Has Globalization Destroyed the American Middle Class?[1]

June Zaccone, Executive Committee, National Jobs for All Coalition
and Assoc. Prof. of Economics (Emerita), Hofstra University

ABSTRACT

The mainstream view of globalization is that it is good for just about everyone--economies rich and poor grow faster and the incomes of workers everywhere rise faster. There may be a slight exception permitted for unskilled workers, but their problem is they need training. In any case, there is nothing to be done against the forces driving globalization. It is described as a natural market evolution, created by new technologies and better techniques permitting the effective management of far-flung operations. The reality is quite different. Technology has permitted globalization, which has been furthered by governments, especially ours, pursuing a corporate agenda. In the US, growth has slowed, workers' incomes have stagnated, inequality has risen to Gilded Age levels and the middle class has been splintered as jobs have disappeared. A few have joined top income levels, with far more pushed down to lower-skill, lower-wage service jobs.

Now an economist from the conservative Hoover Institution concedes there may be problems of job availability, wages and inequality, and even proposes some government policies to improve them.

The paper will explore the employment and wage problems created by globalization, as well as provide a critique of the mainstream version of how globalization happened, its consequences for working people, and what strategies would help to repair the damage.

Most economists and pundits applaud as presidents and a largely acquiescent Congress open markets for one country after another, most recently agreements with S. Korea, Colombia and Panama, though Colombia leads the world in assassinations of trade unionists.[2] There is a major "free trade" agreement under negotiation right now--the Trans-Pacific Partnership,[3] yet another advertised as "job-creating," with some highly controversial provisions.[4]

A *Times* editorial is typical: "free trade is good for this country…." [5] The editorial endorsed aid, but not jobs, for displaced workers. McKinsey & Co., business consultants, who have recommended offshoring for decades, tell us: "By moving service industry work to countries with lower labor costs, US companies can focus on creating higher-value jobs…. any job losses must be seen as part of an ongoing process of economic restructuring, with which the US economy is well acquainted."[6] For at least a generation, politicians, academics and pundits have claimed that globalization is good for everyone.

This conclusion persists despite whatever evidence to the contrary accumulates. Sometimes proponents add an exception for unskilled workers, but in effect, they view this as a personal problem, which workers could solve with training. Globalization's critics are ridiculed. *Times* pundit Thomas Friedman calls us "a Noah's ark of flat-earth advocates"—an odd term of abuse--his book lauding the new global world is titled *The World is Flat*.

Gregory Mankiw, a Bush 2 economic adviser and author of a major economics text, was challenged for practical advice for the mayor of Flint, Michigan, where workers' jobs are being outsourced. His answer: "I don't know about the mayor, but I know what the people should do. The people should move."[7] He didn't say whether to South Korea or Texas.

Early in that Administration, some cracks in the mainstream monolith began to appear. Perhaps the beginning of unease was provoked by the shift of professional jobs, like programming, engineering, and other high-skilled jobs to China and India. This contradicted the expectation that the US would keep the best jobs, though *Business Week* still concluded that "by sending routine service and engineering tasks to nations with a surplus of educated workers, the U.S. labor force and capital can be redeployed to higher-value industries and cutting-edge R&D." The prominent free-trade advocate, economist Robert Z. Lawrence, said "I still have faith that globalization will make us better off, but it's no more than faith." Their concern was that "if more politically powerful middle-class Americans take a hit as white-collar jobs move offshore, opposition to free trade could broaden."[8] [2/03] The expectation that our job growth would be driven by innovation was unfounded. According to Michael Mandel, "In the late 1990s, the Bureau of Labor Statistics projected 2.8 million net new jobs in leading-edge industries such as pharmaceuticals, software, semiconductors, communications and aerospace" between the years 1998 and 2008. The result? Actual change in Leading-edge Industries: a *loss* of 68 thousand jobs.[9]

A new stage of globalization was shaped by new types of global agreements. The most important were NAFTA, the North American Free Trade Agreement, whose terms began in January 1994, and the World Trade Organization, WTO, in January 1995. Earlier agreements had focused on trade in goods. Current ones have a far broader agenda, like intellectual property rights and investor protections, though reducing trade barriers is still important so that companies producing abroad have access to markets anywhere. High interest rates of the early 1980's, Volcker-engineered, further aided offshoring by US firms. These drove up the dollar's value by nearly two-thirds between 1980 and 1985, making US production more expensive, foreign investment and imports cheaper, and driving our trade balance from small surpluses in the early 1980's to a deficit of $153 billion in 1987. The deficit in 2011 was $560B, down from the pre-crisis peak of $753 B.

So where are we now? A *Financial Times* correspondent described our employment problem this way: "the middle-skilled jobs that once formed the ballast of the world's wealthiest middle class are disappearing. They are being supplanted by relatively low-skilled (and low-paid) jobs that cannot be replaced either by new technology or by offshoring–such as home nursing and landscape gardening. Jobs are also being created for the highly skilled, notably in science, engineering and management."[10] David Autor, a labor economist, calls it a "pronounced polarization of job opportunities."[11] His images show this polarization over three decades. [See Figures 1 and 2, p. 3. Wage levels here stand in for skill levels.] During the 1980s [the dark blue line], job shares at the lowest skill levels were declining as those at skill levels above the median rose. In the next decade [light green], this uniformity changed to polarization. Relative employment growth was most rapid at high skill levels, though it was also slightly positive at very low percentiles (10th percentile and down) and modestly negative at intermediate percentiles. During the last decade [dark green line], the news gets worse: the growth of low-skill jobs dominates, with jobs heavily concentrated at the bottom. At middle skill levels, growth in employment shares was negative, with shares slightly negative even at the highest skill levels. So the disproportionate growth of low-skill, low-wage occupations accelerated in the last decade. This polarization has its counterpart in wages. During the 1974-1988 period [blue line], all wage levels except those above 50% of the median declined or stagnated relative to the median, so inequality worsened. In the more recent period [green line], relative wages are rising slightly at the bottom, and those at the highest wage levels are pulling away from the median.

Michael Spence's work on this polarization is examining perhaps our most important economic problem. In 2001, Spence shared the Nobel Prize in economics.[12] He is currently a Senior Fellow at the Hoover Institution and an economics professor at the NYU Business School. In a sign of the times, he also advises the Chinese government on their 12th five-year economic plan.[13] It is remarkable that an associate of a conservative think tank acknowledges any problems with globalization, and even more, advocates public intervention to remedy them. Here is his story of how globalization limits jobs for ordinary workers and keeps wages down, along with his remedies. The review will be followed by a critique and further analysis of our current economic condition.

To the concern with income polarization Spence adds another as important: job scarcity. His theory distinguishes between the tradable and nontradable sectors of our economy. Tradable sector output can be exported, like machinery, food, and consulting services; non-tradable output can't be exported, and must be consumed at home, like government services, most healthcare, and restaurant meals. One would think that construction is nontradable, and mostly it is, but more output has become tradeable. Remember Halliburton's operations in Iraq. California recently hired Chinese contractors to rebuild the San Francisco Bay Bridge, claiming a 5% saving, a ridiculously small sum considering lost taxes and spillover effects.[14] Spence sums up our jobs plight: "If the nontradable sector continues to lose its capacity to absorb labor… and the tradable sector does not become an employment engine, the United States should brace itself for a long period of high unemployment."[15] So to inequality, globalization may add a jobs shortage.

Spence defines globalization as worldwide market integration, a process accelerating over the past 60 years, that is, from about 1950. It is made possible as technology and management expertise reduce barriers like transportation costs and the costs of managing far-flung plants, and as tariffs and other political barriers have declined. His dating is rather premature—European governments didn't permit residents to buy foreign currencies until 1958; capital controls, that is, rules governing the use of their currencies, were slowly dismantled only in the early 1970s. The sharp rise of world trade as a fraction of output begins about 1985; foreign direct investment, around 1995. As late as 1980, China had no multinational investment, and India, almost none. Japan "had less than 1 percent of the world's FDI," and it is still minor.[17] The importance of dates is that Spence attributes to globalization the economic success of some emerging economies, like China, that preceded it. After Tiananmen Square in 1989, China was shunned; "in 1992… China's growth went up to 12 percent per annum. This … revived American, European and Japanese interest in China."[18]

According to Spence, "Until about a decade ago, the effects of globalization on the distribution of wealth and jobs [in developed economies] were largely benign." At the same time, globalization resulted in "More and more developing countries …experiencing growth rates of 7-10 percent; 13 countries, including China, have grown by more than 7 percent per year for 25 years or more." Here are his success stories p. 20]. Note that success began well before the current surge of globalization, and for Indonesia, Malaysia and Thailand, was ended by the 1997 Asian financial crisis, one of globalization's debacles. Faster growth in emerging economies has enlarged their share of world output, so that the share of industrial countries, the G-7, is shrinking.

How did globalization change our labor market? Relocating parts of the production process has changed the price of goods, types of jobs available, and wages almost everywhere. In the past, U.S. policymakers could assume that output and employment grew together. The global economy has created a divergence between them. Major emerging economies now produce goods in which the U.S. historically dominated—design and manufacture of electronic parts, drugs, and information technology. These lost jobs supplied our middle-class incomes.

As a result, jobs *here* are shifting away from these high-wage sectors to those that are growing more slowly. The result is wider disparities in income and employment, with more opportunities for highly educated workers and declining job prospects and stagnant incomes for workers with less education. In summary, middle-class incomes have stagnated because whatever jobs the US has created in the past few decades are in sectors which neither computers nor outsourcing have eliminated, like fast foods.

Spence's study looked at US employment for the 18 years starting in 1990 until the crisis in 2008, separating the economy into tradable and non-tradable sectors [see pg. 13]. Note that tradable sector jobs have hardly increased. He concluded that net job creation was impressive—27 million jobs. Actually, not so impressive. Note the sharp slowdown in the rate of job creation after 2000. It is clear that the private sector was the problem. Of the new jobs, 98 percent were in non-tradable production. Government (22 million jobs by 2008) and the health-care industry (16 million jobs) together created roughly 40 percent of new jobs. (Retail, construction, and hotel and restaurant industries also were major job creators. Except perhaps for construction, most of these are low wage jobs.) There was negligible growth in industries where we compete with other countries, though there was considerable variation. Some industries like finance, consulting, and computer design were highly competitive, and employment and productivity, that is, output per worker, increased. Jobs in direct competition with other economies barely grew. Though the tradable sector accounted for more than 34 million jobs in 1990, by 2008 it had added only a negligible 600 thousand jobs. These years should not be treated as a unit, as Spence treats them. They include two quite different periods—both employment and economic growth were faster during the Clinton years than the Bush 2 Administration. Job growth from 2001 to 2007 was slower than adult population growth, so the share of working adults declined. For the average working person, income growth stagnated.[19]

WHAT CREATED THE JOBS SHORTAGE? There are two possibilities: technology and outsourcing. Labor-saving technology has changed both tradables and non-tradables. However, says

Spence, if technology were the only problem, jobs in manufacturing would not have contracted so much more than other sectors. Information technology has eliminated jobs across the US economy in finance, retail and government, too, but their employment has grown.[20] Spence gets support from a new Brookings Institution study. It argues that the huge job losses sustained by manufacturing between 2000 to 2007 can't be attributed to productivity gains as the rates of increase were nearly the same as the 1990s. Productivity gains lower costs and usually expand the market. If productivity were the source of the job losses, then the 2000-2007 losses should have been similar to those of the 1990s. However, manufacturing jobs vanished at a 0.2% /year average during the 1990s, compared to 3.0% between 2000 and 2007. Nor are high wages the problem. Since 2000, the US has lost manufacturing jobs at a faster rate than countries with higher wages. "…Australia, France, Germany, Italy, the Netherlands, and Sweden… had higher manufacturing wages and lost smaller shares of their manufacturing employment …between 2000 and 2010."[21]

Data on corporate job creation provide support for Spence's conclusion that the offshoring is more important than technical change in eliminating jobs. Outsourcing has reduced employment in virtually the whole manufacturing sector, except the high end. Autour and his co-authors also attribute a high fraction of job loss to trade: "conservatively, [trade with China between 1990 and 2007] explains one-quarter of the … decline in U.S. manufacturing employment."

The shift of employment from tradable to nontradable is a major problem because the nontradable sector is unlikely to generate as many jobs as we need, and the range of jobs left in the tradable sector is narrowing to high-level skills. This limits the choices of middle-income workers. Government and health care jobs are unlikely to grow at rates that preceded the economic crisis. "*If anything, it is remarkable that the U.S. economy did not have much of an employment problem until the recent economic crisis.*" Of course it *did*—as we saw earlier. We lack not only good jobs but enough jobs of any type.

Though productivity has grown in both sectors since 1990, it grew far more rapidly in the tradable sector, tending to displace labor. Partly because of this divergence, employment grew more rapidly in the nontradable sector. Low productivity growth in nontradables kept average incomes in that sector from rising much. Average incomes did rise in tradeables, both because productivity rose and because lower-wage jobs moved abroad. Income inequality grew worse, then, as most jobs were created where wage increases were modest, and jobs and income for the highly educated at the upper end of the tradable sector, like finance, were flourishing.

The effect of globalization on the US economy is not market failure. Spence describes companies as "doing exactly what one would expect them to do. The resulting efficiency of the global system is high and rising." However, globalization does create problems of income distribution, as not everyone gains, and some may lose. Though everyone benefits from lowerpriced goods, people also care about being employed. Income loss is immediately apparent; the gains from low-priced goods are not. Who were the major beneficiaries of globalization? Clearly, the top—the top 1% of households claimed about 39% of pre-tax income gains from 1979 to 2007, a share larger than 36% for the bottom 90%. In 2010, the top 1% captured 93% of the income gains in the first year of recovery.[22] Worsening income inequality is striking, and associated with the global era.

Spence asserts that when multinationals shift their labor-intensive production to poorer countries, they thereby increase growth and competitiveness in economies such as the United States, an assertion requiring evidence, which he doesn't provide. Competitiveness has risen in some sectors, for example, finance, but fallen in the tradable sector as a whole. We have never had such large trade deficits, peaking in 2005 and 2006 at nearly 6% of output. Clearly growth hasn't speeded up in richer economies. China is the high-flyer—Japan, the EU and US growth rates all fell. Spence expects that developing countries will learn even more advanced technologies, our tradable sector will produce with fewer workers, and labor-intensive work will continue to shift to emerging economies. Opportunities for the highly educated will expand: in the tradable sector because the global economy is growing and in the non-tradable sector because it must remain competitive with the tradable sector. But those with less education will face shrinking choices and more competition, and so depressed income growth. During the housing bubble, middle-class jobs lost in the tradable sector were offset largely by jobs in the non-tradable or service sector. Because this consumer spending was based on debt, when the binge ended, many service jobs disappeared.[23] They are unlikely to repeat their rapid expansion, given the government deficit and the private sector's rising health care costs and weak markets. Private investment will not return until either domestic consumption or exports increase.

Multinationals have little incentive to improve labor-intensive production in advanced economies, according to Spence, because globally they can access abundant labor with a wide range of skills and education. If emerging economies continue to grow, their cheap labor will eventually be absorbed. But two or three decades is a long time for our workers to wait.

What can be done? Spence believes that modest changes can bring public and private interests back into alignment, pointing to Germany as a model of successful adjustment to global competition. In particular, a mix of competitive wage levels and technology to improve productivity could help us keep some manufacturing. US wages are *already* well below Europe's, even below Ireland's, but well above China's [chart1]. Germany has retained a strong export position by removing labor market rigidities and privileging jobs over income. The result is a smaller loss of manufacturing jobs and markedly lower income inequality than ours, because "unions, business, and government cooperated to meet the challenge."[24, 25] German firms behave just like our firms when operating in the US. Their auto manufacturers' high profits and pay show the utility of stronger labor laws.[26]

Spence warns that American optimism about the market's ability to solve problems is a barrier to addressing these challenges. However, we need to achieve a fair income distribution without much damaging global efficiency and openness. Government, labor, and universities should pool knowledge about promising technologies and markets. Huge investments in education, technology, and infrastructure must be made despite fiscal tightness, to restore opportunities for future generations. Guided by the private sector, governments should invest in technologies that expand middle-income jobs producing exports. Education is a priority, given the ongoing structural changes and the growing premium for highly educated workers.

The tax structure needs to promote competitiveness, investment, and employment, so he recommends that corporate tax rates and tax rates on investment returns be lowered.[27] Consumption taxes should offset revenue loss. These taxes would have the added benefit of shifting demand from domestic to foreign, needed to avoid high unemployment and an unsustainable trade deficit. [His reasoning here is mysterious: if consumers are buying less, exports will rise only if prices fall, the dollar depreciates, or corporations expand marketing efforts. Otherwise, if consumers buy less, profits will fall.] Even all these actions may be insufficient. Tradeoffs will have to be made between jobs and income. [This tradeoff implies wage stagnation, creating an even worse income distribution, as would consumption taxes.]

The current share of our top 1% is larger than anywhere else in the industrial world. France, Japan, the Netherlands, Sweden, Switzerland have all managed globalization without serious loss of fairness. Their more equal income distributions suggest that there are acceptable tradeoffs between market forces and equity. Our challenge is to retain vitality and openness while providing rewarding employment opportunities and reasonable equity for all Americans.[28]

Spence's open-mindedness about the problems of globalization is impressive. He is a mainstream writer who has gone beyond mainstream opinion.

My analysis questions Spence's acceptance of the current global framework and his assumptions:

1. Was our version of globalization inevitable, the outcome of technical and managerial changes?

2. Is it true that until recently, its effects on the distribution of wealth and jobs in developed economies were largely positive.

3. Have the results in developing countries been beneficial? What does "efficient" mean?

4. Will those with a college degree be assured of a job?

5. Finally, what should be done? Do we want to compete by adopting lower standards—low-wages, powerless unions, weak safety and pollution rules, and a 19th century work-week—maybe take Gingrich's advice and put school-children to work? The Boston Consulting Group has predicted that changes already in motion will return manufacturing to the US within 5 years: "rising Chinese wages, higher U.S. productivity, a weaker dollar, and other factors will virtually close the cost gap between the U.S. and China for many goods consumed in North America." By "other factors", they mean that lagging wages, flexible work rules and incentives make southern states increasingly competitive as low-cost bases.[29] This is not good news, nor is the White House approval of this study.[30]

1. First, on the inevitability of current global arrangements: Contrary to popular belief, some aspects of globalization are not historically new. Foreign trade in goods has existed since prehistoric times. Technology has traveled for millennia, but the transfer was accomplished through goods or travelers carrying information. What is new to our era is the export of capital and technology. During the industrial era, economists writing about foreign trade, like Adam Smith, correctly assumed that investment was domestic investment—now obviously untrue. It is this—the foreign siting of production, along with the associated technology—which has fundamentally changed the effects of the global market. Far from transferring cotton textile production to its Indian colony, Britain's rule had the effect of gradually destroying India's existing production. The British East India Company's 18th century mercantilist policies made cotton workshops in India uncompetitive. India was forced to sell raw cotton and, by British-imposed law, to buy cloth from Britain. British colonialism de-industrialized India. Needless to say, reporting this history does not imply approval of it.

Further, our globalized world is not the result of freely operating market forces. Globalization has happened much as the market economy was created. Karl Polanyi described the first phase of the market economy:

> *"The road to the free market was opened and kept open by an enormous increase in continuous, centrally organized and controlled interventionism….*[31] *"In the period 1830 to 1850 the multitude of laws abolishing restrictive regulations was accompanied by an enormous increase in the state's administrative functions. This can been seen in the extent of bureaucratic control needed to manage the New Poor Laws and in the complexity of the countless laws passed to dismantle the agricultural system and smooth the way for burgeoning industrial capitalism. Far from removing the need for state regulation and intervention, laissez-faire increased it considerably…. Capital flowed to areas where the empire's military power could protect it, and the state reaped the political benefits of this invisible expansion."*[32]

An enhanced state role was characteristic of 19th century US economic development as well, especially in the West. And now governments, especially ours, have set the current global rules. *Of course* technology makes globalization potentially profitable, but thousand-page[33] so-called free trade agreements exist primarily to promote and protect corporate access. These agreements have done almost nothing to improve worker rights or environmental sustainability. According to Public

Citizen, "[the WTO] [1995, created by Uruguay Round]—and the army of rules that it presides over—actually covers a huge array of subjects never included in trade agreements before. The new agreements … included one-size-fits-all rules interfering with food safety standards, environmental laws, social service policies, intellectual property standards, government procurement rules, and more."[34] Foreign investors can use international agreements to avoid domestic courts and require host governments, that is, taxpayers, to compensate them if regulations reduce the value of their investments.[35] According to Gretchen Morgenson, the WTO financial services agreement that loosened rules may "raise trouble for any country that tries to ban risky financial instruments."[36] What barriers have not fallen? Dean Baker reminds us that there are no Walmart hospitals or universities: privileged labor has not yet faced the threats of the lower-paid. Trade liberalization in highly paid professional services like doctors or economists has generally not been on the agenda. The power of governments to shape outcomes is critical, as trade has not only destroyed jobs here but its disruption of agriculture in Mexico and elsewhere has pushed mass emigration as competition by cheap imports destroyed rural living.[37]

International agreements accelerated the challenge of low-wage economies to higher-wage countries. China was admitted into the WTO in 2001. Its industrialization was immature but its government even then had considerable clout. So unlike weaker developing countries in Africa and Latin America, it was able to keep tariffs above those of developed countries, though below other non-industrial economies, and WTO rules made it illegal for countries like the US to protect their markets from a flood of imports. These protections continue even as its economy grew to a size second only to ours. To illustrate, its auto tariff is 25%, there's a 17% value added tax rebated to exporters, and a sales tax up to 40%, an environmental measure based on engine size.[38] Failure of the Doha trade round has thwarted barrier reduction, and China won't reduce them unilaterally.[39]

2. Was globalization benign at first? Evidence of problems abounds. Since the earliest days of economics, the living standard of ordinary people has been a criterion by which to judge economies. Take Adam Smith: "No society can surely be flourishing and happy, of which the far greater part of the members are poor and miserable." I have found no evidence that growth of developed countries was improved. On the contrary. The much deplored 1960's turn out to be the decade of fastest industrial country growth. Our own experience includes the slowdown of the real growth of output and wages. The growth of non-recession years 2000 to 2007 was the slowest expansion of the postwar era, despite two wars, massive Bush tax cuts, and a housing boom. The trade deficit is a major reason why.

This deficit is ignored almost completely when the effects of globalization are discussed. Spence mentions it once. Its hulking presence is a reminder that we must renew our domestic production capabilities or ultimately face sharply higher costs for goods as the dollar depreciates. Our trade deficit with China alone was $300B in 2011.[40] Each trade agreement has been touted as job creating. How wrong they were! [Table 2] The trade deficit has made a difference.[41] It is one reason for difficulties creating enough jobs. A trade deficit pulls spending out of our economy and stimulates the exporting country. The drain must be made up by either private or public sector deficits. An Economic Policy Institute study estimates that our deficit with China cost us 2.8 million jobs between 2001 and 2010, about 2% of jobs. Of these, 1.9 million manufacturing jobs were nearly half the losses from that sector. To improve growth and jobs, we must do something about the deficit.[42] The US creditor position, which reached a peak in 1980, was wiped out in just six years by chronic deficits.

Let's look at what happened to male workers, the "privileged" sex. Men's economic condition peaked in the early 1970s. For years the impact on many families was blunted as wives went to work, then the housing bubble boosted construction, employing millions. A smaller share of men is employed today than at any time since World War II--only 63.5 percent last July [2011]—nearly as low as the depth of the downturn.[43] Even among prime working-age men of 25 to 54, only 81 percent held jobs, well below the 85 percent minimum of the 1982-83 recession. In contrast, in 1969, 95 percent of prime-age men had a job. All the lost men can't be in graduate school.

Men who do have jobs are getting paid less. "In 2009 the median full-time male worker aged 25-64 brought home $48,000—roughly the same as in 1969 after adjusting for inflation."[44] Hourly pay for the average worker hasn't increased in 40 years. Added to this is racial and ethnic disadvantage. The Census Bureau projects that people of color, including Asians and Native Americans, will be the majority by 2042. What will the economic and social prospects be then if we don't improve their life chances?[45]

A source of downward pressure on wages in the US and elsewhere has been a corporate attack on unions, backed by political muscle. It is easier to attack unions when their existence is described as a barrier to job creation or global competitiveness. Union decline is not only a consequence of globalization and technology.[46] If it were, we'd expect similar declines in all countries experiencing similar impacts of these forces. Instead, over the last several decades there has been a range of trends in union membership, with the largest declines in countries dominated by neo-liberalism.[47] Their decline has weakened the middle class. Unions have been a major force raising living standards. They bargained for paid holidays, vacation, health insurance, pensions, workplace safety, and wages which kept up with productivity improvements.[48] Unions boost political participation among members and nonunion members as well, providing an effective voice for policies favoring the middle-class. So states with a greater percent of "union members have significantly higher voter turnout rates, higher minimum wages, a greater percent of residents covered by health insurance, stronger social safety nets, and a more progressive tax code."[49]

If median household income had kept pace with productivity since 1970, as it did before, it would now be nearly $92,000, not $50,000.[50] The threat posed by their presence helped to raise wages for non-union workers. "One study concluded that the decline in unionization since the 1970's is responsible for one-fifth to one-third of the growth in our inequality."[51] Employer opposition, reflected in thousands of workers fired or otherwise punished in a typical year for union organizing, also includes threats to close plants, illegal but effective intimidation.[52] The same threats were successfully used to water down Chinese government rules to improve work standards.[53]

Perhaps US workers have suffered but the poorest workers abroad have gained significantly? This is disputable. There has been an apparent growth slowdown in developing countries that did not share China's power during the globalizing era.[54] This study, which averages growth without weighting for either GDP or population, can be disputed, but it aims to remove the outsized influence of China and India. Except for the poorest countries with per capita income between $355 and $1225 annually, that experienced a minor uptick in growth, the rest suffered a slowdown. And that minor improvement disappears without India and China, though these are included only as two countries among many. The experience of India and especially China distorts estimates: according to World Bank estimates, the entire net decline of the number of people living in extreme poverty, i.e., below $1.25/day between 1981 and 2008 has been in China. Elsewhere their number increased, though the percent declined.[55]

A little acknowledged cause of worldwide economic difficulties has been a persistent imbalance between the pressures to enlarge production compared to forces increasing consumption. International competition and corporate power have kept down wages or slowed their increase as production has expanded. The imbalance, until the financial collapse, has been obscured in the US and elsewhere by immense household borrowing that kept up consumption as well as taking advantage of what was perceived as a sure thing: speculation in housing.

Wages were suppressed in part by millions of additional rather powerless workers worldwide. Two forces have expanded the global labor force. Agribusiness has pushed peasants off the land, expanding an urban slum population desperate for work; and the integration of the formerly "socialist" countries into the world capitalist economy has made available millions of workers with frayed safety nets. "Between 1980 and 2007, the global labor force grew from 1.9 billion to 3.1 billion, with 73 percent of it located in the developing world, and 40 percent in China and India alone."[56] A 2005 study of China's industrialized Pearl River Delta found that some workers worked up to sixteen hours continuously, and that corporal punishment was routine. An estimated 200 million Chinese work in hazardous conditions, claiming 136,000 lives in 2004, according to a Chinese agency for worker safety.[57] "Especially in the coastal SEZs[special economic zones]—where most foreign corporations do business—Chinese workers now have lower wages in terms of purchasing power, fewer benefits, longer work hours, increasing work-related injuries, and other associated problems compared to ten years ago [i.e., 1995]."[58] Wages have since risen, but in 2008, China's manufacturing workers earned $1.36/hour, 4% of a US worker's wage.[59] Chinese businesses, many of them foreign, profit from US investment, but not much benefit trickles down to the work force.

Even such low labor costs are apparently insufficient. Taiwan's Foxconn, the world's leading electronics manufacturer, and the producer of Apple's iPhones and iPads in China, plans to build 500,000 robots[60] during the next three years. Its current robot labor force is 10,000, supplementing its 1.2 million workers. Fourteen of these committed suicide[61] in 2010, creating a scandal by plummeting out of factory windows. The company has since installed suicide-prevention nets. Labor rights groups have described these factories as 21st century "labor camps" with "military-style drills." Foxconn's CEO described their suicide rate as "within the norm" for China. More recently [1/13/12], another dispute involved worker suicide threats, so the company hired psychiatrists. As a major importer, the US could have demanded better working conditions in its global agreements. Some Asian governments are pressing businesses to raise wages: "There is a genuine feeling that the low-wage segments [of Asia's population] haven't made much progress in recent years….. Economists have argued that, in some respects, minimum wage hikes in countries like Thailand are only putting some workers back to where they were a decade ago, once inflation is factored in."[62]

In some of the poorest countries, the supply of labor has been augmented by children. Though Asia and Latin America continue to reduce child labor, since 2008, sub-Saharan Africa has experienced an increase both in relative and absolute terms. It also has the highest incidence, with one in four children working.[63]

Most of us think of efficiency as achieving a specific outcome with minimum expense or effort. If we use a new kitchen tool that chops vegetables faster, but in normal use, puts us in the emergency room and kills the cat with toxic fumes, we'd not call that tool efficient. When we get our ipads cheaper by dangerous work conditions, enforced low wages, and loose pollution controls, that isn't efficient either. It appears to be cheaper to firms only because they don't pay all the costs. A recent study estimates that China's workers get $10 for assembling a $500 ipad. Would it be so onerous to pay double or triple that to improve conditions for such deprived workers? Foxconn has responded to current pressure by announcing wage increases and overtime reduction. We'll see. Legislation prohibiting imports whose production breaks the laws of the exporting countries would help. The WTO prohibits subsidies and unfair advantages in trade. Though underpaying and overworking employees is the most obvious unfair advantage, the WTO has never said a word about this abuse that helps the least honest suppliers to beat competitors.[64]

Globalization has given us a wide range of goods at low prices, improved American-made cars, and flown us flowers in winter, but the cost has been paid by those with the least economic power, here and abroad, in the form of lost opportunities, lost wages, and for many, lost limbs and lives. Slower growth, and so sluggish job creation, has kept down wages here. Some experts suggest that we are approaching even faster labor-replacing change. W. Brian Arthur,[65] an economist specializing in technology, predicts major job destruction from a trend beginning about 1990, when "computers started seriously to talk to each other." Transactions once done by human beings are now being executed electronically, like your airport check-in or tracking online packages. Arthur is concerned that job effects will be major, "dwarfing the much more publicized effect of jobs disappearing to places like India and China." If he is right, we must rethink how to create jobs producing the social services and capital we need, how to distribute the leisure technology makes possible, and how to provide income for those pushed out of work.

Is a college education the answer for workers? "In the 21st century, the best anti-poverty program around is a first-class education," President Obama said in his 2010 State of the Union Address. He and Spence are too optimistic. The prospects for college graduates are not entirely promising either. Though the college-educated still have a slowly rising pay premium over those with only high-school, the real income of recent college graduates has hardly risen since the late 1970's. Because starting incomes have been rather stagnant or worse at all educational levels, the rising premium of recent college graduates is based largely on the falling wages of high-school graduates. Only those with advanced degrees have experienced strong wage growth.[66] Though they are less likely to be unemployed, college graduates and those with advanced degrees are now just as likely as high school dropouts to be unemployed long-term.[67] Projected job growth [p.19] belies the hand- wringing about shortages of college graduates. Look at "Job Openings due to growth and replacement needs 2010-2020".[68] Though the market for high-school graduates will shrink and that for associate degrees and above will expand, well over two-thirds of projected jobs [39.7% + 29.5%] require only a high- school diploma or less. According to the Census Bureau, of the population 25 and over in 2011, 30.4% had at least a college degree, far more than jobs requiring them in 2010—20%, according to the third column.[69]

STRATEGIC POLICY—What can we do? A lot, but only with recovery from belief in a laissez-faire policy which has never existed. Spence's proposal to reduce taxes on investment returns is more than disappointing. First, corporate taxes are already low--the 2011 rate was the

lowest in decades, and corporations pay a lower tax on their domestic profits than on foreign ones. Further, his proposal does not distinguish among types of investment—building a gambling casino might be more rewarding to investors than a solar energy startup. A good beginning would be a shift from subsidizing 19th century technologies t~~o focus on those of the future. To illus~~trate: Oil companies still receive tax subsidies for exploration and production. An 1872 mining law continues to give priority to mining on public land over other uses with almost no consideration of environmental consequences. Taxpayers foot the bill for cleanup, and mining companies pay no royalties on gold, silver, copper and other minerals they mine there,
and for this privilege, buy mining permits that cost the same today as in 1872.[70]

Spence suggests government intervention very gingerly, but government has in the past assisted some important new technologies.[71] Paul Krugman points out[72] that

> "This is the country of the Erie Canal and the Interstate Highway System. The Erie Canal was a huge public infrastructure project financed with no private or public-private partnership. Can you imagine doing that in 21st century America?"

According to Doug Henwood, "In fact, financiers [have] long been shy about funding risky ventures. Henry Ford couldn't get a dime out of them when he was revolutionizing auto production. Financiers weren't at all interested in computers from the late 1940s through the mid-1960s--the Pentagon and Census Bureau funded the industry in its early stages. Ditto the Internet, which was initially a project of the military. Basic pharmaceutical research is funded by the National Institutes of Health. Wall Street is more interested in things that have been proven."[73] Federal grants supported university-related research that ended up as Google, Cisco, Genentech, Sun Microsystems, and a favorite, iRobot, that produced the Roomba vacuum cleaner, and many others.[74] Now we have an impoverished view of public action.

Spence cites German policy with approval, but its planning goes well beyond his examples of worker-firm consultation. It includes a commitment to a new energy regime.[75] Its technology permits it to be a powerhouse exporter despite its higher labor costs. This used to be the US model. No longer. To take one example where government intervention could be a catalyst for important investments, and might not even require Congressional approval: government purchases could make environmental investment profitable by creating an early market, as was done to boost computers. Climate change is at a crisis level, and the US currently has few mitigating policies in place. Only rising energy costs might yield major adjustments before catastrophe. As we dawdle European countries and China are already investing in clean-tech industries, like solar.[76] Europe appears to be moving to create a regional supergrid for renewable power transmission[77]. The EU pledges to supply 20% of its energy with renewables by 2020.[78] The US government is the largest consumer of energy, and therefore is the largest greenhouse gas source. It could accomplish wonders with green procurement of cars and efficient buildings. This would help push toward full-employment. So long as workers are chasing jobs, wages will suffer. Rather than continue its postwar investment in technology, agencies have cut back, except perhaps military, which used to have civilian spinoffs but doesn't much any more. A family drone, anyone? "…687,000 high-tech manufacturing jobs [have been] lost since 2000. Universities cut back 20% on public research. 85% of growth in R&D employment by American companies occurred abroad."[79]

The New International Order: In the US during the post-Civil War period, some companies became national, but the system of economic regulation was local--we could have depressions national in scope, but until the New Deal, we had no national policy tools to fight them. The current international regime is unfortunately similar—we have corporations international in scope, economies significantly impacted by global trade, investment, and financial instability, but no international rules or effective regulatory bodies to cope with them. Institutions are lagging behind social and economic reality, and some have called for a "Global New Deal." Though not yet perceived as a problem by our political system, the lag is one for our society. Responding will require renegotiating international agreements: to recognize the utility of raising living, labor and environmental standards, regulating international financial flows; applying an effective jobs policy, and using our greater wealth to make life better for all who inhabit our planet.

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[1] Presented at the Columbia Seminar on Full Employment, Social Welfare and Equity April 2012 [revised June 2012]. It is a response to Michael Spence, "The Impact of Globalization on Income and Employment," *Foreign Affairs*, J/A 2011. This paper could not have been done without the work of some outstanding researchers and their websites, like the Center for Economic and Policy Research, the Economic Policy Institute, the Center on Budget and Policy Priorities, and government sites, like the Congressional Budget Office.

[2] http://usleap.org/usleap-campaigns/globalization-trade-and-workers-race-bottom Passed Congress 10/11

[3] Canada, Japan and Mexico will probably join nine countries (US, Australia, Brunei, Chile, Malaysia, New Zealand, Peru, Singapore and Vietnam). A Bush 2 project, carried forward by Obama. "Through this agreement, we are seeking to support the creation and retention of high-quality jobs…" http://www.ustr.gov/about-us/press-office/fact-sheets/2011/february/engagement-trans-pacific-partnership-increase-export

[4] "Under the agreement currently being advocated by the Obama administration, American corporations would continue to be subject to domestic laws and regulations on the environment, banking and other issues. But foreign corporations operating within the U.S. would be permitted to appeal key American legal or regulatory rulings to an international tribunal. That international tribunal would be granted the power to overrule American law and impose trade sanctions on the United States for failing to abide by its rulings." http://www.huffingtonpost.com/2012/06/13/obama-trade-document-leak_n_1592593.html? See also http://www.citizen.org/documents/release-controversial-trade-pact-text-leaked-06-13.pdf

[5] http://www.nytimes.com/2011/06/30/opinion/30thu2.html

[6] https://www.mckinseyquarterly.com/Who_wins_in_offshoring_1363

[7] http://economistsview.typepad.com/economistsview/2006/03/mankiw_on_globa.html

[8] http://www.businessweek.com/magazine/content/03_05/b3818001.htm

[9] Michael Mandel, Global Innovation and Jobs,

[10] Edward Luce, http://www.ft.com/intl/cms/s/0/6327a7f4-21bb-11e1-8b93-00144feabdc0.html#axzz1yHgsnPp1

[11] *The Polarization of Job Opportunities in the U.S. Labor Market*, CAP and Hamilton Project, 4/10, p. 2; images, p.3.

[12] markets with incomplete and asymmetric information with Joseph Stiglitz

[13] "Some See 2 New Gilded Ages, Raising Global Tensions, *NYTimes*, *Business*, 1/23/12. http://www.nytimes.com/2012/01/23/business/global/wrenching-the-globe-into-a-new-economic-orbit.html

[14] http://www.counterpunch.org/random07012011.html saving claim $400 million on an estimated cost of $7.2 billion

[15] http://www.thenextconvergence.com/op-eds/18-op-eds/244-globalization-and-unemployment

[16] http://www.econ.brown.edu/fac/Mark_Dean/Other_Paper_1.pdf

[17] http://www.nytimes.com/2012/03/09/business/global/japan-looks-beyond-its-borders-for-investors.html?

[18] http://www.isreview.org/issues/02/China_Part2.shtml

[19] Leonhardt, http://www.nytimes.com/2011/10/09/sunday-review/the-depression-if-only-things-were-that-good.html [20] Bruce Greenwald, a professor of Finance and Asset Management at *Columbia Business School*, insists that automation has always had a larger role in job loss than trade, and concludes that workers have been little affected by either, finding, for example, that unemployment has been low and "wages have not been measurably affected." p57 He predicts that markets will force surplus countries like China to appreciate their currency. [Not so far.] 57 In the US, consumption of manufactured goods has risen 31%, jobs change -9%, imports 6% so 34% from productivity, and only 15% jobs lost to globalization of the 40% difference,1981-1991; 2000-2006 rise to 35% for jobs lost to globalization.

[21] Howard Wial, Manufacturing Job Loss Is Not Inevitable, http://www.brookings.edu/opinions/2012/0222_manufacturing_wial.aspx

[22] Saez "Striking it Richer: The Evolution of Top Incomes in the United States", updated March 2012

[23] **~~https://www.mckinseyquarterly.com/The_US_employment_challenge_Perspectives_from_Carl_Camden_and_Michae~~** l_Spence_2849 Stiglitz: Bk of Jobs: "the bottom 80 percent of the American population had been spending around 110 percent of its income"

[24] http://ineteconomics.org/blog/inet/michael-spence-next-convergence

[25] Meyerson, "The US:Where Europe Comes to Slum," *LA Times* …Human Rights Watch late last year documents, companies that routinely welcome unions, pay middle-class wages and have workers' representatives on their corporate boards in Germany and Scandinavia have threatened their U.S.-based employees with permanent replacement by other workers as the penalty for protesting wage cuts (that was the German manufacturer Robert Bosch), ordered workers to report on fellow workers' pro-union activities (that was T-Mobile, a subsidiary of Deutsche Telekom) and disciplined workers who couldn't show up for unscheduled weekend shifts announced on Friday night (that was IKEA, according to an L.A. Times story).

[26] http://www.dailykos.com/story/2011/12/28/1049409/-German-auto-manufacturers-high-profits-and-high-pay-show-why-US-labor-laws-need-to-be-stronger

[27] WSJ 2/3/12 With Tax Break, Corporate Rate Is Lowest in Decades

[28] Spence, http://www.nationofchange.org/global-jobs-challenge-1318867455

[29] http://www.scdigest.com/ontarget/11-06-06-1.php?cid=4609

[30] http://www.remappingdebate.org/article/manufacturing-policy-white-house-remains-grip-%E2%80%9Cratchet-down%E2%80%9D-consultants

[31] "Witness the complexity of the provisions in the innumerable enclosure laws; the amount of bureaucratic control involved in the administration of the New Poor Laws….Yet all these …were erected with a view to the organizing some simple freedom—such as that of land, labor….Administrators had to be constantly on the watch to ensure the free working of the system." Polanyi, *The Great Transformation, pp. 140-141*, eg enclosure movement, in which common lands were confiscated by larger landowners.
The law doth punish man or woman
That steals the goose from off the common,
But lets the greater felon loose
That steals the common from the goose. Anon., 18th c re enclosures

[32] http://mondediplo.com/2000/04/08golub

[33] NAFTA 900 pages http://www.citizen.org/Page.aspx?pid=531; thousands of pages Uruguay Agreements Act 1994; WTO's 700-plus pages of rules

[34] http://www.citizen.org/trade/article_redirect.cfm?ID=10441

[35] http://www.ips-dc.org/reports/investment_rules_in_trade_agreements_top_10

[36] http://www.nytimes.com/2012/03/18/business/wto-and-barriers-to-financial-change.html? "Barriers to Change"

37 http://www.truth-out.org/how-us-policies-fueled-mexicos-great-migration/1326205463; http://www.truth-out.org/migration-product-free-market-reforms/1327435191

38 "…W.T.O. rules against protectionism have made it difficult for countries in the West to limit China's sixfold surge in exports during those 10 years, even as the Chinese flood of products has forced factory closings and layoffs elsewhere. http://www.nytimes.com/2011/12/09/business/global/chinas-10-year-ascent-to-trading-powerhouse.html

39 US currently [2011] has a big parts deficit with China, though an auto surplus. [typical US auto tariff is 2.5% SK cars http://trade.gov/wcm/groups/internet/@trade/@mas/@man/@aai/documents/web_content/auto_stats_auto_china_pdf.pdf

40 http://www.census.gov/indicator/www/ustrade.html 2/12. Goods deficit with China 2011 was $296B. Entire goods and services deficit was $558.0

41 Krugman asks, "why do we find it so hard to achieve full employment even with saving somewhat low by historical standards. And the answer seems clear: it's the trade deficit."

42 R.E. Scott, "Employment & Trade Growing U.S. trade deficit with China cost 2.8 million jobs between 2001 and 2010 , EPI 9/20/11

27 http://www.msnbc.msn.com/id/31910387/ns/us_news-environment/t/interior-chief-mining-law-needs-fixing/#.Tw7sPkpOHto free access to National Forest timber, giveaways of railroad land to Western timber companies, & encouragement of clearcutting, the default method here. The careful landowner of forest gets no breaks. A timber company's clearcuts, herbicides, tractors, laboratory seeds are tax writeoffs.

43 "The Slow Disappearance of the American Working Man," Bus.Wk, http://www.businessweek.com/magazine/the-slow-disappearance-of-the-american-working-man-08242011.html

44 Michael Greenstone and Adam Looney, *Have Earnings Actually Declined?* http://www.hamiltonproject.org/files/downloads_and_links/02_jobs_earnings.pdf, p1

45 http://www.faireconomy.org/dream Asians have higher median than whites

46 Schmitt & Mitukiewicz, "Politics Matter: Changes in Unionization Rates in Rich Countries, 1960-10," CEPR 1/11

47 NYTimes editorial, 1/8/12 Unionization has an only modest impact on growth and jobs. Six of ten states with the highest unemployment have right-to-work laws. North Carolina, with the lowest private sector unionization in the country has the sixth highest unemployment rate

48 In most countries, the growth of productivity outpaced the growth of real hourly compensation in manufacturing throughout much of the period from 1970 to 2009, creating a compensation productivity gap. chartbook2011.pdf BLS

49Unions Make Democracy work for the Middle Class," Madland & Bunker, CAP 1/12 http://www.americanprogressaction.org/issues/2012/01/unions_middleclass.html

50 http://www.thewealthcap.org/facts-2/ and http://motherjones.com/politics/2011/06/speedup-americans-working-harder-charts

51http://www.nytimes.com/2012/01/08/opinion/sunday/continuing-assault-on-unions.html

52 Bronfenbrenner 1990's; illegal Fair Labor Stds Act; http:// www.berkshirepublishing.com ans/HTMView.asp?parItem=S031000669A
and http://www.americanrightsatwork.org/publications/general/why-are-workers-rights-violations-so-rampant.html

53 U.S.-based corporations, through the American Chamber of Commerce in Shanghai & the U.S.-China Business Council criticized the draft for reducing labor market flexibility, increasing the cost of production & reducing jobs for Chinese workers, and negatively impacting China's competitiveness and appeal as a destination for foreign investment. In the 1980s and 1990s, American multinationals used the threat of relocating to China as a bargaining chip in their wage negotiations with workers in the US. Years later, they used the threat of India, Vietnam, and others against Chinese workers. After months of lobbying and negotiations, a weaker version of attempt to restrict the use of temporary labor, limit the ability of employers to randomly fire workers, and gave workers collective bargaining rights for wages and benefits became law in April 2007. CP 2/22/12

54 Mark Weisbrot, Dean Baker, & David Rosnick, "The Scorecard on Development: 25 Years of Diminished Progress," http://www.un.org/esa/desa/papers/2006/wp31_2006.pdf

55~~http://web.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:21882162~pagePK:6~~4165401~piPK:64165026~theSitePK:469382,00.html World Bk Updates Poverty Estimates. http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/0,,contentMDK:23129612~pagePK:64165401~piPK:64165026~theSitePK:469372,00.html

56 "Global Reserve Army of Labor and the New Imperialism," Monthly Review, v. 63, Iss. 6 (Nov. 2011) http://monthlyreview.org/2011/11/01/the-global-reserve-army-of-labor-and-the-new-imperialism

[57] ibid., and Dale Wen, *China Copes with Globalization*, http://www.ifg.org/pdf/FinalChinaReport.pdf

[58] Wen, ibid.

[59] BLS: Bannister, MLR, March 2011

[60] Daniel Honan, "The Robot Hiring Boom Has Arrived," Big Think, 12/27/11

[61] http://www.reuters.com/article/2010/11/05/us-china-foxconn-death-idUSTRE6A41M920101105

[62] "China's Wage Hikes Ripple Across Asia," *WSJ* 3/13/12, http://infoseekchina.blogspot.com/2012/03/chinas-wage-hikes-ripple-across-asia.html

[63] http://www.ilocarib.org.tt/index.php?option=com_content&view=article&id=1363:new-ilo-global-report-on-child-labour&catid=214:2010-news&Itemid=1209 5/10

[64] http://therealnews.com/t2/index.php?option=com_content&task=view&id=31&Itemid=74&jumival=7927

[65] "The second economy**"** *McKinsey Quarterly*, October 2011.

[66] http://www.epi.org/blog/false-signals-on-need-for-college-graduates/

[67] http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/Fiscal_Analysis/Pew_PFAI_Unemployment_Chartbook.pdf

[68] http://www.bls.gov/emp/ep_table_104.htm

[69] Col: 19.5%; Mast 7.9%; Profl 1.5%, drs 1.5%. http://www.census.gov/newsroom/releases/archives/education/cb12-33.html

[70] http://www.msnbc.msn.com/id/31910387/ns/us_news-environment/t/interior-chief-mining-law-needs-fixing/#.Tw7sPkpOHto free access to National Forest timber, giveaways of railroad land to Western timber companies, & encouragement of clearcutting, the default method here. The careful landowner of forest gets no breaks. A timber company's clearcuts, herbicides, tractors, laboratory seeds are tax writeoffs. http://act.credoaction.com/campaign/1872/

[71] Fred Block "Over the last thirty years, these government initiatives have matured into a highly sophisticated and complex system that funds much of the important technological innovation in the U.S. economy. …highly decentralized… dozens of …government agencies, through the federal laboratory system, and …hundreds of dedicated [university] research centers. …decentralization …has helped to keep its existence largely unknown…..The R&D 100 Awards recognize 100 ... exciting new technologies. In 2006, 88 of these products were produced by U.S.-based firms. … in 77 of these cases, federal dollars provided some of the funds used by the actual teams who developed these products." http://triplecrisis.com/pulling-away-the-curtain/

[72] http://www.playboy.com/magazine/playboy-interview-paul-krugman

[73] Doug Henwood, http://lbo-news.com/2012/01/15/npr-hack-apologizes-for-wall-street/

[74] sciencecoalition.org/successstories/resources/pdf/Sparking%20Economic%20Growth%20Full%20Report%20FINAL%204-5-10.pdf

[75] see globl file, RifkinGerIndRev

[76] Christopher Parenti, *Tropic of Chaos*, 236.

[77] turbines run by wind on Scotland's coast would connect with Germany's solar panels, join the power of coastal waves of Belgium and Denmark with hydro-electric dams in Norway's fjords: Europe's first electricity grid based on renewable power will begin [1/10], as nine countries plan to link their clean energy projects around the North Sea. The network, made up of thousands of miles of efficient undersea cables, would solve a big criticism of renewable power – its unreliablability. With a renewables supergrid, electricity can be supplied across the continent from wherever the wind is blowing, the sun is shining or waves are crashing. http://www.guardian.co.uk/environment/2010/jan/03/european-unites-renewable-energy-supergrid see also http://www.greenbang.com/european-supergrid-could-have-it-all_21004.html

[78] This is not proceeding rapidly. "An Energy Supergrid for Europe faces Big Obstacles," Gardiner, NYT 1/17/12, Business

[79] http://www.truth-out.org/national-science-board-report-us-losing-research-and-development-jobs-asia/1327251194