labor only" technologies à la Ricardo do point the way to generalized multi-factor technologies à la Heckscher (1919) and Ohlin (1933).

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APPENDIX 2 INELASTIC DEMAND CAN CAUSE CHINA'S INVENTIONS TO REDUCE ITS FREE TRADE REAL NNP

Here we enlarge on Act I(b)'s footnote 1's point that a Chinese invention which raises world net national product, and also raises China's autarky net national product and raises U.S. net national product can, when international demands are realistically *inelastic,* still hurt China's own free trade per capita income permanently. In the Mill version of Act I's demands, the text had defined "before" and "after" P_2/P_1 terms of trade as follows for before and for after:

(A2-1) $(P_2/P_1) = (p_2/p_1) = (Q_1 + 0q_1)/(Q_2 + q_2) = \frac{200}{200} = 1$

(A2-2) $(P_2/P_1)' = (p_2/p_1)' = \frac{200}{800} = \frac{1}{4}'$

(A2-3) Before $\frac{Relative\_China\_share\_of\_world\_geometic\_mean}{Relative\_U.S.\_share\_of\_world\_geometic\_mean}$

$= (p_2q_2/P_1Q_1) = (1)\ (\frac{200}{200}) = 1$ for Mill

(A2-4) China net national product U.S. net national product

Also, the Mill "after" story had divided the enlarged postinvention world net national product half and half:

(A2-5) $(p_2800)/(P_1200) = (\frac{1}{4}) \cdot 4 = 1' = \frac{1}{2} \div \frac{1}{2}$;

(A2-6) U.S. after net national product = China after net national product

$= \frac{1}{2}\sqrt{800 \cdot 200} = \frac{1}{2}(400) = 200 < 100 =$ China before net national product

The above Mill story is the same as in the article.

But now suppose reality makes us shift gears away from Mill-like demand elasticity. Suppose that inelasticity dictates that a new "squared" Law of Demand holds, so that always $P_2/P_1 = [Q_1/Q_2]^2$ the invention

(A2-7) $(P_2/P_1)' = (p_2/p_1)' = (Q_1/q_2)^2 = (\frac{200}{800})^2 = (\frac{1}{4})^2 = \frac{1}{16}'$

This is a new ball game, one where China's postinvention abundance of Q_2 decimates viciously her own terms of trade. Now China will end not with half of postinvention world net national product, but with only *one-fifth* of world net national product:

(A2-8) $(p_2p_1/P_1Q_1)' = (\frac{1}{16})(q_2/Q_1) = \frac{1}{16} \bullet \frac{800}{200} = \frac{1}{4}' = (\frac{1}{5})/(\frac{4}{5})$

(A2-8) entails that China's share of the world net national product is 1/5 compared to the U.S.'s 4/5 share.

To what *exact* money-metric utilities are we now to apply these ($\frac{1}{5}$, $\frac{1}{4}$) 1 fractions? There is left this Appendix's task to explicate how correct money-metric utility is to be measured when Mill's (A2-1) demand and its implied geometric mean must be replaced by equation (A2-7)'s new "what kind of mean?" The provable answer is that the Harmonic Mean corresponds to $P_2/P_1 = (Q_1/q_2)^2$ in a parallel way to how the geometric mean had corresponded to the unsquared $P_2/P_1 = (Q_1/q_2)$.

The unweighted harmonic mean of consumptions C_1 and C_2 is defined as "the reciprocal of the mean of the C_1 and C_2 reciprocals," that is,

(A2-9) Harmonic mean of $(C_1, C_2) = [\frac{1}{2}C_1^{-1} + \frac{1}{2}C_2^{-1}]^{-1}$

(A2-10) $= 2C_1C_2/[C_1 + C_2]$

Applying these definitions to Act I(b)'s "before" production of (200, 200) and "after" production of (200, 800), we use the Harmonic Mean to calculate world output in both cases for before and for after:

(A2-11) world net national product = 2(200)(200)/[200+200] = 200

(A2-12) world net national product =2(200)(800)/[200+800]=320'>200

Is China better off with only $\frac{1}{5}$of 320 than she had been preinvention, earning then $\frac{1}{2}$ of 200? Unequivocally the answer is "No," that is,

(A2-13) $\frac{1}{5}(320) = 64' < 100 = \frac{1}{2}(200)$

General Money-Metric-Utility Means

The exact geometric mean and the exact harmonic mean are two different species of the genus of money-metric utilities. Paired with each of the two are their respective Laws of (Homothetic) Demand:

$$\text{GM} = \sqrt{C_1 \cdot C_2} \longleftrightarrow P_2/P_1 = C_1/C_2$$

(A2-14) $$\text{HM} = [\tfrac{1}{2} C_1^{-1} + \tfrac{1}{2} C_2^{-1}]^{-1} \longleftrightarrow (C_1/C_2)^2$$

In general, when individuals with different demand tastes engage in auction trading, there cannot be defined simple money-metric utilities of total society value. Mill's geometric mean case best minimizes heterogeneity phenomena. Also, as seen, when demands belong to special linear power functions--as with Harmonic Means--money-metric utility is a singularly useful construct.

Still, in winding up our analysis, it will be of interest to comment on a model where *all* individuals maximize the same 2-good demand function even when they enjoy unequal degrees of affluence. Instead of $P_2/P_1 = Q_1/Q_2$ or $P_2/P_1 = (Q_1/Q_2)^2$ Mill-like equations, we would have to write down non-homothetic Hicks relations $P_2/P_1 = R(Q_1,Q_2) \neq R(Q_2/Q_1)$ for any R marginal rate of substitution function. As Alfred Marshall (1879) knew, such $R(C_1,C_2)$ cases could generate *multiple* different free trade equilibria.

We could easily specify a case where one of the C's could have for all parties a *zero* (!) income elasticity. In just such a case, a doubling of China's productivity could give all of the *global* benefit to one of the countries, leaving the other country with zero benefit from new free trade. Odd, but not paradoxical.

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APPENDIX III

Perils of a Different Globalization

by Stephen S. Roach

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Economics and politics are on a dangerous collision course. As the forces of globalization strengthen, the drumbeat of protectionism is growing louder. Made in France, the European strain of protectionism reflects a newfound nationalism that strikes at the heart of pan-regional integration. Made in America and exacerbated by fear of the "China factor," a different strain of protectionism plays to the angst of middleclass U.S. wage earners.

Whether the threat is perceived to be from the inside (as it is in Europe) or the outside (as in the United States), the responses of increasingly populist politicians are worrisome, to say the least. French Prime Minister Dominique de Villepin is seeking to protect "strategic" industries from foreign ownership. In the U.S., it's not just resistance to foreign takeovers; bipartisan support is also building in the Senate to impose steep tariffs on China. All this harkens back to the demise of an earlier globalization that many date to the enactment of the infamous Smoot-Hawley Tariff Act of 1930—a political blunder that may well have been key in turning a U.S. stock market crash and recession into worldwide depression. Like the circumstances over 75 years ago, the current global trade dynamic has played an increasingly important role in boosting the world economy. Protectionism and the contraction in global trade it would trigger puts all that at risk.

Today's world, of course, is very different than it was back then. So, too, is the fabric of a globalization that is causing such a powerful political backlash. In the early part of the 20th century, the world was brought together by the crossborder exchange of manufactured products. In the early part of the 21st

century, globalization has swept beyond tradable goods into a very different realm of commerce—information flows, financial capital, and services.

A globalization that moves from tangible tradable goods activity to the more intangible functions of the Knowledge Economy is not well understood. But the impacts of this shifting character of cross-border integration could well be more powerful than they were in the past. That's because the incidence of the disaffected—the workers who feel the brunt of intensified global competitive pressures—is shifting into a segment of the global labor market that has never really known the meaning of job anxiety and stress. Blue-collar workers in factories have, of course, long been on the front line in facing the ups and downs of business cycles, as well as the intensification of global pressures. By contrast, white-collar workers in services-based enterprises have not. That is now changing. The rules of engagement on the battleground of globalization are being rewritten. The services economy is now on the leading edge of feeling the stresses and strains of an increasingly competitive and open world economy.

This is a truly extraordinary development in the continuum of economic history. Economists have long dubbed services as "nontradables"—underscoring the time-honored proposition that service providers had to be in close proximity with their customers to offer in-person delivery of expertise, advice, or assistance. In the Internet Age, the boundaries between tradables and nontradables have become blurred. Now, with the click of a mouse, many once-nontradable services can be offered up from anywhere in the world. At work is the globalization of software programming, engineering, design, medicine, accounting, consulting, and a multitude of other professional services. Labor input—and the knowledge-based content of the service it delivers—is now beamed to your desktop on a real-time basis from Bangalore, whether you like it or not. This compresses both the quantity (i.e., headcount) and the price (i.e., real wage) of higher-cost labor input in the developed world—with most of the impact presently showing up in the form of a persistent stagnation of real wages. The result is an IT-enabled globalization that throws long-sheltered knowledge workers into the global competitive arena for the first time ever.

As in the early 1930s, the new strain of globalization has spawned a political backlash. But the pressures are very different as they migrate from manufacturing to services. That's not to say blue-collar workers aren't feeling the heat in today's world. Unfortunately, there just aren't that many of them left. Factory sector workers currently account for only about 15% of total employment in the G-7 collection of major industrial countries (the

U.S., Canada, Japan, France, Italy, Germany and the UK)—about half the 29% share prevailing as recently as 1970. While there could well be more to come in the attrition of manufacturing employment—the U.S. portion is now close to 10%—simple math tells us this aspect of the hollowing has just about run its course. With the pendulum of global competition now swinging toward services, the resulting white-collar shock has added a new and very destabilizing element to the globalization debate. It has created a deepening sense of anxiety that afflicts workers who have long harbored the belief that they would not face pressures from low-wage offshore talent pools. The persistent stagnation of inflation-adjusted wages in the developed world—even in a high-productivity-growth U.S. economy—has shattered that sense of security. It is an exceedingly painful, but perfectly logical outgrowth of an increasingly powerful global labor arbitrage.

Politicians have been quick to come to the defense of the new warriors of globalization. The numbers leave them with little choice. Unlike the sharply reduced ranks of manufacturing employees in the developed world, services are the dominant source of work, income generation, and political power. In the G-7 countries, services currently account for close to 75% of the total workforce—literally five times the share of manufacturing. And yet that's where the current strain of globalization is playing out with greatest intensity and, accordingly, where it meets its greatest resistance from the politicians. Little wonder that services reforms have stalled in Europe, or that the Doha Round of global trade liberalization has been stymied by a highly contentious debate over services.

Significantly, the new globalization could be far more disruptive than the strain of the early 20th century. That's due importantly to the extraordinary speed of the transformation now at work. A century ago, the burst of globalization was also spectacular, but the new "connectivity" of the early 20th century still faced very real physical constraints—namely, the expansion of shipping capacity and the construction of ports and overland transportation networks. The modern-day strain of globalization does not have to face such daunting physical constraints. The only limiting factors today are growth in IT-enabled connectivity and bandwidth—both of which have continued to expand at explosive rates long after the "law of large numbers" might have produced slower growth rates. By Mary Meeker's reckoning, the rapid expansion of global Internet usage continued in excess of a 15% annual rate in 2005—even though total worldwide penetration pierced the 1 billion threshold toward the end of the year.

In other words, the infrastructure of today's globalization of intangibles is being installed at a much more rapid pace than was the case in the globalization of tangibles a century ago. In essence, that's because the hurdle rates of disseminating the new technologies of connectivity are much lower today. That key differentiating development, in conjunction with the rapid growth in offshore knowledge-worker talent pools, has enabled the global labor arbitrage to move much more rapidly up the value chain than was the case in the early 20th century. Five years ago, when the debate was first joined on white-collar offshoring, the focus was on relatively low-value-added data processing and call centers. Today, the whole gamut of higher-value-added professional services workers is feeling the heat. As a result, the current strain of white-collar shock dwarfs the impacts of the blue-collar shock of a century ago.

The debate breaks down over what needs to be done. Rich countries are flirting dangerously with protectionism while poor countries continue to bet on export-led growth. Meanwhile, the new competition fostered by IT-enabled globalization hurtles ahead at breakneck speed. At the same time, the global labor arbitrage is forcing a realignment of relative wages in the world economy —with the rich developed world fearing a "race to the bottom" while the poor developing world is hoping to ride the rising tide. The combination of IT-enabled globalization and real wage stagnation in the developed world creates an angst that is too tempting for populist politicians to resist. The hyper-speed that drives this disruptive integration of the world is a perfect set-up for a protectionist backlash.

Unfortunately, there is no easy resolution of these political and economic tensions. In the end, the competitive profile of any knowledge worker reflects the interplay between skill sets and fully-loaded costs. A nation's stock of human capital is key in shaping the former, while the ever-declining price of IT-enabled connectivity puts an important new wrinkle into the cost calculus. Countries that sign up for globalization must meet both aspects of this challenge head-on. The hyper-speed by which the rules of a new competition are changing in the Internet Age adds a critical urgency to the politicization of globalization—and to the protectionist pressures it has evoked.

The orthodox prescription is to counsel patience—that the "win-win" of globalization eventually will raise living standards in the developing world while creating new markets to be tapped by industrial countries. Yet the unprecedented speed of an IT-enabled globalization draws the rewards of that patience into serious question—at least for the foreseeable future. In the end, politicians are usually

at their best in counting votes. With workers in services outnumbering those in manufacturing by a factor of five to one, the body politic in the industrial world has cast its ballot in favor of protectionism. Opportunistic politicians are taking the bait—seemingly unconcerned about the tragic lessons of the 1930s. While globalization is very different today than it was back then, the risks of making an equally tragic mistake on trade policy should not be minimized.

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APPENDIX IV

Comment on Global Trade and Conflicting National Interests

by Ralph Gomory and William Baumol

EDWARD M. GRAHAM

The presentations by Ralph Gomory and William Baumol were based on a new and original model of international trade as presented in their book *Global Trade and Conflicting National Interests*.[1] The model comes in several "flavors" and my comments pertain only to what I consider to be the most interesting of these "flavors."

The model proposed by Gomory and Baumol differs from neoclassical trade models based either on the Heckscher-Ohlin-Samuelson (HOS) or Ricardian hypotheses. The HOS model posits that comparative advantage, which enables mutually gainful trade among nations, arises from relative differences in factor endowments among trading nations. In the Ricardian model, comparative advantage arises from relative differences in productivity. Comparing the neoclassical models of trade (where the neoclassical models consider only two countries and two products and, in the case of the HOS model, two factors of production) with the new model by Gomory and Baumol, the main distinction. (There are extensions of these models that consider more than two countries or two products or two factors of production, but these are not discussed here.)

In the HOS model, there are "relative differences in productivities." If, for example, $(T/L)_j$ is the ratio of land to labor in country j and $(T/L)_k$ is this ratio for country k, and T and L are measured in the same units in both countries, then either $(T/L)_j > (T/L)_k$ or $(T/L)_j < (T/L)_k$. In the former case,

country j will have a comparative advantage in goods or services that use land relatively intensively in their production. In the latter case, country k will have a comparative advantage in goods or services that use labor relatively intensively in their production.

In the Ricardian model, factor quantity ratios are replaced by the ratio of labor productivities for two products or services, where in the standard models average labor productivity is assumed equal to marginal productivity. Thus, if $(c/f)_j$ is the ratio of labor productivity for cloth to labor productivity of food in country j and $(c/f)_k$ is the same ratio for country k, the Ricardian hypothesis states that if $(c/f)_j > (c/f)_k$, then country j will have a comparative advantage in cloth production whereas country k will have a comparative advantage in food production.

In either case, comparative advantage implies that if both countries are open for trade, each country will export those goods for which it has a comparative advantage and import goods for which the other country has a comparative advantage. It can be shown that trade in these goods benefits both countries and is preferable to the autarkic production and consumption of both goods. Trade, therefore, is strictly a positive sum.

In the version of Ralph Gomory and William Baumol's model discussed here, it is also assumed that there are two countries that might trade with each other. This model, however, departs from the neoclassical models in several ways. First, in contrast to the neoclassical models noted above, which assume that (at least initially) the production of all relevant goods and services occurs in both countries, Gomory and Baumol assume that the initial production of a given product or service occurs in just one of the countries (the innovator country). Moreover, the country in which this initial production occurs is a matter of historical accident. Second, whereas the neoclassical models assume the existence of just two products or services, Gomory and Baumol assume that a multiplicity of products and services exists. (In their simulations, they take the number of such products and services to be 10, but this is an arbitrary choice.) Since each country is wholly specialized in one or more products or services, and one country can produce n products[2], n = 1, 2, …10, while the other country produces (10 – n) products, the total number of ways in which production can be allocated between the two countries is $N = \sum_{n=1}^{10} \left(\frac{10}{n}\right)$ where $\left(\frac{10}{n}\right)$ is the number of combinations of 10 objects taken n at a time. In this instance, N ≈ 1000.

Furthermore, Gomory and Baumol assume that entry into the production of any product entails significant fixed costs that must be sunk (and are therefore non-recoverable) and that the production of any product is subject to a scale economy. In addition, because each product is only produced in one country, a country demanding a product it does not produce can only meet this demand by importing from the producer country.

Since a country's initial entry is a matter of historic accident, it is possible that the distribution of industries between the two countries is inefficient, which is to say that the productivity of industries located in each country might be improved if the two nations could simply trade entire industries[3] between them. Unlike Gomory and Baumol, the following example assumes that such trades are both allowed and made without cost (thus, industry A will move from country j to country k while industry B moves from country k to country j, if such a trade improves productivity in both nations).

After all such trades are made, the following prevails in the model: If either country initially holds a large number of industries and the other holds a much smaller number, both countries can benefit if one or more industries are transferred from the country with a large number of industries. The benefit arises largely because of scale economies: If a large number of industries are located in just one of the countries, the scale of output of each industry is reduced over the scale that could be achieved if the number of industries were fewer. To be sure, the scale of output of industries in the other country would be reduced as a consequence of the transfer, but (apparently) the model assumes declining scale economies with output (such that, in each industry, the first derivative of marginal cost with respect to output declines with increasing output, but the second derivative rises).

However, if both countries possess about the same number of industries, as the Gomory and Baumol model assumes (so that, in the authors' formulation, national incomes are close to equal), then if an industry moves from, say, country j to country k, the latter country benefits while the former country loses. Thus, there arises what the authors colorfully call a "zone of conflict" between the two countries.

In this model, world income (the total income of the two countries) is at a maximum within the zone of conflict; this maximum occurs where each country holds half of the total of industries. Thus, all of the following arise:

1. If both countries initially each hold half of the world's industries, world income is maximized. However, it is nonetheless true that either country can raise its income by affecting a transfer of an industry to itself from the other country. Countries thus, with this initial condition, play a negative sum game. Each country can gain income by taking an industry from the other, but the gain to the "winning" nation is less than the loss to the "losing" nation.

2. If one country holds less than half the world's industries, it gains by taking an industry from the other country. Moreover, there is a gain in world income but a loss of income is suffered by the second country.

3. The two considerations above suggest that there is some scope for a cooperative outcome between the two countries. In case 2 above, for example, the first country might be able to convince the second country to transfer an industry to the first country by offering compensation for the loss to the second country. Because the gains to the first country exceed the losses to the second country, this compensation can be set such that neither country loses and at least one gains. Cooperative strategies between the two countries are thus Pareto-dominate competitive strategies (a possibility that the two authors do not seem to have considered!). The bottom line is that "conflict" in the "zones of conflict" arises only if cooperative deals between the two countries are excluded.

The Gomory-Baumol model can be criticized on a number of grounds other than that implied by item 3 just above. One of these is the assumption of complete specialization by each nation (which, as noted, is not assumed in neoclassical models); a more realistic assumption would be that at least some subset of industries could be such that the same industry exists in both nations. In this case, would the extent of the "zones of conflict" be reduced? In addition, as with the neoclassical models, one might ask if the Gomory-Baumol yields the same outcome with n nations, where $n > 2$, as it does with just two nations. How sensitive the existence and extent of "zones of conflict" is to the parameters that create scale economies is also worth exploring (do these zones become more or less pronounced if scale economies are more pronounced)?

Nonetheless, the existence of "zones of conflict" is the truly interesting aspect of this model that stands in contrast to the neoclassical models. In those

models, trade and international specialization of production can lead to mutual gains between the trading nations (albeit to redistributions of income within the nations in the case of the HOS model that can create domestic conflicts), where no cooperative agreement between the nations (other than simply for each nation unilaterally to allow trade to proceed unimpeded) is required for both nations to realize the gains from trade.[4] But, as noted above, the Gomory-Baumol model yields no such outcome. Although an outcome in their model is possible wherein both nations can achieve maximum gains, this outcome is not guaranteed when each nation acts unilaterally to maximize. Rather, global optimality can only be achieved via some sort of cooperative arrangement that would necessarily have to go far beyond each nation simply keeping the borders open to the other's exports.

Ultimately, the Gomory-Baumol model should be taken seriously because it raises concerns about "globalization" that do not arise in neoclassical models. However, this model (as was the case with a generation of "new" international trade models introduced during the late 1970s and early 1980s) could be used, prematurely at best, as a justification for isolationist international economic policies that could prove very damaging to U.S. national interest. The temptation will be great to say "Gomory and Baumol show that comparative advantage is a wrong paradigm and therefore we need to reverse or abandon the current international trading rules, or at least those that promote open trade and investment" (not all of the current rules by any means do!). This would be an unfortunate outcome if for no other reason than, as indicated, the model does actually imply a cooperative outcome where one would indeed want to retain an open trading and investment regime, albeit perhaps operating under more complex (and likely far more difficult to enforce) rules than at present. Moreover, the Gomory-Baumol model has not been subjected to rigorous empirical testing and its main differences with more traditional models, while intellectually defensible, may prove to be unfounded in practice. (Einstein's special theory of relativity thus, for example, completely revised the intellectual underpinnings of Newton's laws of motion. The differences, however, between relativistic calculations and Newtonian ones, for even fast moving objects—fast moving from a normal "human perspective," that is—such as supersonic airplanes and missiles are so slight that the Newtonian calculations suffice for all practical purposes. The intellectual differences between the two paradigms—that of Einstein and that of Newton—thus are enormous, but the empirical differences for anyone but an astrophysicist are all but nil.)

My bottom line: while the Gomory-Baumol model might provoke a lively and perhaps even intense intellectual discussion, it is not quite ready to be used to reshape policy. On this last matter, I realize that I differ from at least one other commentator on this presentation.

NOTES

1. Ralph E. Gomory and William J. Baumol, *Global Trade and Conflicting National Interests*, Cambridge, MA: The MIT Press, 2000.
2. I will drop the "and/or services" from here on.
3. Even in these models, there are non-globally optimal outcomes possible if nations selfishly and unilaterally pursue only their self-interests, e.g., if two nations each attempt unilaterally to apply "optimal tariffs" to each other.

APPENDIX V

Rethinking Trade and Trade Policy: Gomory, Baumol, and Samuelson on Comparative Advantage

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I RETHINKING TRADE AND TRADE POLICY

Ralph Gomory and William Baumol (2000) and Paul Samuelson (2004) have recently raised concerns about the future impact of international trade on the U.S. economy and national income. Having Messrs. Gomory, Baumol, and Samuelson (GBS) speak out on trade is an important and significant event. William Baumol is a renowned microeconomic theorist and former president of the American Economics Association, while Paul Samuelson (1948, 1949) is one of the originators of the modern theory of comparative advantage that is widely used to explain and justify international trade. That theory is known as the Heckscher–Ohlin–Samuelson (HOS) model of trade and it is learned everywhere by graduate students interested in international trade.

These observations lead to two points:

Point 1 is that GBS's questioning of current trade developments has nothing to do with "protectionism." GBS are strongly in favor of trade, believing there are gains to be had by all. What is open to question is how the size of those gains and their distribution across countries may change over time. That raises critical policy issues regarding what can be done to maximize the U.S. share of gains from trade and hold on to them, and it is this issue that is their ultimate concern.

Point 2 is that GBS are microeconomics and trade theorists and their critique concerns trade theory. Theirs is not another case of counting manufacturing job losses or bemoaning of the trade deficit. Instead, they use pure trade theory, which justifies current trade policy, to question some commonly held beliefs. Empirical critiques that focus on jobs and the trade deficit are not enough to change trade policy. Such empirical critiques must also be accompanied by theoretical argument, which is what GBS have provided.

II THE GBS CONTRIBUTION TO THE TRADE DEBATE

Before engaging with the substance of GBS's analysis it is worth distinguishing their argument from some existing theoretical critiques of trade. First, their argument is not about the adverse income distribution impacts of trade. These effects are widely understood, and Samuelson also made pioneering contributions to this area of trade theory in his work with Wolfgang Stolper (1941). According to the Stolper-Samuelson theorem, the factor that is relatively scarce in the pre-trade equilibrium loses out when a country opens to trade. In the case of the U.S., that means American workers lose as they implicitly become part of a global labor market. This income redistribution effect remains operative, but it is distinct from the new concerns raised by GBS.

Second, GBS's argument is not about wage and employment dislocation costs caused by rearranging country production patterns in accordance with the principle of comparative advantage. Such wage losses have been emphasized by the Institute of International Economics (Kletzer and Rosen, 2005), which has proposed wage insurance as a means of compensating those who are economically injured by trade. The costs of trade-induced job dislocations and the case for wage insurance remain real and present, but they too are distinct from and supplementary to the new concerns of GBS.

The new issue raised by GBS is the dynamic evolution of comparative advantage and the resulting impact on the distribution of gains from trade. The theory of comparative advantage says that there are gains from trade for the global economy as a whole. However, the distribution of those gains between countries depends on demand and supply conditions that determine the terms of trade (i.e. the relative price of imports and exports), and these conditions can change.

One critical factor is the global pattern of demand, and a country will benefit more from trade if international demand for its products is relatively stronger as this will drive up the price of its exports. A second factor is the evolution of supply, and it is possible that rapid supply growth can harm a country by increasing global supply and driving down the price of its exports.

This latter possibility was first identified by Harry Johnson (1954, 1955) and subsequently expanded by Jagdish Bhagwati (1958), while the empirical work of Hans Singer (1950) and Raul Prebisch (1963) on declining prices of commodities relative to manufactured goods gave it operational policy significance. The Johnson-Bhagwati work then spawned a policy literature that showed how countries whose production has an impact on global prices can use export tariffs to tilt the terms of trade in their favor, thereby capturing additional gains from trade.

In the post-WWII period the U.S. did relatively well from trade as capital was globally scarce, demand for capital goods was strong, and there were also relatively few capital goods suppliers. That meant the U.S. enjoyed favorable terms of trade, which meant it captured a large share of the gains from trade. The question is will this continue over the next fifty years?

The earlier work of Johnson (1954, 1955) and Bhagwati (1958) focused on the effects of domestic technological advance on the terms of trade and distribution of gains from trade. GBS change the focus and examine the implications of economic catch-up by trading rivals. It is commonly assumed that all countries benefit from technological progress in other countries because this expands the global production possibilities frontier (PPF).[1] However, it turns out that while it is true that the global PPF is expanded, it is not necessarily true that all countries benefit from this expansion. This is an important theoretical finding.

Samuelson's (2004) concern, developed in the context of the debate over international outsourcing and trade with China, is that increases in productivity of foreign trading partners may diminish the U.S.'s share of the gains from

trade. The economic logic is as follows. As China catches up in the production of goods in which the U.S. has historically specialized—be it through its own innovation efforts or by outsourcing of production to China by U.S. firms—this will increase global supply and drive down U.S. export prices, thereby worsening the U.S. terms of trade. Though there are still gains from trade for the U.S., these can be less than they were prior to China catching up.

Gomory and Baumol (2000) explore similar themes in an environment in which firms also have internal economies of scale so that average unit costs fall as the volume of production increases. Like Samuelson's (2004) model, theirs is a world of full employment so that the problems they identify with trade are not due to unemployment, and introducing unemployment compounds the concerns they identify.

Economies of scale mean that each good is produced by only one country. Gomory-Baumol assume that all countries have access to the same technology. Which country gets to produce what goods then depends on which gets to move down its cost curve first and thereby gain a cost advantage that locks-out other producers. Such lockout means that multiple different equilibria are possible, and the particular equilibrium that actually prevails depends on which country gets a head start in which industries.

The existence of multiple equilibria means that it is only by chance that the actual equilibrium maximizes global output, and the prevailing allocation of production across countries may be globally inefficient. For instance one country may get a head start in a large number of industries, thereby blocking new entrants into them. Consequently, the scale of production is too small in these industries and the global economy loses the benefit of larger scale. In this situation, rearranging the pattern of global production can benefit all by expanding scale in some industries and reducing it in others.

By way of example, consider the case where there are two identical countries and four industries, and each country has full employment. Suppose the initial equilibrium has country one controlling industries 1–3, and country two controlling industry 4. In this event, scale is too small in industries 1–3, and too large in industry 4. A superior production plan that expands global income is to have each country produce two goods, thereby expanding production in industries 1–3 and contracting it in industry 4.

The inefficiencies can get even worse if countries have different cost curves. Such differences can exist because of differences in technology or due to "external" economies of scale arising from agglomeration effects. Such positive

agglomeration effects arise when individual firms' efficiency is enhanced as the entire industry expands so that industry expansion lowers the costs of individual firms. In this case, not only can there be a global mal-distribution of production (Gomory-Baumol inefficiency), but production can also be misallocated to countries with inferior technology and higher costs. This can happen if a high cost inefficient country gets to move down its average cost curve first, thereby becoming the low cost global producer and acquiring "ruling" cost advantage. Even though other countries are potentially more efficient, they are locked out by the first country's head start moving down its average cost curve.[2]

This situation is illustrated in figure 1 (see page 132) which shows the average cost curves for industry k in countries 1 and 2. The average cost for industry k in country 1 lies above that of country 2 throughout. Yet country 1 can become the global producer if it gets a head start and moves down its average cost curve first, thereby gaining a competitive advantage over a new entrant in country 2 and locking out that new entrant. Figure 1 shows country 1 producing $Q_{1,k}$ at an average cost of $\$_{1,k}$. Country 1 is able to block country 2 from producing despite the fact that it is potentially more efficient because country 1 has secured a cost advantage by being first to move down the average cost curve.

In sum, where cost curves differ across countries world output can be reduced for two reasons. First, the country with the true low cost production technology may not produce. Second, production may be mal-distributed globally, with some countries producing too many types of goods and others producing too few, thereby resulting in inefficient exploitation of economies of scale.

In addition to giving rise to potentially inefficient global production patterns, Gomory and Baumol (2000) show that IRTS can give rise to trade conflict as countries' incomes converge. This argument is illustrated in figure 2. Assuming two identical countries with identical technologies with identical demands for each good, global income is maximized when countries have the same number of industries and each country produces half of world output. However, individual country income is maximized when a country has more than half of the industries. That means there exists a zone of conflict in which reallocating production between countries can increase global income, but one country also benefits at the expense of the other.

The economic logic for this pattern is as follows. Consider an initial equilibrium where most industries are located in one country. In this case, scale is too

low in those industries and too high in the few industries located in the other countries. Reallocating some industries from the country with many to the country with few can increase global income by increasing the scale of production. Output expands in those industries that remain because resources are transferred into them: it also increases in the industries that are transferred because they had limited access to resources before and now get expanded access in the new country location. All countries benefit from this scale effect. However, in addition there are terms of trade effects as the prices of goods produced by the expanding industries falls. That means the marginal gains to the country receiving new industries exceeds the gains to the country losing industries. As incomes of the two countries converge, the scale gains from further reallocations decrease and the terms of trade effects may outweigh them.[3] At this stage, further industry transfers can lower the income of the country losing industries even though they expand global income and the other country's income.[4]

The moral of the story is twofold. First, countries do not benefit from autarky and producing everything because they lose the benefit of economies of scale. Second, countries still want to retain a more than proportionate share of industries as this restricts global output in those industries, driving up prices of those goods. Since they also export these goods, this confers a terms of trade benefit that increases their income. The implication is that losing too much of the industrial base is bad for an economy, although it might be good for the global economy. Correspondingly, a country that has a disproportionately few number of industries has an interest in engaging in strategic policy to attract more industries as this confers both scale gains and terms of trade improvements.

III POLICY IMPLICATIONS OF GBS'S CRITIQUE

The central focus of Samuelson's (2004) analysis is the economic implications of technology catch-up in other countries. For Gomory and Baumol (2000) it is the implications of loss of the industrial base and transfer of industries to other countries. Both have dramatic implications for trade policy. Traditionally, such policy has been thought of in terms of tariffs, quotas, and export subsidies. Now, it needs to be re-conceptualized in terms of the forces driving industrial and technological development within countries, and it must also take account of the possibility for rivalrous strategic policy between countries.

Technology transfer and catch-up is critical in both stories, particularly that of Samuelson. Additionally, there is a new emphasis on the fact that comparative advantage in the modern world is created and not endowed. In the 18th century

world, trade was driven by the search for exotic spices and raw materials. In that epoch, climate and natural resource endowments significantly determined the pattern of comparative advantage, and little could be done to alter this pattern.[5] In today's economy, comparative advantage is driven by technology, and technology can be importantly influenced by human action and policy. That has huge implications for the distribution of gains from trade among countries.

Strategic trade policy is also critical in both stories, particularly that of Gomory and Baumol. Within their stylized framework, the critical insight is that equilibrium in a world of IRTS is potentially quite fragile. This opens the way for policy interventions that change the equilibrium, and thereby redistribute the gains from trade. For instance, policy may confer a temporary benefit on a country's producers that moves them down their average costs curves so that they acquire ruling cost advantage. This can establish a new equilibrium pattern of global production that persists after the policy benefit is removed.

Such possibilities mean that IRTS creates much room for economic conflict between countries. Given the existence of multiple equilibria in which the distribution of gains from trade depends on the particulars of the prevailing equilibrium, countries may have an incentive to try and change the equilibrium.[6] This generic policy implication of IRTS has long been present in new trade theory (Krugman, 1984; Brander and Spencer, 1985), but Gomory and Baumol's detailed simulations show just how potentially malleable the equilibrium pattern of trade is in the presence of IRTS.

Specifically, there are a number of scenarios in which strategic policy matters. For instance, consider a situation in which technology is initially unequally distributed across countries. In this case, backward countries will have an incentive to use policy to acquire technology and establish production within their borders. Doing so can increase global income, but it may diminish the income of those countries losing industries if the global economy is in Baumol and Gomory's (2000) zone of conflict.

Another example is if some industries earn higher profit mark-ups. In that case, countries will have an incentive to wrest control of those industries in order to earn the higher mark-ups. Moreover, even countries with strictly higher average cost curves may have an incentive to wrest control despite the fact they are less efficient. Given the presence of IRTS, a high cost country can effect such a transfer if government temporarily provides assistance that moves domestic producers down their cost schedule to establish ruling cost advantage—as shown earlier in figure 1.

Finally, strategic policy can be useful in a world with unemployment due to inadequate demand. In this case countries that stimulate their own domestic demand and poach demand from other countries (through such measures as subsidies), increase production in their industries and lower average costs. Consequently, these countries can become the ruling low cost producer at the expense of others.

Relative productivity decline and loss of technological leadership play an important role in the GBS story. Most immediately, this raises questions about the wisdom of international outsourcing in industries where the U.S. has historically had comparative advantage and been an exporter. Such outsourcing involves technology transfer. Though companies benefit from outsourcing because they get to earn foreign profits, outsourcing can diminish U.S. national income if it transfers technology that increases competition versus U.S. exports.

Outsourcing also has some parallels with offsets whereby countries require companies to promise to transfer some part of production to the buyer country as a condition of the sales contract. The classic example of this is the aircraft industry, both civilian and military. Offsets are a way that one country can capture an industry from another, and they are therefore very troubling from a national interest perspective.[7] However, companies are much less troubled by offsets because they win the order and then get to earn profits on their foreign production. This highlights the divergence between company and national interest—about which more below.

Within the GBS framework technological leadership is key, and there are signs that the U.S. may already be slipping. Freeman (2004) reports that the U.S. share of world high-tech exports fell from 30% in 1980 to 17% in 2001. The U.S. share of world scientific papers fell from 45% in 1980 to 35% in 2001, and the U.S. share of papers in the chemical abstracts service fell from 73% in 1980 to 40% in 2003. China is gaining especially rapidly in the technology area and graduated 325,000 B.S. engineers in 2003, versus 65,000 in the United States. The U.S. lead in producing students with science and engineering Ph.D.s is also falling. In 1989 major Asian nations produced 48 Ph.D.s for every 100 U.S. Ph.D.s: in 2001 they produced 96 for every 100.

This pattern suggests the U.S. needs to bolster public expenditures on science education and research and development. Additionally, tax law should be structured to encourage companies to undertake R & D spending of their own and to invest in the latest technologies and equipment. What was viewed previously as domestic policy is now part of trade policy in the new era of globalization.

Not only does globalization enhance the significance of science and technology policy, it also adds new difficulties. In the pre-globalization era domestically developed science and technology innovations were likely to be applied domestically so that benefit accrued significantly to the innovating country. Today, with corporations organizing production on a global basis, there is nothing to ensure that domestically produced innovations will be applied domestically. Instead, corporations may simply transfer the innovation to a foreign production location. This may be the best way for the corporation to maximize profits, but it may not maximize national income. In the era of globalization, profit maximization by firms contributes to the maximization of global output, but it does not necessarily maximize national output. This is not yet understood by national policymakers.

These observations point to the need for a new policy agenda that addresses corporations. Such an agenda is currently absent. In the 1950s it could reasonably be said that what was good for General Motors was good for the country. This was not because the managers at General Motors were any more altruistic or patriotic than they are today. It was because the global economy was less open and firms were less technologically capable of organizing production on a global basis. Consequently, corporate interests aligned closely with national interests. That alignment has been fractured by globalization. Before globalization, maximization of profits by competitive firms maximized national income. Today, firms maximize profits on the basis of global production allocations. This maximizes global output but does not necessarily maximize national income. Hence the need for national policies that re-root corporations by re-aligning profit maximization with the national interest.

In this regard, there may be important differences across countries. American corporations are free to choose their business strategy on a global basis, without regard to American national interest. Indeed, taking account of American national interest would be a breach of fiduciary duty since managers have an obligation to maximize shareholder value. Contrastingly, in China the national government exerts significant control over corporations, and national interest is factored into business strategy. From a national perspective that means China is advantaged relative to the U.S., though shareholders in Chinese corporations are not as well served as shareholders in U.S. corporations.

A third area needing policy attention is exchange rates. This problem is not addressed by GBS, but is implicit in their work. GBS's analysis is based on pure trade theory, and as such it abstracts from exchange rate issues. In

effect, it assumes that exchange rates are at purchasing power parity values. However, if exchange rates deviate from this they can give rise to significant, costly distortions.

In a world of IRTS, countries can use undervalued exchange rates to give national firms a competitive advantage. Under-valued exchange rates lower the price of exports and increase the price of imports, thereby increasing product demand and output. In this fashion, under-valued exchange rates can help firms to move down their average cost schedules and acquire ruling comparative advantage. Countries can therefore strategically use exchange rates to capture industries they were not previously active in. Moreover, manufacturing firms are clusters of knowledge, skills, and capital, with themselves clustered in industries. Once firms and industries are destroyed it is costly and difficult to reassemble them so that they may not return even if the exchange rate under-valuation is corrected. Consequently, episodes of exchange rate under-valuation can have permanent impacts on the structure of global production (Palley, 2003a).

Moreover, even in conventional trade theory exchange rate under-valuation gives rise to deviations from comparative advantage and misallocation of production (Blecker, 2005a). Comparative advantage is a theory of balanced trade. Consequently, if a country has an under-valued exchange rate and a persistent trade surplus, it implies it is exporting some products that it lacks a comparative advantage in. Likewise, the country running persistent trade deficits is importing some products that it may truly have comparative advantage in.

In the presence of unemployment, which is assumed away by pure trade theory, under-valued exchange rates can be used strategically to poach aggregate demand from other countries and thereby reduce a country's unemployment at the expense of other countries. Long ago, this possibility was identified by Joan Robinson (1947, p.156–70) who termed such policy a "beggar-my-neighbor" remedy for unemployment.[8]

The bottom line is that exchange rates matter significantly for global production and employment outcomes. In a world without IRTS, under-valued exchange rates result in deviations of production from comparative advantage. In a world with IRTS, exchange rate under-valuation can be used to permanently change the equilibrium and lock-in new patterns of global production.

These effects speak to making exchange rates a central part of trade policy and trade agreements. Yet currently, U.S. policymakers have rejected exchange rate intervention on the grounds that markets know best. This policy stance is

at odds with reason and evidence. There are many theoretical reasons for believing that foreign exchange markets are prone to herd behavior. There is also strong empirical evidence that exchange rates depart from their theoretically warranted equilibrium levels—be they defined as purchasing power parity or as the exchange rate consistent with sustainable current account deficits. Worse than that, in some cases other countries (especially the East Asian economies) are strategically manipulating their exchange rates, and that means the U.S. is being economically out-gamed, losing industries and racking up large trade deficits that carry future burdens.

Another form of strategic policy is domestic procurement. Here, countries can direct government purchases toward national companies, thereby scaling up production at those firms. In this fashion, they can help firms move down their average cost curve, thereby becoming the global low cost producer and grabbing global leadership.

Countries can also engage in labor exploitation to gain advantage. In this case they shift down business's average cost schedule rather than moving along it. This has direct relevance for trade with China, which American trade unions have accused of engaging in labor exploitation for purposes of gaining trade advantages.

Labor exploitation is horrendous and unacceptable. However, a legitimate way of lowering business' costs concerns the method of providing health and social insurance. In the U.S such insurance is provided via jobs, making it a job cost. This raises the cost of U.S. based production, competitively disadvantaging U.S. producers and providing an incentive to offshore work. Providing health insurance through a national insurance system that is funded by federal tax revenues can potentially reduce this incentive.[9] The same holds for funding of Social Security. Indeed, to the extent it is funded by taxation of global corporate profits, the cost is partially borne by profits from offshore production.

In sum, GBS's analysis of trade suggests a collection of policies that has some resemblance with what has historically been called industrial or competitiveness policy. However, the proposed policies do not involve policymakers "picking winners," something there is no reason to believe they can do. Instead, it is a matter of establishing the right economic "structure" and "atmosphere". Structure refers to law and rules, and it should provide incentives for firms to innovate and invest and for workers to improve their skills. It should also ensure that the interests of corporations are aligned with the national interest. Atmosphere should determine business conditions, which should be favorable

to domestic business performance. This includes the promotion of full employment and the maintenance of competitively valued exchange rates.

IV PARALLEL MACROECONOMIC ANALYSIS

GBS's analysis of trade is based on pure trade theory. As such it assumes long run equilibrium marked by full employment and balanced trade. Their microeconomic analysis can be complemented by conventional macroeconomic analysis that allows for unemployment and trade deficits. Such macroeconomic analysis echoes their concerns and raises additional concerns about economic stability and the character of international competition.

The current record U.S. trade deficit illustrates this macroeconomic analysis, with the trade deficit contributing to the most recent U.S. economic recovery being the weakest since World War II. Between 2000 and 2005 the U.S. trade deficit rose from $377.6 billion to $716.7 billion, equaling 5.7 percent of GDP in 2005. According to the U.S. Commerce Department the rising trade deficit directly reduced GDP growth by over 25 percent between 2001 and 2005 by channeling spending to foreign rather than domestically produced goods. Moreover, this reduction excludes additional indirect losses stemming from the fact that lower spending on domestic production meant fewer jobs, in turn causing the U.S. to forfeit spending and growth those jobs would have generated.

With regard to employment, Bivens (2004) estimates that the U.S. trade deficit in manufactured goods accounted for 59 percent of the manufacturing jobs lost between 1998 and 2003. Based on an input-output methodology that measures the number of jobs embedded in every billion dollars of the deficit, Robert Scott of the Economic Policy Institute in Washington DC estimates that every billion dollars of goods imports embodies around 9,500 jobs. Stripping out the OPEC deficit of $92.7 billion, the goods trade deficit in 2005 was $695 billion. Using Scott's job multiplier of 9,500, this implies 6.6 million job opportunities were embedded in the trade deficit.[10] The implication is that instead of creating jobs at home, a significant chunk of consumer and investment spending has leached out of the economy in the form of spending on imports.

In addition to having adverse short run employment and output effects, the large trade deficit also has adverse long run macroeconomic effects. Through their impact on the trade deficit, undervalued exchange rates in the rest of the world have severely impacted U.S. manufacturing, with many companies closing U.S. plants because they cannot compete. Some companies have simply gone

out of business, while others have re-located or sub-contracted production—particularly to China. The sectoral impacts of the trade deficit with China have been extensively reported on in the 2003 and 2004 annual reports of the U.S.—China Economic and Security Review Commission.[11]

Many companies have also cut back on investment spending or re-directed investment elsewhere rather than building new modern capacity in the United States. Blecker (2006) examines the impact of the over-valued dollar on U.S. manufacturing profits and investment spending. His estimates imply that the appreciation of the dollar from 1995 to 2004 lowered U.S. manufacturing investment by 61% and the manufacturing capital stock by 17% relative to what it would have been in 2004 had the dollar remained at its 1995 level. This has structurally weakened the U.S. industrial base, and has made the future task of trade deficit adjustment more difficult as the U.S. may now lack the capacity needed to produce manufactured goods it now imports.

These effects on manufacturing jobs and investment provide concrete support for GBS's concerns. Manufacturing is key to long run prosperity, being a major center of productivity growth and innovation. When manufacturing moves offshore, associated research and development activities can move too, thereby further diminishing the flow of future innovations.

Another problem is that international trade remains concentrated in goods, which means that over the long haul countries need to be able to produce and sell manufacturing goods to finance imports. The erosion of U.S. manufacturing capacity undermines this ability, potentially risking a future decline in U.S. living standards and the possibility that U.S. growth and employment could become balance of payments constrained.

The trade deficit also carries significant adverse financial implications for the United States. In particular, the accumulation of foreign indebtedness makes U.S. financial markets potentially vulnerable to a sell-off by either foreign creditors or domestic investors. If this were to happen U.S. interest rates would rise and the dollar would fall precipitously. Inflation would also likely increase because of heavy reliance on imported goods and limited domestic manufacturing capacity to replace those goods. The net result is that the U.S. could experience a return of stagflation.

Finally, the U.S. trade deficit links to the broader issue of export-led growth and the character of global economic development. Export-led growth has countries relying on exports to promote manufacturing growth and development, and this strategy encourages resort to under-valued exchange rates as a

way of attaining international competitiveness. It has been widely adopted by many developing countries, and Europe and Japan have also relied on exports to reflate their economies.

Export-led growth raises a host of controversial issues.[12] These include its contribution toward the record global financial imbalances, exemplified by the U.S. trade deficit: its role in promoting race-to-the-bottom style competition between countries as they look for international competitive advantage however possible: and its tendency to promote global deflation since countries add to global supply without an equal increase in global demand.

Export-led growth can be viewed as a form of strategic policy, which connects it to GBS's analysis. Thus, the reliance on under-valued exchange rates to promote exports can also result in the capture of industries. Export-led growth can also be viewed as adversely changing the character of global economic competition, something that is not addressed in standard microeconomic trade theory. This question of character of competition has been of concern to institutional economists and it provides another angle on the debate over global outsourcing (Palley, 2006). It also provides a logical link to the debate regarding need for international labor and environmental standards (Palley, 2004).

V CONCLUSION: THE IMPORTANCE OF GBS'S CONTRIBUTION

GBS's theoretical work dramatically changes the trade policy debate. In a sense, their work helps pure trade theory catch up with the new realities of globalization. Technology is now highly mobile, and its transfer between countries can be significantly influenced by policy. Strategically designed policy can influence the nature of global equilibrium, and thereby change the distribution of gains from trade. Such strategic policy includes research and development policy, rules governing corporate behavior, exchange rate manipulation, government procurement policy, offset requirements, and policies that impact the international competitiveness of firms. The bottom line is that in such a world it is a mistake for countries to ignore strategic trade policy, and is especially dangerous if a country allows itself to be out-gamed by other countries.

Though there are always gains from trade, countries can suffer from further globalization in the sense that their future gains from trade may fall, making them worse off than before. This sobering conclusion derives from pure trade theory, which assumes away macroeconomic problems of unemployment, trade deficits, and financial instability. When these macroeconomic problems are factored in, the case for strategic trade policy becomes even stronger.

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NOTES

1. For example, see Freeman (2004) in which the tacit assumption is that globalization expands U.S. national income, although workers lose because of a super-sized Stolper-Samuelson effect.
2. Agglomeration economies of scale are particularly complex. Where these are present, a country can appear to have the lower cost curve. However, this may be due to the fact that it was the first starter, and thereby acquired the extra benefit of agglomeration economies.
3. In the Gomory-Baumol model, given their assumptions of identical technology and cost curves across countries, the critical convergence factor is industry scale of production. This determines whether there are global efficiency gains to be had by rearranging global production patterns. When all industries everywhere are producing at the same scale, there are no global gains to be had. However, countries can benefit themselves by capturing industries, but their gain comes at the expense of other countries.

4. The Gomory-Baumol (2000) model assumes identical countries so that a zone of conflict emerges as country incomes converge. In the real world, where countries differ, a zone of conflict may develop as the distribution of production of tradeable goods is equalized. Thus, China can have a far lower national income than the U.S. owing to a large immobile and unproductive non-tradeable sector, but the two countries can still be in the zone of conflict because the distribution of tradeable goods industries is converging.
5. A more precise representation is that Europe had a technological advantage, while the tropics had climatic advantage.
6. It is also true that in some instances cooperatively reorganizing global production patterns can raise incomes and improve welfare for all countries. This can happen when the world initially gets locked into an extremely inefficient equilibrium in which a high cost country gets to be the first to move down its average cost schedule and acquires "ruling" cost advantage. In this case, all can benefit by switching production to the "true" low cost producer. Even though the first-mover country gives up producing a lucrative product, it gains because costs are so much lower in the latecomer country.
7. Offset requirements are illegal under the WTO but in countries like China, where the state exerts significant influence over large chunks of the economy, the tacit pressure for offsets is still there. In the U.S. airlines get to choose the aircraft they wish to fly and don't impose production requirements. Making aircraft sales to China is a different proposition.
8. Blecker (2005b) points out how Joan Robinson anticipated many of the macroeconomic policy problems inherent in new trade theory with IRTS.
9. If wages rise to compensate for the burden of higher tax payments needed to fund the system, this would reduce the beneficial job retention impact.
10. Scott's methodology does not include additional jobs that would be created indirectly by expenditure multiplier effects resulting from increased incomes generated by higher manufacturing employment and production. On the other hand, nor does it take account of jobs that may be created by cheaper imported inputs.
11. These reports can be found at www.uscc.gov
12. For a full treatment of export-led growth see Blecker (2003) and Palley (2003b).

FIGURE 1

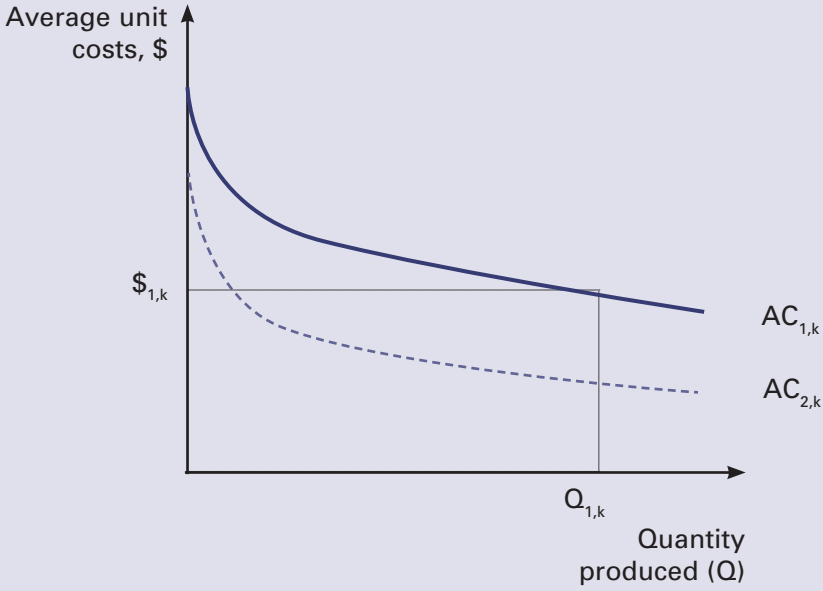
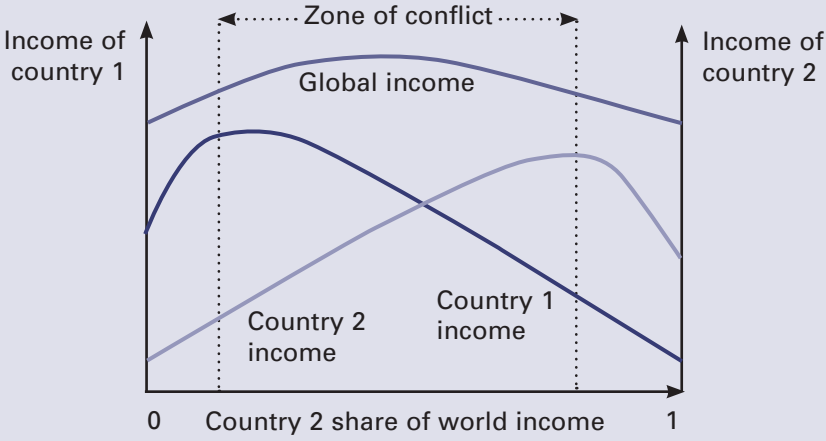


FIGURE 2



APPENDIX VI

The End of the Dollar

AN EXCERPT FROM *Three Billion New Capitalists: The Great Shift of Wealth and Power to the East*
(Basic Books, New York, NY, 2005)

BY CLYDE PRESTOWITZ

Sorry, son, all my money's tied up in currency.
—W.C. FIELDS

At a recent conference in New Delhi concerning the future development of India and China, I was the only American on the program—or in the audience. Nevertheless, the economic discussion was couched in terms of dollars. Charts and tables relating to Indian or Chinese GDP growth rates, export and import volumes, foreign reserve holdings, and other variables were all denominated in dollars. Even when I had the bad luck to run short of Indian rupees in the middle of the conference, the coffee service gladly took my dollars. Nor was this surprising. Wherever I have traveled for the past forty years, people always and everywhere have readily accepted dollars. Few of the conference participants considered that the Indian and Chinese economic developments they were discussing could serve as catalysts for the end of the dollar era.

Yet that possibility was made clear to me on the return trip, when I stopped in Frankfurt for lunch with some German friends. The conversation turned to how inexpensive things are in the United States these days. When I mentioned the price of a new house in Washington, one of my friends became a bit confused and asked what that would be "in real money," by which he meant euros. It was a perfect reversal of the classic American tourist's question to anyone spouting prices in a currency other than dollars. It was also a brutally insightful commentary on a developing financial shift of truly global proportions. Over the past four years, the chronic U.S. trade

deficit has reached unprecedented levels, and the dollar has begun to weaken as a consequence. Of course, this has happened before and the dollar has not lost its global primacy despite a cumulative decline of 70 percent over the past fifty years. But this time it is different. If you don't believe me, listen to George Soros and Warren Buffett.

A BET AGAINST THE DOLLAR

On matters of money, these two have established their bona fides beyond any doubt. Soros is one of the great currency speculators of all time, and Buffett is perhaps the all-time greatest long-term investor. Soros gained fame in the early 1990s as the man who broke the British pound by betting $10 billion that it would fall and making a quick billion when it did. Subsequently, when he warned in June 2002 that the greenback was in danger of losing a third of its value, it was worth taking notice. Of course, you could argue that, since Soros is a professional hedge fund manager whose job is to play the ups and downs of currencies, this remark may have been more manipulation than prophecy. Here's where Buffett comes in. No currency speculator he: in a November 2003 article in Fortune, he noted that he had begun worrying about mounting trade deficits way back in 1987, but he had never bought a dime of foreign currency—until the middle of 2002, when the deficit went from big to enormous. Since then, he says, he has felt it only prudent to begin moving some of his money into nondollar assets. Buffett's commentary is fascinating for both its modesty and its conviction.[1]

Nevertheless, he says he's crying wolf again and backing it with Berkshire Hathaway's money this time by investing in several currencies. He insists he is doing this reluctantly and actually hopes, as an American and as an investor in many U.S. companies, that it doesn't pay off. But he emphasizes that he has to invest prudently, and the U.S. trade deficit has now grown so large that the country's "net worth" is being transferred abroad at such a rapid rate that the value of dollar-based assets may be at risk. To demonstrate why he is concerned, Buffett describes economic developments on two side-by-side islands, equal in every way except in the lifestyles of their inhabitants, which are captured in the names of the islands—Squanderville and Thriftville.

Land is the only asset in these islands, and the inhabitants need only food, of which enough for the needs of all can be produced by each inhabit-

ant working eight hours a day. For a long time, things go along smoothly and pleasantly as everyone works his or her eight hours and each society is contentedly self-sufficient. But then Thriftville is seized by an extraordinary work ethic and everyone starts working 16 hours a day, exporting their excess food to Squanderville where the citizens are more than willing to quit working altogether and enjoy life while living off the food provided by their Thrifty friends. Even better, the Thrifties are willing to supply all this food in return for pieces of paper, Squanderbonds denominated in Squanderbucks. After a while the Thrifties have a lot of these Squanderbonds, which are essentially claim checks on Squanderville's future output. A few Squander pundits are nervous because they foresee that to pay off their growing debt the Squandervillians will, at some point, not only have to go back to work, but will have to work more than eight hours a day. But the pundits are dismissed and accused of being unpatriotic and having insufficient faith that Squanderville's best days are yet to come.

But a lot of Thrifties are getting worried too because they begin to doubt that the Squanders will ever be able to pay off any of those IOUs. In fact, there is some talk in Squanderville about printing more Squanderbucks to create inflation and dilute the value of both the bucks and the bonds so that they are easy to pay off. This talk leads the Thrifties to sell off the bonds quickly for Squanderbucks with which they start buying Squander land. After a while the Squanders are forced to wake up to a grim reality. The party was great while it lasted, but now they have to work eight hours a day to provide their own food plus extra hours to cover the rent on the land they so blithely sold. It is to hedge against the Squanderville syndrome that Buffett is moving some money into non-dollar assets.

THE PONZI SCHEME ECONOMY

What has Buffett and Soros worried is the enormous imbalances in the global economy. Indeed, in some ways it resembles the scheme made famous in 1920 by Boston's Charles Ponzi. He operated a fund in which early investors were guaranteed huge returns to be paid from the money contributed by new investors. The problem was that since the fund had no other source of income, it needed to add investors at a geometrically accelerating rate in order to keep paying the promised returns to the ever growing pool of previous investors. Eventually the entire population of the world would not have been sufficient to keep the fund afloat. When the scheme collapsed, Ponzi was sentenced to

five years in federal prison and investors lost most of their money. (Ponzi somehow managed to disappear before serving an additional sentence on state charges in Massachusetts and started a land scam in Florida.)

In today's global economy, one net consumer—the United States—is accumulating a huge trade deficit by buying more than it produces at an ever accelerating rate. While it imported $600 billion more than it produced in 2004, it will import an excess of nearly $700 billion in 2005. The money to pay for this excess has to be borrowed from the rest of the world. So far that has been no problem because the rest of the world saves by consuming less than it produces, and then lends the savings to the United States so that we Americans can import the excess production of the other members of the global community. These U.S. imports create export-led growth for the rest of the world while adding to the growing U.S. trade deficit. Thus Americans borrow and buy more and more while the rest of the world saves and produces more and more. It then lends more and more to the Americans so they can spend more and more on imports from abroad.

As Buffett noted, this has been going on for a long time, and for a good reason. It suits all the players fine. The Americans (Squanders) get to live beyond their means, and they love it. The best part is that because individual Americans are not borrowing the money, they get to believe they are actually earning their high standard of living. The non-Americans (Thriftvillians) also like it. The extra American demand enables them to invest more and grow faster than they otherwise could, particularly in what they consider key industries. It also allows them to earn a reserve of dollars that can cushion shocks and provide leverage in global financial negotiations. So everyone is happy. If the Americans could guarantee to buy more than they produce at an ever accelerating pace indefinitely, while the rest of the world guaranteed to keep lending to America at the same pace, everyone would remain happy. Unfortunately, as Buffett points out, neither side can make those guarantees.

Here's why. American consumers have been buying so much on their credit cards and home equity lines that U.S. household debt is now at an all-time high of 120 percent of household income.[2] Once the credit cards and home equity lines are maxed out, the kids all have part-time jobs, and mom and dad both work full-time, it is just not possible to consume more unless earnings start rising more rapidly. But earnings can't rise. The lack of domestic savings is holding investment down, and the rapid move

toward outsourcing and offshoring, along with technology-driven productivity gains, is restraining all but executive wages and salaries. And an aging population with lots of retirees means less consumption and less growth over time. Finally, the United States is already absorbing a large portion of the world's internationally available savings. At current rising debt rates, there simply may not be enough global savings to fund the American need.

There are also pressures on the other side of the equation. The great pools of world savings are in Asia, particularly China and Japan. But the aging of Japan's population has already cut savings rates from 15 percent to 6.4 percent.[3] In China, which is also aging, popular pressure to realize the fruits of economic growth through more consumption is also likely to cut savings rates. This is broadly true for the rest of East and Southeast Asia as well. More immediately, however, many foreigners are growing uneasy about the long-term value of the American IOUs they have been piling up. Foreigners effectively lend money to the United States in several ways. Private investors, for instance, might buy U.S. stocks and bonds or real estate or locate new factories and offices on U.S. territory. All of which brings foreign money flowing into the U.S. coffers. Foreign central banks also invest in the United States by acquiring Treasury bonds or buying the dollar in an effort to prop its value up when foreign exchange forces are tending to push it down. During the dot.com bubble of the late 1990s, the vast bulk of foreign money flowing into the United States belonged to private actors rushing to invest in the new El Dorado. In those years, however, the United States needed only $100 billion–$200 billion to balance its deficits.

Recently that amount has grown to nearly $700 billion annually, even as the crash of the U.S. stock markets and a recession have driven many private foreign investors out of the market. They were replaced by their countries' central banks, which are now sitting on enormous piles of U.S. Treasuries, dollars, and other assets. Twenty years ago, America was the world's biggest creditor. Now the Thriftvillians of the world's central banks are choking on close to a net $1.5 trillion of American IOUs and increasingly wondering if Americans are really going to make good on them. They especially wonder this when they consider two developments. One is the rapid offshoring of U.S. manufacturing, software, and services, and the other is the likely continued decline of U.S. savings, as the federal budget deficit widens under the impact of rising social security and health insurance obligations. Both will make the current account deficit get much bigger before it gets smaller.

THE MAKING OF A PICKLE

How did we get into this pickle? Of the many factors, primary have been America's misuse of the dollar, our falling savings rate, our soaring trade deficit, and the myth of free trade, along with the excessively high savings rates, production, and exports of other countries. Let's start with the abuse of America's privileged role as the issuer of the world's money—the dollar.

ABUSING THE DOLLAR

When President Nixon announced the end of the dollar's link to gold and created today's dollar standard, he effectively made the global financial system dependent on America's good behavior.

With no necessity to make good on its obligations in a world with no alternative reserve currency, America was literally licensed to print international money. It could exchange green pieces of paper bearing pictures of presidents for whatever it wished to buy. Do America's gas guzzlers need more oil? Print greenbacks and send 'em to the Saudis. Are American kids in love with everything made in Japan or China? Just run off some of those presidential pictures and send them along. America could have anything it wanted without having to consider the value of what it was getting against the value of what it was giving because—except in a very abstract way and over a very long term (about which more later)—it wasn't giving anything of value.

With no potential discipline or real obligations involved, America's international trade accounts became accounting artifacts. When I was a student in the 1960s, the monthly trade and balance of payments statistics were prominently reported, and France's periodic demands for more gold from Fort Knox were hotly debated. After the Nixon shock, however, this all got relegated to page 42, and America stopped worrying about international trade. Other countries had to count their reserves and find ways to earn dollars in order to procure necessities from international suppliers. But not the Americans. They just ran their printing presses and bought whatever they wanted. If they happened to buy more than they produced, what difference did it make? In fact, it was actually good to buy more than you produced because the world needed an engine of growth, in view of the fact that the Asians saved too much and consumed too little.

NO MORE PIGGY BANK: THE DECLINE OF SAVINGS

America's emphasis—with the memory of the Great Depression still fresh—on consumption as the driver of economic growth after World War II has a twin—

a declining national savings rate. From 1947 to 1973, America's national savings—the combination of household, corporate, and government budget surpluses and deficits—fluctuated between about 8 to 15 percent of GDP. Since 1980, however, everything has gone south. What lies behind this trend is both difficult and easy to explain.

The difficult part is personal savings. Over the past twenty-five years it has steadily declined, from nearly 10 percent of GDP in 1979 to almost nothing today. One factor, clearly, has been the heavy promotion of consumption. As a teenager in the late 1950s, I never received an unsolicited credit card in the mail. When my children were teenagers in the late 1980s, they were each getting two or three a month. In 1968 outstanding consumer credit (calculated in year 2000 dollars) was $119 billion. By June 2000 it had soared to nearly $1.5 trillion. In 1970 only 16 percent of households had a bank type of credit card. By 1998 that figure had climbed to nearly 70 percent.[4] So aggressive are the credit card companies that they use data-mining techniques to identify people with high debt balances on their present cards in order to ply them with additional card offers. I can remember when most retail stores were closed on Sundays. For my children, that is unimaginable.

This shop-till-you-drop mentality did not evolve unaided. For a long time, the interest on credit card debt was tax deductible because the government thought shop-till-you-drop was good for the economy. Even when the feds eliminated the deduction, they provided for tax deductibility on home equity loans, meaning you could keep shopping as long as you owned a house. And don't forget President Bush's stirring injunction to the nation following 9/11. After declaring "war on terrorism," he urged Americans to support the effort by shopping to keep the economy going. The same year, Alan Greenspan, director of the Federal Reserve system and the nation's top economist, slashed interest rates virtually to zero after the collapse of the dot.com bubble in an effort to hold up consumer spending by encouraging home equity loan–based buying. Over the past fifty years, "saving" has almost become a bad word. Hardly anyone wants you to do it.

But the rise of consumerism only partly explains the decline of saving. There has also been a tightening squeeze on the average family's finances. After more than doubling from $21,201 to $43,219 (2003 dollars) between 1947 and 1973, median family income went nowhere for the next twenty-two years, rising only to $48,679 in 1995.[5] It jumped to $54,191 in 2000 but then dropped back to $52,864 in 2002.[6] Had the 1947–1973 trajectory held, median family

income would now be approaching $100,000. Even more revealing, over 80 percent of households in my youth in the early 1950s only had one earner. Today over 70 percent have two.[7] One could argue that the real per capita standard of living has declined. Of course, I must quickly acknowledge that today's houses are bigger than yesterday's, and families now drive two or three cars in place of one and shop online instead of driving to the mall on Saturday. Moreover, the imported clothing, toys, and PCs they buy are very inexpensive and have given families a kind of income boost through lower prices. Michael Cox, of the Dallas Federal Reserve Bank, has written that if you calculate retail costs not in the familiar constant dollars but in the amount of average-wage work time needed to earn something, most consumer goods have grown significantly cheaper over the past generation. Cox argues that the material possessions of Americans at the poverty line in 2000 roughly equaled those of middle-income Americans in 1971.[8] So perhaps "decline" is too strong a word. Still, the average American family has been under increasing pressure to find ways to pay for the average lifestyle. One way to do that has been to save less.

The part of the falling national savings rate that is easy to explain is the government portion. The Reagan tax cuts of the early 1980s did not generate enough economic growth to offset the revenue loss arising from lower tax rates. As a consequence, the federal budget deficit soared to an unprecedented 6 percent of GDP and further accelerated the decline in the national savings rate arising from the fall in private saving.[9] America was spending far more than it was earning, and conventional analysts began to warn that government borrowing might soak up all the savings necessary to fund private investment, causing a spike in interest rates.

It never happened, because all that American buying included lots of imports that put billions of dollars in the hands of foreigners, especially of Japanese, who seemed to be making everything at the time. With global trade now denominated mainly in dollars decoupled from gold, the foreigners had no alternative but to accept and hold those green presidential pictures in return for all the Hondas, Walkmans, and Airbuses they were selling us. But rather than just look at the handsome pictures, they used them to buy U.S. Treasury bonds. This funded the burgeoning budget deficit and kept interest rates under control. Americans could have their cake and eat it too. Deficits, whether fiscal or trade, didn't seem to matter for the United States. By implication, neither did savings because, in lieu of its own, America could soak up the savings of the rest of the world. How good could life get?

Actually there were a few clouds in this picture. Social security was looking as if it would run out of money, and the federal budget deficit projection was getting so big that all the savings in the world might not be enough to offset it. So Reagan eventually raised taxes, and Bush I and then Clinton raised them even more. That, along with the 1990s dot.com bubble that produced rising tax revenue, put the federal budget in surplus and offset the continuing fall in private savings to keep total national savings at least in positive territory. Mind you, this was not enough to fund America's investment needs. The country was still borrowing like crazy, accepting those green pictures back in return for Treasury bonds or shares in U.S. companies and golf courses.

Then came the election of Bush II in 2000, and new tax cuts at the moment when private savings were collapsing completely. The budget deficit set new records in each following year, and America's national savings evaporated. In 2004 the Congressional Budget Office and several other public and private groups calculated a U.S. financial shortfall of $2.3 trillion over the next ten years.[10] But official Washington was not worried. As Vice President Dick Cheney said, "Reagan proved deficits don't matter."

AMERICANS IN SQUANDERVILLE

Cheney actually had a point. What's the big deal about national savings? So we consume more than we produce, run a trade deficit, and have no savings to fund further investment. But our economy grows and stimulates growth in the rest of the world. Saving is a virtue but not an end in itself. It simply provides investment capital for the real objective: growth and higher living standards. If you can get the capital without saving, that would seem pretty close to paradise. This is where American conservatives like Cheney think they are. They firmly believe that American democracy holds the secret to superior economic performance. Conservatives know that America's investment needs have long outstripped its now nonexistent savings. But they fully expect that foreigners will cover the gap indefinitely, both because they have no alternative to keeping their reserves in dollars and because they believe the U.S. economy will always yield the best return.

Recent history has seemed to justify this view. After raising concerns about declining competitiveness in the 1980s and recession in the early 1990s, the U.S. economy turned around to produce the longest boom in its history. It seemed to far outstrip the Japanese and European economies in both growth and productivity. On top of that, the Silicon Valley phenomenon, with its stock options,

and the boiling NASDAQ market, were making everyone rich. Of course, foreign investors were putting their money in the United States. And who said Americans had no savings? Look at their capital gains in the stock market and at the skyrocketing equity in their homes. If you counted savings properly, it was argued by conservative economists, Americans were the world champions.

Then the market crashed, destroying $8 trillion of value. This is one reason market gains on paper don't count as savings. There were other flaws in the argument as well. Much of the growth was phony. The United States had experienced one of history's great investment bubbles, comparable to the South Seas bubble in the early eighteenth century, the Tulip bubble in the 1630s, and the Japanese bubble of the 1980s. The growth of such bubbles and their collapse are not usually considered signs of robust economic health.

Another apparent justification has been productivity growth. Productivity is the single most important thing in economics. It's the difference between a rich economy and a poor one. If I can produce twice as much as you in the same amount of time, I am going to be a lot richer than you. During the golden age of 1947–1973, productivity grew faster than it ever had, at about 2.8 percent annually. That's why real income more than doubled. For the next twenty years, however, productivity growth languished at about 1.5 percent and real income hardly moved. Then there was a huge jump to 2.5 percent annual productivity growth in the late 1990s, and everyone became euphoric about the new economy and its magnetism for foreign capital.

Still, it's not entirely clear that this jump was real. By creating huge excess investment, bubbles generate high rates of production, and factories running at 100 percent of capacity are always more productive than those limping along at 70 percent. The argument has been made that the huge infusion of IT equipment and processes that accompanied the bubble was a major factor in the jump in U.S. productivity, and it contains some truth. Although productivity growth fell off somewhat in the recession of 2001–2002, it has remained good over the past several years. U.S. analysts, comparing this to the approximately 1.5 percent rates of Europe and Japan, have not hesitated to attribute foreign capital flows to America to its apparently superior productivity.

Yet the way productivity is calculated and the effect of offshoring make it very hard to get an accurate accounting. For example, U.S. productivity calculations are done by a method known as hedonic scoring. Here's the deal. Last year you bought a laptop with a one gigabit hard drive and a Pentium 3 microprocessor for $2,000. This year you got one for your wife, but it had a

two gigabit hard drive and a Pentium 5 chip, and it cost $1,000. Did computer production fall in the United States or did it double? Measured by price, it fell in half; but measured by computer power, it doubled. The U.S. government, using hedonic scoring, says it doubled. (It's actually more complicated than that, but you get the idea.) For sure, it didn't fall by half, but is your wife really using all that extra power? Maybe it didn't double either. After all, when you buy your new Cadillac with 400 horsepower to replace an old one that only had 200, you don't consider that you got two cars in place of one. Anyway, the key is that other countries don't use hedonic scoring, so it's not entirely clear how our productivity compares to theirs.

Then there's the effect of offshoring. When companies close factories and move production offshore, they close the worst plants first. Remember that productivity is the amount produced per worker per hour. When the unproductive plant closes, output per worker rises. That's very good, but what of the workers from the plant that closed? Unless they get new jobs that pay as well as and with the same productivity as the old jobs, they become a drag on the economy.

Offshoring adds another complication as well. When my tax accountant moved his back office to Bangalore, it didn't mean he was doing more tax returns. Rather, as he explained to me, by laying off his back office staff and outsourcing the work to India, he would save a huge amount of money. How would this play out in U.S. productivity accounting? Here's how it seems to work. Say my accountant sells $1,000 of tax returns. He pays nine back office employees a total of $500 to crunch the numbers and pockets $500 in profit for himself. Thus, before the switch to Bangalore, the U.S. economy gets to add $1,000 to GDP, and productivity is $100 per person employed. After the switch, the nine American back office workers have become fifteen Indian workers. The cost of doing the work in India is $100, which has to be deducted from the $1,000 gain to U.S. GDP. Thus the number of people required to do the work has increased, but as far as U.S. accounting is concerned, there is only one, my accountant. He is now making a profit of $900; and because he is now the only worker in the firm, productivity has gone to $900 per worker. U.S. GDP has decreased, and the number of people required to do the job has increased. But because most of those people are not in the United States, American productivity has taken an enormous jump. You see how slippery all this can become.

In truth, superior U.S. performance presently explains little of the foreign capital flow. The money now coming into the United States is largely not

funding private investment. Rather, it is going into treasury bonds that fund budget deficits and excess U.S. consumption. When you borrow to invest, you expect to eventually pay off your loan and make a return. But when you borrow to throw a big party, you can expect only bigger credit card payments down the road, along with less money available for investment. That's Buffett's Squanderville, that's where the United States is right now.

OVERSTUFFED PIGGY BANKS

The fault, however, doesn't lie entirely with the Americans. In their efforts to achieve rapid economic growth, first Japan, then the Asian tigers like South Korea and Singapore, and now China have all contributed to the American problem. In *The Wealth of Nations,* Adam Smith argued that the objective of economic activity is consumption. While this may be true for the Asian economies in some long-term sense, their development models all involve the suppression of consumption, along with a heavy emphasis on saving, investment, and production. In Singapore, for example, the government mandates large contributions to a pension fund. In Japan, consumer credit is limited even today. Asian savings rates, at 30 percent to over 50 percent of GDP, are higher than Western rates have ever been except in wartime, which is perhaps not surprising given that industrial development is seen in Asia as a key element of national security and of avoidance of Western dominance. For similar reasons, savings have frequently been channeled not by the invisible hands of bureaucrats. They push investments in industries they think will grow faster and enjoy higher productivity gains than others or that will raise the general level of industrial technology and prevent undesirable strategic dependence. Whether the strategy is economic or geopolitical, it is not aimed at satisfying consumers today.

We have already seen a number of examples of this. The semiconductor industry has been a favorite, with Japan, Taiwan, South Korea, and now China all promoting its development through special financial incentives and regulatory policies. These countries are prepared, in effect, to buy semiconductor plants because those plants are seen as universities-cum-research centers that will bring quick technology transfer. Sometimes there is another factor. In capital-intensive industries with only a few competitors, dominant companies can become quasi-monopolies earning high profits and paying high wages. Sometimes policymakers aim to ensure that their country includes companies that dominate these industries.

Thus, while competition and market forces operate, they are subject to intervention. Nor are the Asians the only ones to use these techniques. Americans and Europeans invented them; RCA and Airbus are good examples. But in the past fifty years they have been used more extensively and consistently in Asia than elsewhere.

High productivity usually requires economies of scale that in turn require mass production. The high Asian savings rates and the drive for mass production mean these countries always produce more than they consume. Their high savings rates mean they cannot sustain their own production and would all go into recession or depression if they suddenly had to depend on their internal demand. In short, they save and produce too much.

THE ELEPHANT IN THE ROOM

There is a solution to this problem—exports. "Export-led growth model" is the phrase coined to describe the Asian approach to economic development. The model has a number of variations. For example, Singapore and China have welcomed foreign direct investment, while Japan, Taiwan, and South Korea have resisted it. But there is a common feature: if you are a country that produces more than it consumes and depends on exports for growth, you don't want a lot of imports. You might want to import raw materials or commodities you don't make, but imports of what you do make, or of products in industries you are trying to build, interfere with your growth. Thus there is a constant temptation to protect, particularly in "strategic" areas. In practice, this temptation has been yielded to in different ways. The Japanese market has long been notoriously difficult to penetrate, while Hong Kong and Singapore are pretty easy, and China is surprisingly open. However, one characteristic common to all the key Asian economies except Hong Kong (which is essentially dollarized) is managed currencies. They are either pegged to the dollar, like China's yuan, or the object of frequent central bank intervention in the currency markets to conduct a "dirty float." Either way, they usually keep their currencies undervalued versus the dollar.

International economics employs a simple accounting equation to explain the causes and dynamics of the U.S. trade (more accurately, current account) deficit:

Exports – Imports (the trade balance) = Private Savings + Government Budget Surplus (or deficit) – Domestic Investment

A trade surplus means the sum of private savings and government surpluses or deficits is greater than domestic investment. A trade deficit means the opposite. Over the past twenty-five years, nearly all the discussion of this equation has been based on the assumption that the action is from right to left. In other words, low private savings and government budget deficits have driven the American trade deficits.

Nonetheless, because the formula is an equation, the causality can run from left to right as well. An excess of imports over exports could be causing a reduction in private savings and/or an increase in the U.S. government budget deficit. This is the effect of protectionism, pegged currencies, and "dirty floats." Companies producing in the United States sell less than they otherwise would, workers earn less, the government collects less in taxes. The result is a shortage of savings relative to investment and an ever larger trade deficit. Just as foreign governments suppress their domestic consumption, so they also help suppress U.S. savings. This is the elephant in the corner that is rarely discussed in polite company.

It is not discussed because to do so would be to challenge free trade policies that have formed the bedrock of the international economy for over half a century. The mismanagement of the global economy that worsened the Great Depression and helped bring on World War II taught postwar leaders an important lesson. Protectionism not only doesn't work; it can be dangerous. That lesson was the foundation of the postwar economic institutions, of the spread of the liberal trading regime, and of the whole second wave of globalization. The new system, built on free trade principles, succeeded because those principles are essentially sound, and there is great truth in the free trade analysis when its major assumptions are operative. But like generals fighting the last war, economists have too frequently fought the last depression while ignoring important new realities.

The British banker and economist David Ricardo first elaborated the principles of free trade in the early nineteenth century by using the example of trade between England and Portugal. With its wet cool climate, England raised sheep and made woolens that were exported to Portugal. Conversely the warm, sunny climate of Portugal was ideal for growing grapes from which the Portuguese fermented wine that they exported to England. Of course, it was possible for the Portuguese to raise sheep and for the English to culture grapes in some locales, but neither of the climates was well suited to these tasks. Both countries would raise their standard of living by doing what they did best and trading for the

rest. Ricardo further demonstrated that even if one country could both make woolens and ferment wine more efficiently than the other, each would still benefit by specializing in what it did best and importing to supply other needs. Or take the extreme case in which one country, say Portugal, insists on being self-sufficient even though this raises prices for its consumers. England is still better off by specializing in woolens and importing Portuguese wine. That the Portuguese irrationally penalize their consumers is no reason for the English to do likewise. The Portuguese are only hurting themselves. This theory of comparative advantage is mathematically unassailable and has been elaborated over the years to form the solid underpinning of international trade theory and of the myriad of free trade agreements that have dramatically lifted global living standards over the past half century.

It is important to note, however, that the theory rests on certain conditions. Ricardo was writing before the industrial revolution had really taken hold. By observation he could see that the direction of most of the trade of his day was determined by differences between countries in climate, resources, and topography. Gold was the international money and there was no "dirty float." Economies of scale hardly applied to sheep herding or winemaking, and both were mature industries without steep learning curves. Markets were mostly for competitive commodities in which producers had no power to influence the total quantity produced or the prices asked. No extra profits or "rents" were derived from dominant market positions. Finally, there was little intellectual property and technology, labor, and capital did not move easily from one country to another. Many of these conditions still apply to trade such as that in wheat or exotic flowers. But in the modern world, they frequently don't apply.

To see the limitations of some of the assumptions, let's take the example of hydro-generators, the machines that generate electricity from rushing water. In 1982, when I was counselor to the Secretary of Commerce, there were about ten manufacturers of such equipment in the world. Allis Chalmers was the last American corporation in the group. One day Allis representatives came to complain about unfair bidding. They had data showing a pattern of dramatic underbidding by several Japanese companies on a series of contracts let by various U.S. municipalities. On one contract, all the bids would be around, say, $10 million except Japanese company A, which would come in at $5 million. On the next contract, for the same kind of equipment from the same bidders, Japanese company B would be in at $5 million. Obviously illegal, collusive bid rigging was taking place.

The Commerce Department wanted to initiate an investigation, but to do so it needed the support of the Council of Economic Advisers. The brother of a close friend of mine happened to be on the council, so I approached him about the council's view. Amazingly, I was told the council saw no problem. The U.S. municipalities, he said, were getting cheap generators and making cheap electricity and selling it at low prices to consumers. Why complain? I answered that Allis Chalmers would probably have to go out of business and lay off several thousand employees. "So what?" was the response. "They can find other work in the service economy. Services are growing." When I noted that there were high costs involved in closing down a company and having whole communities look for a new livelihood, I was told that the gains to consumers outweighed these costs. Then I noted that in Japan these same companies monopolized the market and engaged in similar bid rigging, but at much higher prices because there was no outside competition. What would happen, I asked, when all the other companies had been driven out of the business and the Japanese began to raise their U.S. prices to Japanese levels? The response was that the American companies then could come back into the market. I was stunned. Here was a very intelligent person of great reputation who simply didn't understand the practical realities of the modern marketplace. Soon after this Allis did go out of business and prices did rise.

Not all economists are quite so ivory tower. Paul Krugman and Joseph Stiglitz, for instance, have done groundbreaking work on the issues of free trade, uncertainty, and modern market dynamics. Krugman is noted for his work demonstrating that free trade may not always be the best way for a country to raise living standards. He wrote in the 1980s that much of trade appears to require an explanation in terms of economies of scale, learning curves, and the dynamics of innovation—all phenomena incompatible with the kind of idealizations under which free trade is always the best policy. Economists refer to such phenomena as "market imperfections," a term conveying the presumption that they are marginal to a system which approaches ideal performance fairly closely. In reality, however, imperfections may be the rule rather than the exception.[11]

Krugman went on to explain two ways in which an activist trade policy might benefit a country more than free trade—by seeking rents and external economies. In economist-speak "rent" means profits or wages in one industry that are higher than those in a comparable industry (think of those Boeing 747 profits). The conventional view is that rents are not an issue because in a competitive

economy there won't be many. If a particular industry looks very profitable, others will quickly enter and compete the rents away. In reality, however, there are often barriers—such as the need for very large scale production, huge upfront capital costs, or steep learning curves—that keep competitors out and profits high. Think of Microsoft, for example. Why aren't other companies rushing to write and market operating systems to compete with the hugely profitable Windows? Krugman demonstrated mathematically that in this type of situation, the use of government subsidies or protection of the market at a critical moment could well improve a country's welfare over the free trade scenario.

"Externalities" is economist-speak for benefits arising from an activity that can be diffused to others not engaged in the activity. Learning how to run laboratories, for example, is a kind of knowledge that can be diffused far beyond a specific lab. The acquisition of such "externalities" can also be stimulated by appropriate government intervention. This is why China offers free land and tax holidays to get semiconductor plants, and why so many central bankers seem to enjoy dirty floating.

Despite this new strategic trade analysis, the conventional wisdom has been hard to shake. In response to a statement by the chairman of the Council of Economic Advisers, Gregory Mankiw, that offshoring of jobs was good for the U.S. economy, a storm of protest arose in the Congress and on the shop floor. Then a roll call of big-name economists rose to Mankiw's defense with all the conventional free trade arguments. They were all true too—if you assumed full employment, no dirty float, no free land and tax holiday subsidies abroad, no learning from doing externalities, and no rents. But these economists should have known that every one of those assumptions is frequently at odds with the reality of today's markets.

Why did they make a defense that rested on an unreal view of the world? For two reasons. One was inertia: the strength of academic tradition, the old fear of protectionism, and the ingrained view that even if the other guy subsidizes and protects, you are still better off with free trade. The second was distrust of American democracy. Privately most economists accept the strategic trade analysis. But they fear how it could be mishandled by Congress. Better a suboptimal free trade regime, they believe, than a strategic trade policy dictated by K Street lobbyists. This is not an unreasonable position. The U.S. Congress and the government generally are capable of amazingly stupid things. The problem, however, is that if the other guy is doing it and you're not responding in some way, you become part of his policy—a policy aimed at beating you.

THE SEEN HAND AT WORK

This possibility has been brilliantly demonstrated by Ralph Gomory and William Baumol in a little noted but extremely important book entitled *Global Trade and Conflicting National Interests.* The essence of their argument is that while the Ricardian world of climate- and resource-based comparative advantage permits only one best economic outcome for both trading partners, that is not true for most of today's trade, where economies of scale and other factors are decisive. Rather, there are many possible outcomes that, once established, can be maintained indefinitely, depending on what countries actually choose to do, what capabilities, natural or manmade, they actually develop. These outcomes vary in their consequences with some being good for one, some for the other, and some for both. Often the best outcome for one country is a poor outcome for its trading partner. This means that in a modern free trade environment, a country's welfare is critically dependent on the success in international trade of the industries within its borders (that may or may not be its citizens).[12]

Gomory and Baumol show that because there is no universally best outcome, national trade interests often conflict. An industrialized country benefits from trade with a newly industrializing country up to a point. But after that point, acquisition of more industries by the developing country actually becomes harmful to its industrialized trading partner.[13] At that point, the developed country's interests are best served by competing vigorously to maintain its industrial and technological advantages. If it fails to do so, its prosperity will be diminished. For a long time, the United States and, to a lesser extent, Europe have not only failed to respond to the competitive challenge of developing countries but have actually embraced the disappearance of important industries.

The Gomory and Baumol work seems to have shifted the academic center of gravity. In several articles former Reagan administration assistant Treasury secretary Paul Craig Roberts has pointed to the current absence of most of the key conditions of classic free trade. He notes that for comparative advantage to work, a country's labor, capital, and technology must not move offshore. The internal cost ratios that determine comparative advantage reflect the quantity and quality of the country's technology and capital. If these factors move abroad to where cheap labor makes them more productive, absolute advantage takes over from comparative advantage.[14]

Lester Thurow has written in a similar vein. The conventional conclusion that everyone wins from trade, he notes, is subject to the assumption that full employment will be maintained. Otherwise, short-term economic losses could

easily outweigh long-term gains. Moreover, the conventional analysis assumes that workers losing their jobs get new jobs at wages equal to what they had. In reality full employment is rarely maintained, and American workers who lose manufacturing jobs and manage to get new jobs in the service and retailing sectors can count on a 25 percent pay cut.[15]

Last but very far from least is the ninety-two-year-old dean of American economists, Paul A. Samuelson. Ricardian proof of the efficacy of free trade and comparative advantage, he says, "does not deny that the new technical Chinese progress in goods in which America previously had a competitive advantage can, all else being equal, permanently lower measurable per capita U.S. real income."[16] Thus do the winds of changing views blow through the academy. But whether they will have any effect on policy and business is very much open to question, because of another economic theory.

EQUAL PAY FOR EQUAL WORK

Along with comparative advantage, "factor price equalization" is one of the foundations of international trade theory. It's simple. The idea is that in a world of open markets, the same factors of production ought to cost the same everywhere. The best example is the price of oil. There is a world price that is quoted on commodity exchanges around the globe every day. The same grade of oil costs the same whether it is sold in Tokyo, London, New York, Houston, or Singapore. Wheat and other commodities behave similarly. There is not an American price for hard red winter wheat and another price in India and yet another in South Africa. It's all about the same.

In principle, this should be true of labor too. Why should my wife's hairdresser cost more in Washington, D.C., than a hairdresser doing exactly the same job in the same amount of time in downtown Bangalore? Basically because my wife can't get to Bangalore conveniently. If she could, she would, and the cost of hair dressing would quickly equalize between the two cities. Right now, the Washington hairdresser is riding on the overall greater productivity and consequent higher living standard of the United States as compared to India. Even if she is not more productive, other parts of the economy are, and she gets a fee that reflects that generally higher standard. But if you could move people to Bangalore as fast as e-mail, a lot of prices would change quickly; hence the concerns I expressed in the prologue.

This is exactly what is happening as a result of the move to outsourcing offshore. When software is written in Bangalore instead of Silicon Valley, the price

of the factor we call programmers is being equalized. There is the example of Jon Carson in Boston who, in a jam and needing programmers but uneasy about shipping the work to India, got U.S. programmers to accept Indian pay rates.[17]

While international trade and trade deficits are often blamed for "lost jobs," jobs are not the real issue. What really bites is what the jobs pay. Economists frequently ignore the factor price equalization discussion because they say wages in developing countries will rise along with productivity as the economies move up the scale of industrialization and as demand for labor bids up its price. There is no doubt that this happens. People used to talk of cheap Japanese labor, but now it costs more than American labor. The price of an English-speaking Chinese electrical engineer with an American MBA and ten years of experience is moving up very rapidly. But generally speaking, the addition of 3 billion new capitalists to the global labor pool almost overnight in the context of instant worldwide communications and networked production with express delivery is likely to have an equalizing effect on many wages. There is no doubt that Asian wages will rise, but the interval could be long.

I was therefore amused during the 2004 presidential election campaign to hear both candidates proclaim that "American workers can compete with anybody as long as the playing field is level." This is nonsense. They can't, and we shouldn't want them to. What is the point of all the public and private investment in education, R&D, and expensive equipment, if not to give our workers an advantage? As Paul Craig Roberts says, without different internal cost ratios, there is no basis for comparative advantage. Outsourcing is driven by absolute advantage. Asia has an absolute advantage because of its vast excess supply of skilled and educated labor. With First World capital, technology, and business knowhow, this labor can be just as productive as First World labor, but workers can be hired for much less money.[18]

The stars are now aligned to drive more hiring of inexpensive workers. Countries may think in terms of comparative advantage, but businesses think in absolute terms. Consider my company and your company. I produce left-handed widgets, and you produce right-handed ones. You are the best in the world at making right-handed widgets. You can also make left-handed widgets more cheaply than I can, but for the moment you buy from me because that frees you up to concentrate on right-handed widgets, in which you are the world champ. This is comparative advantage at work, but it is not comfortable for me as a CEO. At any moment, you could decide to jump into my business and knock me out of the market or force my price down. So I look for any

opportunity to get my costs under yours in absolute terms. If I can do that by moving my plant to China, that's what I'll do. Thus business is driving the global system toward trade based on absolute advantage rather than on classic comparative advantage. The comment by the President's Council of Advisers on Science and Technology that the only way to win is to do things no one else can do is an absolutist doctrine and comes from the heart of American business. But it could be coming from Japanese, European, or Chinese business as well.

THINGS THAT CAN'T GO ON, DON'T

In Washington you often hear the phrase "This can't go on." The late economist Herbert Stein used to answer, "Things that can't go on, don't." The $64,000 question before the world today concerns the U.S. current account deficit and the dollar. Will they go on? The recent prominence of the dollar in the world's leading periodicals reveals growing anxiety. Despite the nervous edge of headlines like "The Makings of a Meltdown," many analysts remain sanguine.[19] The U.S. economy is growing faster, they argue, and has more rapidly increasing productivity than any other economy and thus will continue to be the most attractive place for foreigners to invest their money. In early December 2004 the Federal Reserve Bank of New York released a report predicting strong productivity growth at 2.6 percent annually for the next ten years. This is far above the rate of 1973–1995 and represents a continuation of the strong productivity growth of the dot-com era. Combining this with population growth, the Fed predicted a trend growth rate for GDP of 3.3 percent, about double that of the European and Japanese economies.[20]

The growth argument is supplemented by the "no alternative to the dollar" view espoused by longtime Wall Street guru Henry Kaufman.[21] As the world's only superpower, he says, the United States has much better growth than other big economies with little risk of inflation, and it has deeper, broader, better organized markets that currently provide a better return than any other. Then comes Kaufman's final, intriguing point: realigning global economic and financial relationships in a smooth and orderly fashion is currently beyond the cooperative and organization capacity of the Chinese, Japanese, and Europeans. China would have to revalue the yuan by 50 percent to 70 percent, Japan would have to turn its aging citizens into bigger spenders than they have ever been, and Europe would have to turn inflationary. Since none of them are going to do any of this, Kaufman argues, they have no alternative but to continue buying U.S. Treasuries in support of the dollar. They may do it kicking and screaming, but they will do it.

Academic commentary has been less bullish on growth than the headlines, but also less nervous. One widely noted study by Catherine Mann looked at a number of countries and concluded that the United States could sustain a current account deficit of a little over 4 percent of GDP.[22] When the paper was written in early 2002, the deficit was 4.3 percent of GDP and thus presumably sustainable. Mann noted, however, that the deficit would become unsustainable at some point barring significant structural changes, and suggested that one such change could arise from global trade in services. Because the services share of GDP normally rises as economies develop, and because new technologies and trade liberalization have made it easier to trade services, there could be a dramatic shift in the U.S. trade account. U.S. exporters of services, said Mann, are "highly competitive" and could take advantage of the new technology to penetrate foreign markets and reverse the long-term trends of U.S. trade. Absent such a shift, however, Mann concluded with what seems to be the current academic conventional wisdom: things are sustainable for now, but Americans will gradually have to adjust to a falling dollar and pressure for less consumption and more saving.

These are all good arguments, but they accept American mythologies too readily and ignore the realities of the new capitalist road. It is comforting to Americans to keep telling themselves they have the best productivity and GDP growth and will therefore remain the location of choice for foreign investment. But is it true? While there is much evidence to indicate that U.S. productivity has indeed taken a jump, there is also cause for prudence about this conclusion. Beyond the weaknesses I have already outlined, other evidence suggests that the U.S. performance may not be as overwhelming as it looks. The Financial Times columnist Martin Wolf points out a paper by Credit Suisse First Boston showing that, from 1992 to 2002, real net domestic product per hour increased just 1.1 percent annually in the United States, while gaining 1.4 percent in the Eurozone.[23] If you remove the effects of the Internet bubble, in other words, the United States looks a lot like Europe. Another point is hours. While American productivity per worker per year is improving faster than that of Europe, on a per hour basis the Europeans are starting to come out ahead. This once again raises the issue of living standards. Americans are not only working more hours than Europeans or Japanese, they are working six more weeks a year today than they did twenty years ago.[24] Yet median family income has not risen much. What's going on? Wages are supposed to rise with productivity. Either the productivity gains are not really there or they are all going to shareholders. The

latter would be consistent with the likely impact of 3 billion new capitalists on wages. In either case it is difficult to see how rapid GDP growth can be sustained if workers don't get some of the benefits of rising productivity. Beyond this, the growth is also suspect. As IMF chief economist Ken Rogoff says, the United States is getting the "best recovery money can buy."[25]

The U.S. economy is a bit of a Potemkin village. GDP growth is high, unemployment appears to be low, and household wealth appears to be increasing. But a closer look reveals a more sobering reality. America's growth is in part borrowed from the future. It's like a company striving to make its annual sales projections by offering special incentives to its accounts to stock up now, before the year closes, instead of waiting to resupply at the normal time. We might call it "shipping in place." U.S. consumers are consuming, but with borrowed money as they have mortgaged their homes to maintain living standards. Yet because investment and production have not kept pace with consumption, more of this borrowed money is flowing overseas to pay for imports. At a national level, Federal Reserve chairman Alan Greenspan says the U.S. government budget deficit is a threat to long-term stability because it is not subject to correction by market forces.[26] At the same time, the country's net international debt is high and rising rapidly. This is not a healthy kind of growth, and analysts like Morgan Stanley's chief economist, Stephen Roach, emphasize that it can't be sustained in view of the "profound income leakage arising from global labor arbitrage."[27]

As for unemployment, it's easy to keep it low if you put 2 percent of all the men in the country in jail and don't count them as unemployed, which the United States currently does. Further, we only count as unemployed those receiving unemployment benefits or who tell poll takers they are actively seeking a job. To see how this works, look at Kannapolis, North Carolina. When the town's only mill shut down, reported unemployment soared. A year later, however, unemployment magically disappeared—not because people got jobs, but because their benefits ran out.[28] The real story of the U.S. economy is rising hours worked, rising debt, and job creation largely restricted to low-paying categories like retail sales and fast food restaurants. This is not a formula for long-term prosperity.

The impact of 3 billion new capitalists on the United States, along with America's abuse of the dollar and its soaring public and private debt, has made foreign central bankers and finance ministers very nervous. They are all in a global game of financial chicken. If foreigners dumped a large portion of their

dollar holdings, the dollar would fall dramatically and cause a recession or even a depression in the United States. Because the rest of the world lives by selling to the Americans, a U.S. recession could be devastating to the rest of the world's economies. Dumping dollars could precipitate global stock and bond market crashes that would bring huge losses to, among others, those doing the dumping. From this perspective, Americans are holding the world's financiers hostage. On the other hand, should things fall apart, the first player who gets out of dollars will take the smallest loss. Thus any hint of significant dollar dumping is likely to cause a chain reaction—fast.

If you are a finance minister or central bank director, this possibility creates two worries. First, if it looks like things are beginning to fall apart and you don't move, you could wind up losing billions for your country, along with your reputation. Second, Americans owe so much that they are sure to be tempted to inflate the debt away. If they do that while you are steadfastly holding on, you will again lose gobs of money, and your epitaph will not be heroic. So all the players, or nearly all (about which more later), are damned if they do and damned if they don't. So far they haven't, but tomorrow is another day.

Recently everyone's nervousness has been reflected in some interesting moves. As private money abandoned the dollar over the past two years, the European Central Bank followed free market principles and refrained from any intervention in the currency markets. American officials said they wanted a strong dollar, but their body language said weak dollar. Consequently the euro, which had languished during the dot-com boom, gained over 35 percent against the dollar in a two-year period, just as Soros had predicted. The Bank of Japan, on the other hand, engaged in massive intervention, buying over 623 billion dollars in 2003 in a largely successful effort to prevent the dollar from falling against the yen.[29] Because the Bank of China keeps the yuan pegged to the dollar by law, it doesn't intervene in the exchange markets as the Japanese do. But its trade surplus means that to hold the peg, the bank has to keep accumulating dollars. While doing so, however, the Chinese have quietly been buying lots of oil. They need the oil, and buying it now with strong dollars is a way to avoid investing in U.S. Treasuries, whose value could plummet in a crisis. The oil producers, in turn, have been taking the dollars from the Chinese and selling them for euros and euro bonds, putting more upward pressure on the euro. The Russians only added fuel to the euro fire when they announced the decision to reverse the dollar-euro ratio of their international reserve holdings. This activity has begun to price European goods out of international markets.

As a result, the Europeans are now talking about "stabilizing" the dollar by organizing a joint buying operation with the Japanese. So far the system is still holding together, but it is increasingly shaky.

No one knows for certain what will happen, but clearly the global financial markets could implode very quickly. Former Federal Reserve chairman Paul Volcker says there is a 75 percent chance of a dollar crash within the next five years. This is Soros's great fear too. In public statements and in conversations with me, he has expressed concern about the market fundamentalist view that prevails in Washington and parts of Wall Street. This is the belief that markets are self-correcting and best left alone—a dangerous siren song, says Soros. Far from being self-correcting, he emphasizes, markets tend to excess. They overshoot. Anyone with any experience of markets knows this. When markets are going down, all the weaknesses get concentrated, and you need intervention at the right time to stop things from getting out of control. If the dollar started to melt down, the results could be really nasty. A 1930s-style global depression is not out of the question.[30]

The lack of an alternative to the dollar is the only reason it hasn't taken a big fall already. But now those alternatives are emerging. The euro, though not a perfect substitute, is becoming more attractive. Besides the Russians, others are also sneaking into euros, which is why it has recently strengthened so much.[31] In Asia there is serious discussion of creating an Asian currency unit, or Acu, in imitation of the European Ecu, which preceded the euro.[32]

In the end, it is very simple: the global economy is highly distorted. Americans consume too much and save nothing and the rest of the world, especially Asia, consumes too little and saves too much. There are three ways for this situation to work itself out. Americans could consume less and save and invest more. The fastest way to do this would be to cut the federal budget deficit. There are two problems. If Americans take all the adjustment, it would entail a big reduction of GDP. Since no political leader could survive that, it is not going to happen voluntarily. Nor is the federal deficit likely to be cut. If anything, it will increase as the baby boomers retire and cause a dramatic rise in social security and medicare payments. The second option would be for Asia and the rest of the world to cut saving and increase consumption. That will undoubtedly occur over the long run, but in the short run it would slow up the growth that is the raison d'être of these regimes, especially China's. Moreover, if it did occur, the reduction of the flow of Asian savings to U.S. financial markets would cause the dollar to fall.

That is, of course, the third and by far most likely event. When and how it might occur no one knows. Most analysts would like to see a smooth, gradual decline of 30–50 percent from present dollar values. How things develop will be significantly determined by China. To many Western economists China's policies seem foolishly mercantilist. But China's accumulation of dollar reserves has given it great negotiating leverage against the United States, and its policies induce rapid industrial development and technology transfer. So China might decide to prop the dollar up for a long time, as will, almost certainly, Japan. Europe might even join in to avoid the pain of the rising euro. But there is always the unexpected. Vladimir Putin is increasingly unhappy with the United States. Could he show his dissatisfaction by dumping dollars? What about OPEC? There are surely a number of members who have no love of the United States and might jump at an opportunity to dethrone the dollar. Remember also that before the Asian financial crisis of 1997, no one anticipated the damage hedge funds could cause. Recently a little bond market maneuver by Citibank caused a scary ripple in the European markets. There's no guarantee that something like that won't trigger a dramatic dollar crisis, and if it does, it won't just be another decline. It will be the end of the dollar's dominant role as the world's money.

It is on this—the end of the dollar's hegemony—that Soros and Buffett are betting. That, after all, is the logical outcome when some people squander their resources and others take thrift to the extreme.

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