

**INTERNATIONAL TRADE AND INDUSTRIAL RECOVERY IN THE  
USA**

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**Abstract**

This paper explores relationships among technological innovation, alternative sources of energy, international trade agreements, and sustainable development. There has been growing concern that international trade destroys domestic industries, increases levels of unemployment, and exacerbates poverty levels. While older or classical deglobalization arguments have historic and legitimate concerns, technological innovation in the energy sector is creating a new paradigm for a re-evaluation of the effects of trade agreements. The energy revolution is creating new jobs that are insulated from outsourcing and amending some of the opprobrious results of trade agreements. In this paper, I argue that international trade and innovation can spur the revival of moribund industries even in the aftermath of resentful trade agreements, largely because trade-induced innovation can reduce levels of poverty and promote sustainable development. The paper uses time series and cross-sectional data to analyze the effects of innovation on: trade, the resuscitation of collapsing industries and the diminishing levels of poverty in some cities of the USA.

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**Keywords:** Dynamic Comparative Advantage, Free Trade Area, Globalization, Renewable Energy, and Sustainable Development

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**1. Introduction**

This paper explores relationships among technological innovation, alternative sources of energy, international trade agreements, and sustainable development. There has been growing concern that international trade destroys domestic industries, increases levels of unemployment, and exacerbates poverty levels. While older or classical deglobalization arguments have historic and legitimate concerns under contingent conditions, technological innovation in the energy sector is creating a new paradigm for the re-evaluation of the effects of trade agreements. The energy revolution is creating new jobs that are insulated from outsourcing and amending some of the opprobrious results of trade agreements.

In this paper, I argue that international trade and innovation can spur the revival of moribund industries even in the aftermath of resentful trade agreements, largely because trade-induced innovation can reduce levels of poverty and promote sustainable development. The paper uses time series and cross-sectional data to analyze the effects of innovation on: trade, the resuscitation of collapsing industries and the diminishing levels of poverty in some cities of the USA.

In “Trade Treaties and Deglobalization (Warburton, 2017), I alluded to the drawbacks of unreasonable restrictions on international trade and pointed out that freer international trade has a great potential for increasing human welfare and sustainable

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development when trade is well managed. This paper focuses on innovation and industrialization as mechanisms for improving human welfare without endangering bi- or multi-lateral trade relationships.

The paper is structured to provide an overview of dynamic comparative advantage and its evolving effects on productivity, employment, poverty and cleaner environmental conditions. The next section provides a brief background of the relationship between trade and industrial development. In Section 3, I examine the manufacturing revival in the USA within the framework of existing trade agreements and sustainable development. Probative questions about insular markets, higher production costs and poor wages are presented and discussed at the end of the paper.

## 2. A brief overview of the trade-industrialization nexus

The arguments in favor of international trade and industrialization have historic precedents and dimensions going all the way back to the eighteenth century. As Shafaeddin (1998) noted, many writers have attributed the industrial development of Great Britain to technical changes during the Industrial Revolution (1760-1830). Not surprisingly, many concepts and sentiments have emerged and evolved along the spectrum of trade and industrialization. Notably, ideas of nationalism, exploitation (dependency) and economic growth (or decline) have influentially configured the debates.

The successful development of the eighteenth century Industrial Revolution has been historically attributed to a deep sense of nationalism and freer trade (Marshall, 1920). Despite the massive industries that were created in the bygone era, Britain obtained considerable advantage as a result of steam energy and trade liberalization in the 1860s (Marshall, and Shafaeddin). Implicitly, the earlier policy to restrict trade was envisioned as a detriment to the industrial development of Britain.

To a large extent, Marshall shared Smith's (1776) view of international trade liberalization with some somewhat subdued precautions. When Smith proposed theories for the acquisition of national wealth, he was not oblivious of the ancillary effects of freer trade. Using the pin factory, with which he was well acquainted, he argued that one of the most robust effects of international trade was specialization.

For Smith, specialization had greater ramifications for increasing national output (income) via three main channels: (i) economies of scale, (ii) absolute advantage (which was later modified to be comparative advantage by David Ricardo) and (iii) technological change.

*"...[T]he invention of all those machines by which labour is so much facilitated and abridged, seems to have been originally owing to the division of labour. Men are much more likely to discover easier and readier methods of attaining any object, when the whole attention of their minds is directed towards the single object, than when it is dissipated among a great variety of things."* (Smith, p.13)<sup>1</sup>

Smith's arguments are not without contemporary empirical merit. In "Globalization and Structural Change in the US Manufacturing Sector..." (Warburton, 2012a), I

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<sup>1</sup> For a concise discussion of Smith's arguments, see Van den Berg, pp.141-152.

discovered that though productivity in the USA manufacturing sector was increasing between 1987 and 2010, the increase in productivity will ultimately be contingent on the direction of changes in national income. Of course, nations increase their income when more of their products can penetrate foreign markets at competitive prices. Accordingly, if energy production can reduce the cost of production and generate income, positive externalities can be generated by international trade. As expected, Ozkan et al (2012) found causality effects between energy production and national income in the case of Turkey.

Lurking underneath the very attractive theory of trade liberalization is the awareness that Britain attained industrialization in the eighteenth century with some amount of protectionism. Such a reality has provided rationale for less industrialized countries to embrace some measure of protectionism. In fact, the dichotomy between levels of development and search for newer markets that were to be integrated into the circuits of capitalism resulted in twentieth century revulsions against capitalism and imperialism.

The theory that protectionism and growth may be mutually inclusive contributed to opposition against *dependencia* in Latin America and a movement in favor of import substituting industrialization (ISI) in Latin America and Africa. Yet, empirical evidence suggests that industrial value added (net output) may have a long-run (conintegrating) relationship with economic liberalization for some countries (Warburton, 2012b).<sup>2</sup>

The economic history of the USA also indicates the realism of protecting infant industries. Hence, according to Bairoch, "the modern protectionist school of thought was actually born in the United States," which also became "... the mother country and the bastion of modern protectionism" (Bairoch, 1993, pp. 23 and 30; see also Shafaeddin). McKee (1934) had also reported the basis of the protectionist fervor in the USA, going all the way back to the eighteenth century.

In his 1791 report to the USA Congress, Hamilton had reported that international trade was not free and that industrialization can be developed through the protection of infant industry (McKee, 1934). In fact, Hamilton presented a theory with widespread appeal in the USA. In a complementary paper (Warburton 2017), I showed why the perverse adoption of protectionist policies of the 1930s led to undesirable economic consequences for the USA and the global economy.

The British industrial circumstances had provided a contextual basis for Hamilton's protectionist dispositions. The Europeans had heavily subsidized their industries, which created stifling conditions for industrial progress in other areas of the world. As such, it was believed that the asymmetry of exchange imperiled the manufacturing capacity of the USA. Craft (1995) finds credence in the theory that inventions and innovations during the Industrial Revolution contributed to the acceleration of industrial development in Great Britain. To catch up with Britain, Hamilton proposed a system of protective duties, prohibition and pecuniary bounties based on other

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<sup>2</sup> As an operationalization matter, intermediate inputs are deducted from outputs to get industrial value added. Of the sampled countries in the empirical exercise, Ghana was more susceptible to liberalization after the ISI experiment and growth in net output.

countries' successful experiences as a means of temporary infant industry protection (McKee, 1934, pp. 234-276, see also Shafaeddin).

It is noteworthy that eighteenth century protectionist policies of the USA were somewhat measured and not sweeping or impulsive. Hamilton had argued in favor of selective protectionist policies that would exempt certain inputs from taxation; the inputs were necessary to enhance the productivity of skilled USA artisans.<sup>3</sup> Can the time horizon of industrial protection be infinite?

Economists tend to use caveats when evaluating the bases of protection. Two preconditions are usually instructive: (i) the protective tariff must lead to an increase in domestic output and reduction in production costs, and (ii) other firms in the industry must derive benefit from protection by acquiring knowledge of successful operations in the aftermath of a protectionist policy. That is, firms must be able to replicate useful knowledge that is derived from protectionist policies (positive externality).<sup>4</sup>

Since trade is generally based on the accrual of benefits, which may be asymmetric, its discouragement is usually counterintuitive. In the contemporary global economy, articles of trade are diverse, and for the past fifty years the comparative advantages of progressive nations have undergone remarkable evolution. More so, several macroeconomic conditions now necessitate the basis and dimensions of international trade. Pointedly, there must be compelling reasons for promoting exports when production costs are low and disposable income is insufficient to substantially absorb domestic production and inventories. Concomitantly, trade imports have positive effects on domestic market when they increase production, productivity and per capita income. The next section takes a look at dynamic comparative advantage in the USA.

### **3. Dynamic Comparative Advantage: The Energy Revolution and the Rise and Fall of Coal**

In the previous section, I laid the foundation for freer trade and measured restrictions. The historical bases for trade have always been grounded on comparative advantage and the opportunity costs that are associated with the use of limited economic resources. However, the basis of comparative advantage has not been static for countries that have developed, including the USA. In reality, business cycles and exogenous factors threaten the vitality of developed economies and their abilities to make stronger commitments to freer trade arrangements.

Fortunately, in the post 2008 recession period, policies have been adopted to deal with unemployment and structural changes in the economy of the USA. The new policy responses are reducing the cost of production and generating skilled jobs for higher wages. In the new economy that is unfolding, the higher paying jobs are insulated from outsourcing and they have substantially reduced the levels of

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<sup>3</sup> Exempted input value may be used to estimate domestic value added (the difference between the value of untaxed input and untaxed finished product) to derive an effective rate of tariff—the ratio of the tax amount on finished product to the value added amount.

<sup>4</sup> There is a presumption that the assistance of social planners must be predicated on real market failures, especially when infant industries are incapable of accessing financial capital for sustainable growth; for further reading see Feenstra and Taylor, pp.311-312.

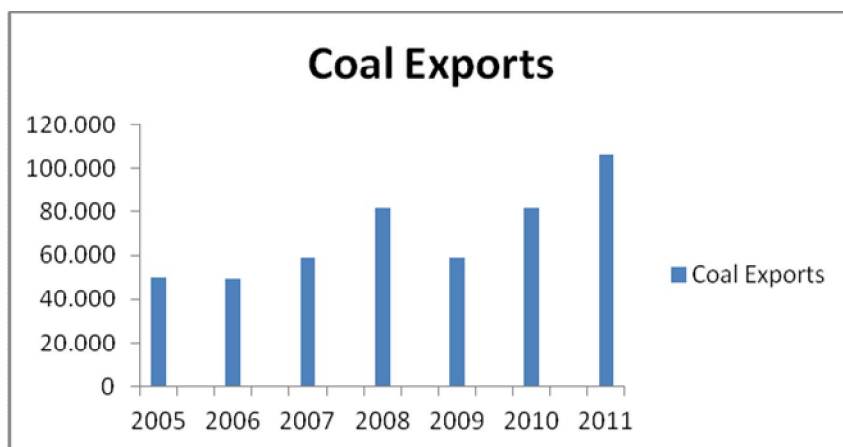
unemployment in several cities of the USA while generating positive external effects. The number of poor people is diminishing in some cities and the policy changes are fostering sustainable development.

It is important to note that these jobs have emerged without the assistance of trade restrictions. Yet, policy makers must be deliberate in improving the infrastructure that will connect the unemployed to newer and secured jobs. This connection can only be made through investment in human capital, enhanced infrastructural development, efficient transportation, information diffusion, and incentives to compensate for risky relocations and the accompanying emotional setbacks. In effect, barring efficient transportation and geographic proximity, the cure of structural unemployment has sentimental dimensions that require planning for the location of new industries in very distraught areas where jobs have been eviscerated as a result of freer trade and structural changes.

One of the main issues in international trade agreements is whether trade can be sustainable, as to say compatible with the increase of real wages, employment and industrial production per head over extended periods of time. Though NAFTA has been strongly criticized, freer trade of goods and services within NAFTA has important positive effects, including the creation of employment in Mexico and diminution of emigration. Additionally, Mexico is a potential market for many goods and services produced in the USA, which contributes to development in Mexico and the USA. NAFTA coexists with dynamic changes in the energy sector and this development is helping to redefine industrial location.

Over the years, while foreign consumption of coal has been increasing (see Figure 1), there has been a paradoxically punishing decline in the domestic consumption of coal. The production of newer sources of energy, legislation, and regulation have accounted for the controversy. Some adjustments to the industrial sectors of the USA have increased industrial employment and income without diminishing freer trade.

**Figure 1: Increasing Exports of USA Coal**



Data Source: [www.sourcewatch.org](http://www.sourcewatch.org) and US Energy Information Administration

Between 2005 and 2011, USA coal exports increased rapidly to respond to global demand. The USA is the world's fourth-largest supplier of coal after Australia, Indonesia and Russia. But the latent capacity to increase shipment puts the USA in the position to supersede Indonesia and Russia. The capacity to increase the supply of coal is not without environmental concerns about the external effects of increasing CO<sub>2</sub> emissions and water pollution. Of course, air and water pollution cannot be contained within any geographic or imaginary boundary, regardless of the sources of production and the destination of consumption. Shocks to external production put pressures on US production and long-term asymmetries continue to exist between increasing foreign demand for coal, especially in Europe and Asia, and declining domestic demand.<sup>5</sup> The effects of alternative sources of energy and enforcement of the Clean Air Act (1970) are captured by Figures 1 and 2.

**Figure 2: Decreasing Industrial Consumption of USA Coal (Short Tons, 1989-2011)**

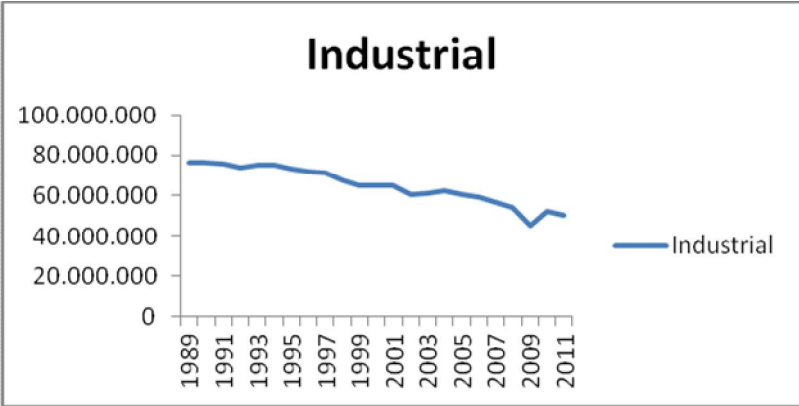
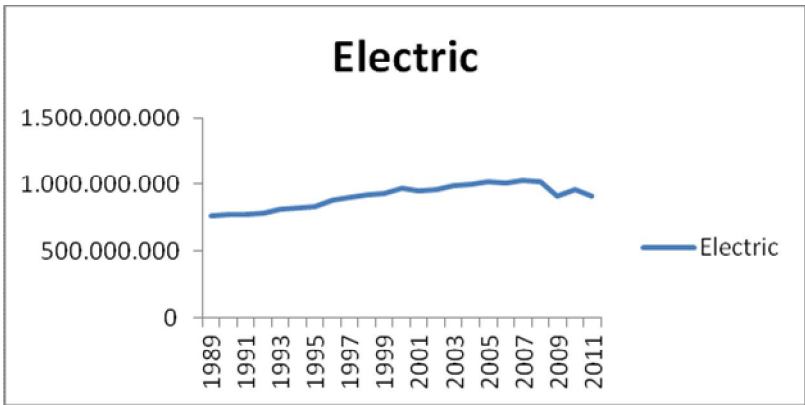


**Figure 3: Electric Energy Consumption (Short Tons, 1989-2011)**



Data Source: US Energy Information Administration

<sup>5</sup> See [www.sourcewatch.org](http://www.sourcewatch.org).

The industrial reduction in electric and coal consumption is significant, because it also mirrors structural changes in the USA economy and the changing dynamics of comparative advantage. Evidently, the transition means that the coal industry is losing workers (see Table 1) while alternative sources of energy are gaining new workers.

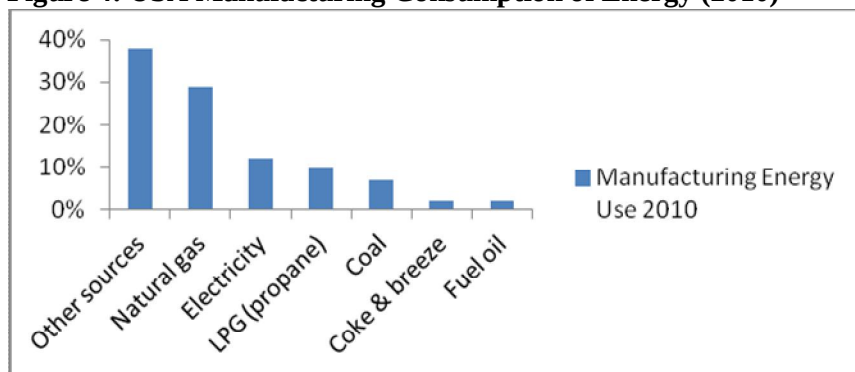
**Table 1: USA Unemployment in the Coal Producing Sector 2014-2015**

|               | Under ground | Surface | Total         | Under ground | Surface | Total         | Percentage Change |
|---------------|--------------|---------|---------------|--------------|---------|---------------|-------------------|
| Kentucky      | 8,191        | 3,643   | <b>11,834</b> | 7,001        | 2,820   | <b>9,821</b>  | -0.17             |
| Pennsylvania  | 5,821        | 2,117   | <b>7,938</b>  | 4,780        | 1,853   | <b>6,633</b>  | -0.16             |
| West Virginia | 14,338       | 3,992   | <b>18,330</b> | 12,555       | 2,935   | <b>15,490</b> | -0.15             |
| Appalachia    | 32,545       | 12,141  | <b>44,686</b> | 27,749       | 9,827   | <b>37,576</b> | -0.16             |

Source: USA Energy Information Administration (EIA)

The shift from coal to newer and cheaper sources of energy requires attention, because industries can now use and export cheaper energy that is insulated from outsourcing and other repulsive effects of globalization. The reduction in costs generates newer comparative advantage for the USA, both in manufacturing and energy, and decreases the level of unemployment without impediments to international trade. Hence, the once struggling manufacturing industry, which was adversely threatened by NAFTA and the 2008 financial crisis, has suddenly gained a new lease of life as a result of innovation and the provision of secured and cost-reducing sources of energy that are sustainable. Pointedly, Figure 4 shows that coal has become a less attractive source of domestic energy.

**Figure 4: USA Manufacturing Consumption of Energy (2010)**

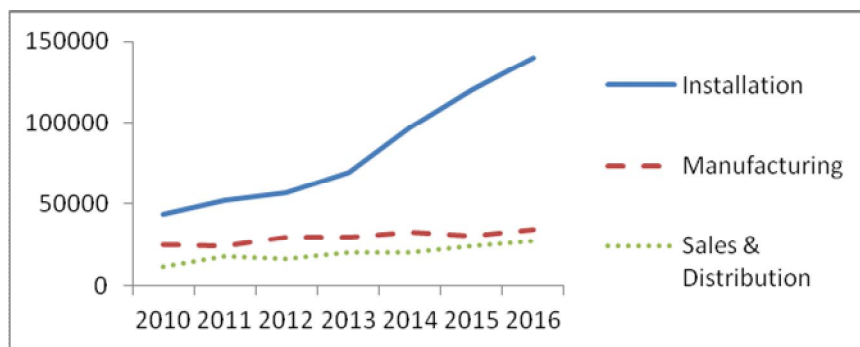


Source: USA Energy Information Administration

The alternative sources of energy are multifarious, including solar energy, natural gas, electricity and propane. The Solar Foundation (TSF) reports that the U.S. solar industry currently provides opportunities for nearly 209,000 solar workers in all 50 states and the solar industry is creating jobs at a rate that is 12 times higher than

employment growth in the overall economy.<sup>6</sup> Since 2010, TSF's Census series has found that solar employment has grown by 123 percent, representing an increase of 115,000 well-paying solar jobs. This growth in solar jobs is continually driven by the increasing demand for solar energy systems over the last decade. "In 2010, the year the Census series began, the U.S. solar industry installed 929 megawatts (MW) of solar capacity. In 2015, over 7,430 MW were installed, eight times that of 2010. The strong relationship between capacity increases and job growth becomes evident when one considers that collectively, demand-side industry sectors (installation, sales and distribution, and project development) make up nearly 80 percent of all solar industry employment [see Figure 5]."<sup>7</sup>

**Figure 5: The Growth in Solar Jobs (2010-2016)**



Data Source: The Solar Foundation

The 2015 Census indicates that solar companies in most sectors increased employment. The project development sector, which includes utility-scale solar, experienced the fastest rate of growth at 48.6 percent (or more than 7,300) jobs since 2014. "With 22,452 people working in this sector, project development now represents 10.8 percent of the solar workforce. Solar companies expect this sector to experience 16.6 percent growth by the time of this writing (end of 2016). Installation firms continue to account for over half the jobs in the solar industry, currently employing 119,931 solar workers [see Figure 8]. Since November 2014, one out of every 83 new jobs created in the U.S. was created by the solar industry."<sup>8</sup>

According to the Solar Foundation, more of America's businesses are now choosing to install solar than ever before. "Walmart once again took the top spot among

<sup>6</sup> See the Solar Foundation, [www.thesolarfoundation.org](http://www.thesolarfoundation.org)

<sup>7</sup> Op. cit.

<sup>8</sup> Op.cit. Solar power is resilient. Despite a snow-packed winter in the Northeast, the installations of 1,306 MWdc across the US gave the U.S. solar market a strong first quarter in 2015. Many major solar companies in the U.S. now offer some form of energy storage, particularly in California, Hawaii, Arizona, New York, and Massachusetts. Solar and storage are also often the core elements of microgrids, which are growing throughout the country (Solar Energy Industries Association, [www.seia.org](http://www.seia.org)).

America's businesses in the electric generation capacity of its solar investments and number of solar projects. The big box retailer, based in Bentonville, Arkansas, boasts of a robust 142 megawatts (MW) of solar photovoltaic (PV) capacity and has completed 348 installations. Many more of the country's most recognizable and best-run companies continue to expand their use of solar energy. IKEA and Costco are powering stores with solar. FedEx distribution centers are powered by solar. Apple and Verizon data centers are powered by solar. The headquarters and offices of Mortenson Construction, L'Oreal, the Better Business Bureau and Forever 21 also rely on solar. Auto manufacturers such as General Motors, Ford, Toyota and Volkswagen use solar energy, and so do manufacturers such as Owens Corning, Intel, and Johnson & Johnson. Across industries, America's business leaders are choosing solar to cut costs, help their bottom line and plan for the future."<sup>9</sup>

The solar industry is designated to be one of the fastest-growing industries in the US and it offers tremendous opportunities for workers from all backgrounds. The 2015 TSF's Census found that the industry continues to exceed growth expectations by adding workers at a rate that is nearly 12 times faster than the overall economy, and accounting for 1.2 percent of all jobs created in the US over the past year. Research shows that employment in the solar industry has grown by 123 percent in the past six years, resulting in nearly 115,000 domestic living-wage jobs. As of November 2015, the solar industry employed 208,859 solar workers, representing a growth rate of 20.2 percent since November 2014.<sup>10</sup>

The production and use of natural gas is also changing the marketability of energy in the domestic economy. Of course, environmental issues will provoke debates about the basis of trade in natural gas and coal. There are contingencies that are associated with the prolonged production of natural gas. Both coal and natural gas are environmentally degrading with imprecise substitution effects.<sup>11</sup>

This means that improved scientific innovations are required to minimize the tradeoff between revenue from natural gas and the deleterious environmental effects that arise from gas pollution. However, FTAs and RTAs provide more auspicious circumstances for trade in natural gas. All US liquefied natural gas (LNG) export projects must receive approvals from both the Department of Energy's Office of Fossil Energy as well as the Federal Energy Regulatory Commission (FERC) under the

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<sup>9</sup> See the Solar Foundation.

<sup>10</sup> Op.cit.

<sup>11</sup> The advantages of natural gas are contingent on the containment of its toxicity. Research shows that, in general, natural gas produces less short-term climate change than coal only if the leakage of methane can be minimized during the extraction process, and only if the efficiency of generating electricity is high. Research also shows that natural gas may not provide the depth of reduction in emissions that is required to avoid substantial increases in global warming, unless effective technology is developed to capture carbon emissions. Natural gas produces less carbon dioxide per unit energy than coal does, but natural gas is predominantly composed of methane, a much more potent greenhouse gas than carbon dioxide. It is estimated that leaks at the drilling fields of natural gas could outweigh its potential benefit; see Cartwright in [environmentalresearchweb.org](http://environmentalresearchweb.org); see also Ratner et al.

statutory provisions of the 1938 Natural Gas Act (NGA) Section 3(15 USC§717b).<sup>12</sup> Exports to countries holding FTAs with the USA are automatically considered to be in the US' public interest and are therefore licensable by the Department of Energy (DOE). The Office of Fossil Energy is required to issue an export permit for exports to countries without an FTA with the United States. The issuance of the permit is contingent on public approbation and LNG permits may not be promptly issued.

The United States is now the world's leading producer of natural gas and the supply is abundant and cheap. The shale revolution has reversed inefficiencies and the US, once a prospective importer, is now an exporter of natural gas. The first shipment of U.S. LNG left in February 2016 and since then the US has shipped LNG to Europe, Asia and South America. (American Petroleum Institute, 2016). Abundant and cheap supply of natural gas means that the US does not have to import substantial amounts of LNG and crude oil for domestic consumption and expanding trade deficits (imbalances).

The dynamic comparative advantage has some important economic and policy implications: (i) the exports of natural gas will depress global prices of gas, (ii) newer energy supply will reduce overdependence on crude oil and reduce current account deficits with TPP countries (see Table 2, Warburton 2017), (iii) FTAs will facilitate less restrictive trade in gas, (iv) the newly discovered comparative advantage will continue to expedite the revitalization of the US manufacturing sector, and (v) the energy revolution is growth-enhancing and sustainable. That is, the new jobs that are produced by the energy revolution are relatively secured from outsourcing—one of the hateful components of the classical theory of globalization—and they increase the growth rate of manufacturing and industrialization for robust international trade and sustainable development.

What should be done with the unemployed coal miners and the dying sectors of the US economy? How can workers with endangered skills be integrated into the changing global economy? Retraining, infrastructural development, location of newer industries, and integration into the new economy are critical for sustainable economic growth.

Industry growth has surged with the energy revolution. Industrial employment has surged over the past five years, with the sector adding some 855,000 new jobs, a 7.5 percent expansion (Kotkin and Shires). The Rust Belt is resurging and the once notorious area of deindustrialization is now racking up jobs, because of a combination of changing factors: the energy revolution, lower interest rates, reduction in unemployment, and consumer confidence. Tables 2 and 3 itemize some of the beneficiaries of structural change and the industrial drivers of US economic growth.

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<sup>12</sup> See Boersma et al, p.2. "Prior to 2014, this process required an initial application to the Department of Energy (DOE) and a national interest determination finding that LNG exports were within the public interest. This process was then followed by a FERC review after which if the project met all regulatory considerations an approval for the construction of an export facility followed." (Ibid).

**Table 2: The USA Manufacturing Revival**

| US Cities                                        | Share of Manufacturing Jobs in Local Economy | Employment Growth (2014) | Employment Growth (2009-2014) |
|--------------------------------------------------|----------------------------------------------|--------------------------|-------------------------------|
| Detroit, Dearborn, & Livonia (MI)                | 12.2 %                                       | 9.8%                     | 31.3%                         |
| Warren, Troy, Farmington Hills                   | 13.4%                                        | 5.1%                     | 38.8%                         |
| Grand Rapids (WY)                                | 20%                                          | 3.7%                     | 27.9%                         |
| Nashville, Davidson, Murfreesboro, Franklin (TN) | 8.9%                                         | 3.4%                     | 23.9%                         |
| Albany, Troy, & Schenectady (NY)                 | 5.4%                                         | 2.8%                     | 19.9%                         |
| Oklahoma City (OK)                               | 6.1%                                         | 2.4%                     | 23.1%                         |
| Louisville/Jefferson County (KY)                 | 11.7%                                        | 3.2%                     | 23.1%                         |
| Kansas City (MO)                                 | 7.3%                                         | 5.1%                     | 8.6%                          |
| Houston, The Woodlands, Sugar Land (TX)          | 8.7 %                                        | 2.4%                     | 19.8%                         |
| Portland, Vancouver, & Hillsboro (OR)            | 10.9%                                        | 2.8%                     | 12.7%                         |

Source: Kotkin, J. and Shires, M. "The Cities Leading A US Manufacturing Revival."

In the southeast, German and Japanese companies have been gradually establishing manufacturing facilities. For example, in the Nashville-Davidson-Murfreesboro, area, manufacturing employment has jumped 23.9 percent since 2009. Japan's Nissan and Bridgestone have established manufacturing plants in [Central](#) Tennessee, which has also created opportunities for small domestic parts companies in the region.<sup>13</sup> These structural changes have positive external effects for the reduction of poverty in the US. Invariably, the structural changes produce results that validate an economic theory of upward mobility. When policy makers create opportunities to reduce unemployment, they can directly reduce the levels of poverty without excessively engaging in transfer payments.

Poverty reduction requires targeted policies beyond tax cuts.<sup>14</sup> Figure 6 shows the relationship between industrial recovery and the direction of poverty in a variety of States that once suffered from a classical effect of globalization (outsourcing). With the exception of Oklahoma, where the general effects are yet to be manifested, other states are making noticeable improvements. Energy accounts for 6 percent of the resurging manufacturing in Oklahoma (see Table 3).

<sup>13</sup> See Kotkin and Shires for the southern recovery and the location and reallocation of industries, including Nissan and Ford, within the US.

<sup>14</sup> See Warburton's "The Bottom Twenty: An Analysis Of Income Inequality In High Income And Developing Countries, 1990-2010," *Applied Econometrics and International Development*, 16(2), 5-26

**Table 3: Drivers of US Manufacturing Revival and Employment (2015/16)**

|            | Aerospace<br>Technology | Energy | Auto<br>Technology | Semi-<br>Conductor | Electronics &<br>Aerospace |
|------------|-------------------------|--------|--------------------|--------------------|----------------------------|
| Michigan   | X                       | X      | 9%                 | X                  | X                          |
| Oklahoma   | X                       | 6%     | X                  | X                  | X                          |
| Texas      | X                       | 4.2%   | X                  | 5%                 | X                          |
| Utah       | X                       | X      | X                  | X                  | 5.1%                       |
| Washington | 7.9%                    | X      | X                  | X                  | X                          |

Notes: Notable cities that are recovering: Seattle, Tacoma, Bellevue (Washington); Oklahoma City (OK); Salt Lake City (UT); Houston, San Antonio, Sugar Land, Baytown, New Braunfels, Round Rock, San Marcos (TX); Warren, Troy, Farmington (MI) and Cincinnati (OH). Notable companies: Boeing, Toyota, Dell Caterpillar, and Pratt and Whitney. Source: Kotkin and Shires

The USA's official poverty rate in 2015 was 13.5 percent; with 43.1 million people in poverty (3.5 million fewer than in 2014). The 1.2 percentage point decrease in the poverty rate from 2014 to 2015 represents the largest annual percentage point drop in poverty since 1999. However, with a population of about 318.9 million (2014 estimate), about 14 percent of the US population live in poverty and more work is required to reduce State poverty levels even as the energy revolution is helping to reduce poverty.

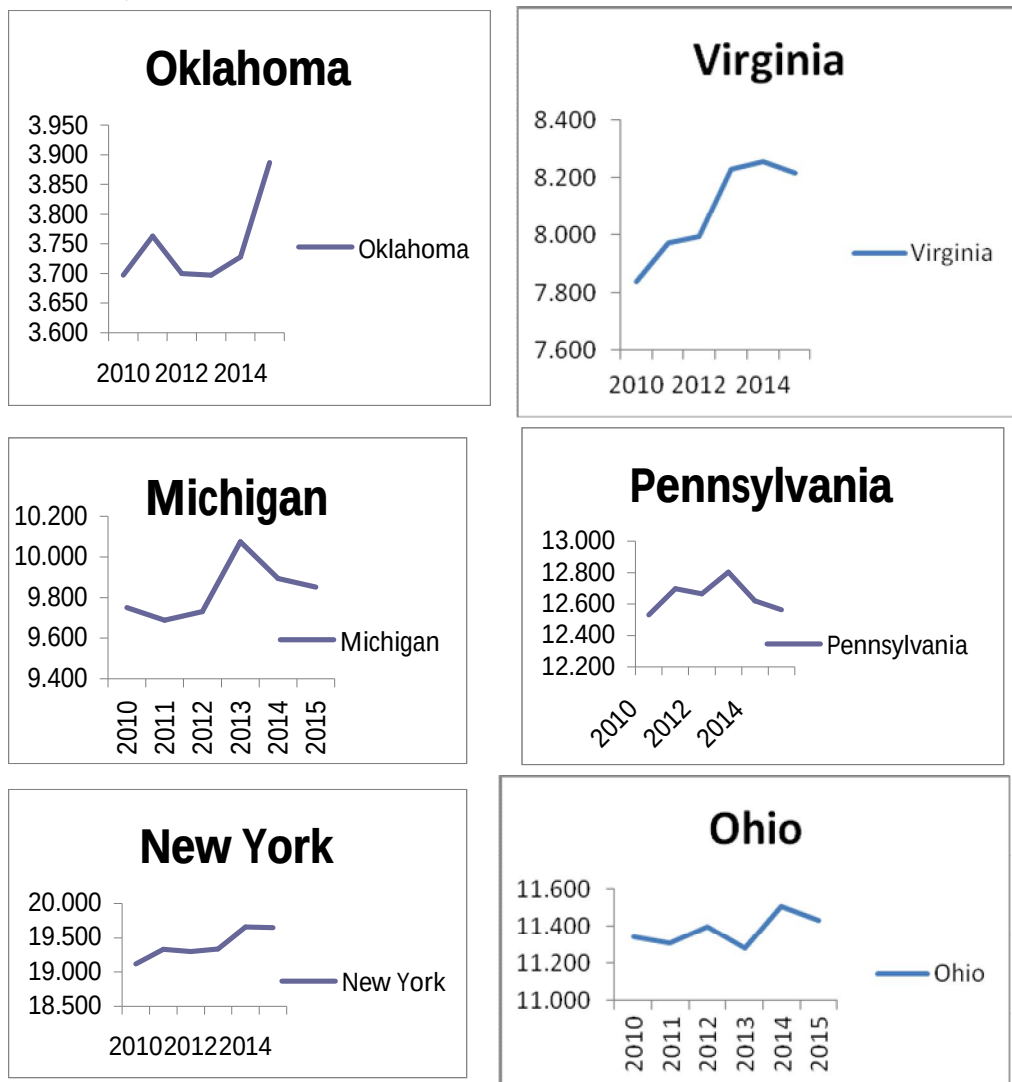
There is a fundamental reason why states with an abundance of nonrenewable sources of energy, including Saudi Arabia and Kuwait, are proactively and frantically looking for alternative sources of energy. Non-renewable resources can neither finance economic growth into the distant future nor maintain a sustainable level of development even with protectionist policies (deglobalization). Forward-thinking policy makers should therefore prepare their workforce for the scientific changes that are inevitably going to influence international trade in the future. Renewables are now emerging in all regions of the world and they will continue to determine articles of international trade into the distant future.

Since the prospects of enforcing environmental instruments are rather loose, FTAs provide an expedient and efficient mechanism for increasing State compliance with international environmental laws. Demand for coal is rapidly rising in Asia and US coal exports to China surged from 2009 to 2010, jumping from 387,000 tons (January-September) to over 4 million tons the following year. Demand for US coking and steam coal has also increased in Japan, India, and South Korea.

#### **4. Can businesses thrive in insular markets with higher production costs and poor wages?**

The repatriation of industries or manufacturing processes cannot be sustained by jingoism and tax cuts, but by the innovations and structural changes that have been taking place in the US economy (dynamic comparative advantage), and the desires of foreign nations. It is an obvious industrial fallacy to argue that tax cuts are very significant and durable modifiers of production, investment costs, and profitability of businesses. Therefore, resource cost, infrastructure, efficient wages, and markets must also play a critical role in evaluating the relocation of industries and the prospects of their successes or longevity.

**Figure 6: Trajectories of Poverty in Assorted USA States (thousands of people, 2010-2015)**



Notes : Rates for 2010/2015: Oklahoma (16.3/14.2%), Virginia (10.7/10.9 %), Michigan (15.7/12.8), Pennsylvania (12.2/12.3), New York (16/14.2), and Ohio (15.4/13.6).

Data source: US Census Bureau

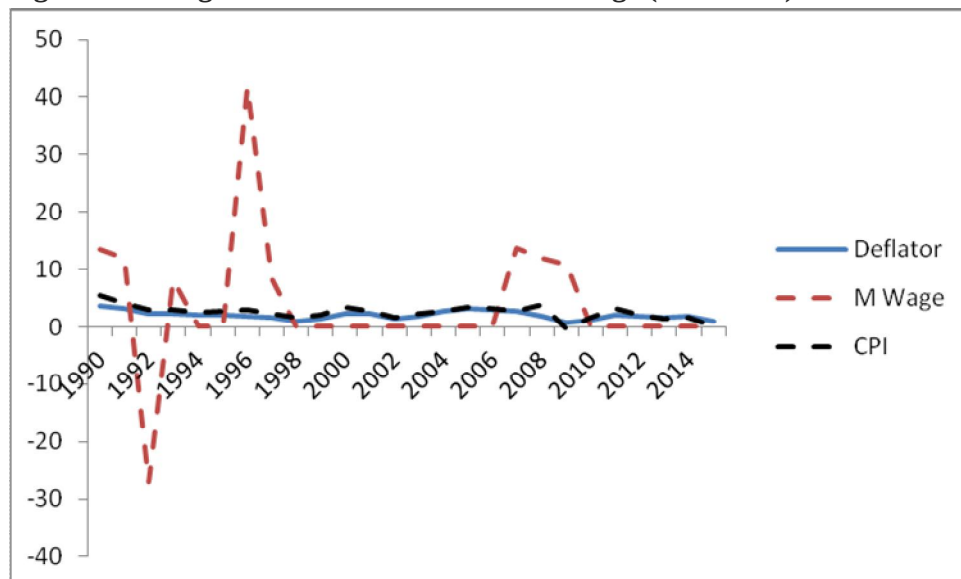
Globalization is significantly about trade deals and the technological advances that make it possible for firms to be competitive in the global economy. Realistically, trade deals and technological advances are mutually inclusive concepts. The futility of technological innovation without market access cannot be overemphasized. Similarly, insularity without adequate domestic consumption is a worthless proposition. Trade restrictions presuppose that the domestic markets are robust enough to consume domestic output. Revisiting Figure 1 (Warburton, 2017), it should be apparent that trade restrictions force nations to move closer and closer to their autarkic situations;

meaning that nations should be willing and able to consume what they produce and store (inventories) as they intensely move to trade restrictions rather than freer trade.

Domestic consumption increases when domestic residents have sufficient disposable income and preference for the goods and services that are produced locally. Since consumption is a function of disposable income, will policy makers be willing to provide producers and consumers with tax cuts to stimulate production, consumption, and public revenue? Will productivity and wages go up? Policy makers will need to delineate clear industrial strategies for the production and consumption of goods whenever the preference for trade restrictions or deglobalization becomes a dominant trade strategy. The practicality of this thought must be premised on the fact that foreign nations will equally be less accepting of US goods in foreign markets. The abominable 1828 and Smoot-Hawley Tariffs should be sore reminders of the disastrous consequences of rash and imprudent trade policies.

Until the recent energy revolution that minimized production cost and reduced poverty, the real value of minimum wage has been falling (see Figure 7) and freer trade has somewhat compensated for a virtually stagnant minimum wage and otherwise unaffordable consumption.

**Figure 7: Changes in the CPI and Minimum Wage (1990-2015)**



Data Source: Bureau of Labor Statistics (US)

Since 1998, US workers earning the minimum wage have not done very well relative to increases in the general price level and prices of consumer products. Apart from the period of the depressionary Great Recession, the minimum wage has stayed flatly below price changes between 1998 and 2014. The decline in real income is not a very robust indicator of the need for trade restrictions and anticompetitive prices. The anger against globalization, which is largely misdirected to economic liberalization, should be seen as a structural problem with falling real income, structural

unemployment, income inequality, and inadequate infrastructure for growth and prosperity. The total impact of foreign trade (exports and imports) may be positive, provided that it does not lead to important deficits and financial restrictions on development (Guisan(2013), p.24).

To a limited extent, the movement to deglobalization is somewhat reminiscent of the industrial situation in Britain after 1815. As the Industrial Revolution progressed in England, displaced and infuriated workers showed their disdain for scientific progress by destroying machines in a burst of vengeance. The machines became their veritable foes and symbols of structural unemployment. Some of the workers wrecked frames and power looms and they were expeditiously hanged or transported out of Britain for their folly. Today, nations are much more civilized and the lives of people are a lot better, because machines and trade have increased productivity over time. Humans are still learning to adjust to the inevitable scientific changes that will arise as time progresses. In fact, the machines of the Industrial Revolution became harbingers of further human scientific progress and we can now talk about technological innovation that has made labor much more efficient and productive for international trade. Yet, wages have lagged behind increases in productivity.

“In 1978, the richest 1 percent of households accounted for 20 percent of business income. By 2007, they accounted for 49 percent. They were also taking in 75 percent of all capital gains. By 2014, the value of the stock market was significantly higher than it was before the crash of 2008. Accordingly, the top was earning substantially more from their investments and acquiring even more of all capital gains.” (Reich, 2015, p.145). On the contrary, between 1947 and 1975, an era of great prosperity, the wages of lower income Americans grew faster than those at or near the top. The pay of workers in the bottom fifth more than doubled. (Reich, 2010, p.43). After 1975, hourly compensation plummeted and diverged significantly below output per hour (productivity). Income inequality remains a perplexing source of discontent against globalization, partly because a significant amount of Americans cannot earn a dollar a day while a significant few can make \$380.52 a minute.

Even with reasonable or modest accommodations of saving and capital accumulation, it is doubtful that the consumption of the wealthy few can generate sufficient spending to absorb domestic production without robust international trade. This paradox is scarcely given deeper thought whenever there is a revulsion against economic integration. Apparently, globalization left human rights behind for quite some time. Newer trade negotiators must not be oblivious of the compelling normative issues that accompany the successful implementation of international trade agreements.

Ever so often, calls for increasing minimum wages to their real levels are greeted with aspersions of socialism; as if minimum wage increases—or the payment of livable wages—are synonymous with socialism and the resurrection of the Bolshevik Revolution. Therefore, policy makers and innovative business managers should find ingenious ways, other than incremental withdrawals from international trade agreements, to be more productive and profitable. Productivity and innovation could actually increase employment and consumption possibilities for sustainable development.

## 5. Conclusion

This paper supports the theory that innovation can stimulate international trade and sustainable development. Historical and empirical evidence broadly suggest that a dual causal relationship exists between trade and industrialization. While disagreeable trade agreement like NAFTA was originally deemed to be counterproductive, the trade agreement sluggishly spurred innovation and opened up markets for the contracting parties. As the US restructured its economy in the post-recession period of the twenty-first century, alternative sources of energy resuscitated industries and reduced the levels of poverty in several cities of the USA.

The natural energy revolution continues to create new jobs that cannot possibly be outsourced, and the new industrial conditions are antithetical to emerging deglobalization sentiments, because they reduce the cost of production and generate new comparative advantages. Accordingly, the USA is contemporaneously poised to benefit from international trade agreements by exploiting its newly earned comparative advantages.

International trade agreements open up markets and minimize trade barriers that reduce consumer welfare, especially when disposable income is comparatively lower and virtual autarkic prices are anticompetitive. In the absence of robust trade, current account disequilibria are more likely to stifle innovation and reduce the prospects of sustainable development. When a growing share of the volume of international trade could actually be driven by relatively cleaner, cheaper and sustainable sources of energy in diverse cities of the USA, international trade agreements must be promoted to increase the number of higher paying jobs that could not be outsourced. As a policy matter, social planners must proactively plan for structural changes and the development of human capital and infrastructure, which are required for sustainable trade, long-lasting employment opportunities and sustainable development, when they engage in international trade.

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