USMCA Effects on Manufacturing Jobs and Competitiveness

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Abstract

The process of renewing NAFTA for the terms that benefit the interests of the United States, coupled with the associated benefits of Mexico and Canada, begins after two decades of NAFTA in action. The new deal, known as USCMA, provides insight into labour rights and adopts policies and regulations for the labour effecting from the deal through the introduction of laws and policies that reflect the core values of the ILO. Additionally, international power dynamics have been shifting from unipolar to multipolar for the last couple of years, and this highlights the importance of regional integration of the United States vis-à-vis other emerging economic powers. Regional integration and diffusion of the supply chain across the North American continent provide a strategic edge in the economic competitiveness for U.S. companies, especially in the automobile and parts sector, in the domestic and international market against rising economies of the East. The paper concludes with a discussion of the manufacturing job, which represents the American myth with respect to Mexican 'fear' and does not reflect the actual situation in practice. Job loss in the manufacturing sector is a result of changing technology and the need for skilled labour for capital-intensive work. On the other hand, the economic competitiveness of the U.S. firms increased due to NAFTA because integrating markets, along with the concentration of most of the automobile production in the United States and North America, suggests a way forward for a regionally integrated and economically competitive environment.

An Examination of USMCA's Impact on Manufacturing Jobs and Economic Competitiveness in the United States

The introduction of NAFTA eliminated most of the tariffs on products that were part of the trade flow between all three member countries, and the key focus of the treaty was the liberalization of textiles, agriculture, and automobile manufacturing sectors, coupled with safeguarding intellectual property protection, and implementation of environmental and labour regulations. The transformation of economic relations between North American economies in the aftermath of NAFTA is evident in the fact that the liberalization of policies can provide enormous opportunities for all due to the elimination of barriers to resource mobility. Within United States polity, NAFTA received bipartisan support, which resulted in an increase in regional trade three-fold, along with cross-border investments within the

region. In a similar way, bipartisan support enforced USMCA in mid-2020, and a major reason for the revision of terms for trade was the undermining of the manufacturing sector and jobs in the United States.

USMCA is the extension of the first (NAFTA) agreement that comprises two developed countries, Canada and the United States, coupled with one developing nation, highlighting the importance of regional integration at an equitable level. The research attempts to explore the relationship between two effect variables, that is, economic effectiveness and manufacturing jobs, due to the cause variable of the U.S.-Mexico-Canada trade agreement at the regional level. The quality research methodology follows a qualitative research design for an effective understanding of the cause-and-effect relationship within the context of North American regional integration. The purpose of the study is to highlight various components of the deal and the effect it can have on employment in one sector, along with overall competitiveness. However, the research concludes with a detailed discussion of the limitations and prospects associated with the USMCA trade deal.

Literature Review

Chatzky et al.'s (2020) article in 'The Council on Foreign Relations mentions NAFTA as a landmark deal between the three North American countries, which became effective in 1994. For one obvious benefit, the trade explosion between Canada, Mexico and the United States, coupled with closer integration of the three economies, resulted in criticism in the United States for outsourcing work and job losses. President Trump referred to NAFTA as the 'worst trade deal ever made,' and in their last year in office, managed to renegotiate USMCA. Negotiations for the renewal of the trade treaty and the process of consultations began in the year 2017, and key features of the deal were auto exports and markets for dairy, poultry, and egg markets, coupled with aluminium and steel tariffs. The new deal came into effect on July 01, 2020, upon ratification from members' states to USMCA, and it is viewed as a modernization of NAFTA's twenty-five-year-old provisions.

Effect of NAFTA on the U.S. Economy?

The experience of NAFTA suggests that the trade potential between neighbours is high vis-à-vis trade with countries that are not in close proximity. Trade liberalization since the enactment of NAFTA resulted in tripling the U.S. trade volume with both the neighbours, surpassing the growth rate of U.S. trade vis-à-vis all other countries. A total of one hundred exports from the United States aim to destinations in Mexico and Canada. Additionally, most estimates suggest that NAFTA managed to grow the U.S. Gross Domestic Product (GDP) by almost 0.5 per cent, coupled with an additional eighty billion U.S. dollars to the U.S. economy. The opponents of NAFTA are of the view that the high concentration in some industries, like auto manufacturing, and the effect of liberalization on manufacturing jobs in the existing literature suggest that the American myth of job loss due to NAFTA lacks empirical evidence; that is, the benefits of trade liberalization are distributed widely in the

society, unlike regional economies operating with restricted resource and labour mobility.

Critics argue that NAFTA led to a trade deficit, mobility of companies to Mexico for low factors of production, and low-wage competition as primary factors, which also contributed to wage stagnation and job losses. Additionally, experts like Dean Baker and Robert Scott argue that the increase in import level during post-NAFTA enactment supplements roughly 0.6 million job losses over the next two decades. As per the proponents of trade liberalization and NAFTA, approximately 14 million jobs in the U.S. rely on trade with NAFTA members while creating 0.2 million jobs with higher wages when compared with the wage rate of lost jobs in the sector; however, their argument limits the scope of analysis to the import growth which would happen either way, even without the enactment of NAFTA. The decline in U.S. manufacturing jobs due to businesses moving to Mexico for low-cost production resources added to the loss of 0.35 million jobs since 1994, which equates to one-third of the total employment in the manufacturing industry. Additionally, auto sector employment in Mexico increased drastically over the same period from 0.12 million workers to 0.55 million workforce.

On the other hand, economists like Cathleen Cimino-Isaacs and Gary Carguergues say that gains in the overall U.S. economy are higher than job losses in the sector. The net effect of job loss compensates in the form of newly created jobs, coupled with benefits for consumers in the form of low prices of high-quality products and services. PHE's (2014) study on the effects of NAFTA on U.S. society suggests that the pact has caused a net loss of fifteen thousand jobs per annum while contributing in the form of 0.45 million U.S. dollars as gains for each job lost. The two critical factors responsible for the gains vis-à-vis each job loss are low prices for consumers and higher productivity levels. Existing literature suggests that evidence-based policy-making is required for managing the labour demands of the manufacturing sector, and the loss of manufacturing sector jobs owes less to NAFTA and more to the industrial stress the sector was going through long before the enactment of NAFTA. Existing literature suggests, as mentioned in David Dorn, David Autor, and Gordon Hanson (2016), that competition vis-à-vis China has played a critical role in reducing the employment levels at home since the year (2001) when China joined the "World Trade Organization (WTO)".

For example, Hanson says, "China is at the top of the list in terms of the employment impacts that we have found since 2000, with technology second and NAFTA far less important." Furthermore, research analysis by Hanson suggests that around 11-17 million jobs lost during the years 2000 and 2010 were attributed to technological change and trade with China. On the contrary, the researcher argues that the U.S. auto sector's economic competitiveness vis-à-vis China increased due to NAFTA. The development of the supply chain for the U.S. auto sector at the cross-border level reduced costs, positively inclined productivity, and improved the economic competitiveness of U.S. firms. Hanson says, "Because Mexico is so close, you can have a regional industry cluster where goods can go back and forth. The manufacturing industries in the three countries can be very integrated," which reflects the competitive advantage of U.S. automakers vis-à-vis Chinese firms. The impact of NAFTA on Mexico and Canada is equally advantageous, and it has assisted both countries in connecting regionally and economically.

Effect of USMCA on the U.S. Economy?

The language of USMCA coincides with the existing “Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)”, which Mexico and Canada are already members of. Increased working and environmental regulations are at the core of USMCA. Additionally, increased access to the dairy market of Canada, coupled with the reduced duty-free limit for consumers in Canada to shop online for U.S. goods. Lastly, higher incentives for U.S. automobile production reflect the prioritization of local industries, which have been under heavy competition from China since the year 2001, and USMCA promotes the economic competitiveness of the U.S. automobile industry. As evident from the case of European economic integration, regional integration results in decreased political autonomy, which the nations enjoyed in the absence of dependence on each other, at least in economic terms. For example, the sunset clause of the sixteen-year is part of the agreement, which requires a review every six years and a review of an additional sixteen-year term during the preceding six-year review. The sunset clause reflects higher control of individual member states to the agreement with regard to the evolution and developments of USMCA, but this also raises concerns of greater uncertainty. For instance, the dominance of the United States as a huge consumer market moves firms towards production in the United States, which can significantly increase the cost of production for vehicles in the case of automobiles. The automobile sector relies on significant investments in the regional supply chains across the North American continent, and higher control in the form of a sunset clause can put industries at risk in a political conflict situation, for instance.

Rebalancing Trade to Support Manufacturing

According to the “Office of the United States Trade Representative,” USMCA is going to prove distributive through the creation of balanced and reciprocal trade opportunities, which assists in supporting jobs for Americans in high-paying categories. ‘Product-specific’ rules, as part of new rules of origin and origin procedures, incorporate light trucks, passenger vehicles, and automobile products. The objective of the introduction of new rules is to incentivize the sourcing of materials and goods within the United States and North America in general. Additionally, the deal mentions seventy-five per cent of content related to the automobile industry is to be produced within North America, and it is a regional-level policy for encouraging economic growth at the regional level and manufacturers in the United States. The rules are aimed at incentivizing resource mobility, especially capital, and they are aimed at preserving and re-shoring parts of production within the United States, coupled with the transformation of supply chains around the United States content. The transformation of the supply chain is extremely useful because it will allow content that facilitates high-paying jobs, along with the facilitation of automobile production in future. Finally, new rules will allow the removal of previous practices under NAFTA’s agreement that incentivized parts production, in addition to incentivizing low wages in the automobile sector. The aim of USMCA is to provide a level playing field for companies in the private sector, similar to NAFTA, coupled with reducing disparities in wages within member countries. An attempt at enhancing working conditions and employment opportunities within the

United States is also an attempt to involve USMCA's core stakeholders, that is, companies operating within Mexico. Furthermore, USMCA guides employers in investing resources in understanding various provisions of the agreement through the education of employees to ensure compliance through oversight.

Santos (2019) argues in favour of reimagining trade agreements between North American nations, that is, the United States, Mexico, and Canada, in terms of consideration for the stakeholders of workers. The author argues that liberal globalization prevailed in the North Atlantic countries in the post-Cold War world order and backlash against it with increasing concerns for the conditions, wages, and economic opportunities for workers associated with regional trade agreements. Over the last three decades, the central component for debate over international trade agreements, especially between Mexico, the United States, and Canada, is a concerned with the impact of the negotiations on the well-being of the workers associated with the employed industry. The limitation of the liberal globalization policies in the North American continent attempts to accommodate labour rights progressively; however, the actual impact of positively shaping the well-being and working conditions of workers is limited. The new agreement between the United States, Mexico, and Canada (USMCA) has the potential to regulate domestic labour laws positively, as well as other issues workers are facing. The author emphasizes achieving a balance between the power of labour and capital within the context of new trade agreements, which needs to be supplemented with reforms at home. There is no denying the fact that the inequitable consequences of liberal globalization have negative consequences for the labour employed in the home industry, coupled with grievances of emerging nationalist movements in economic terms, which are significantly powerful. Without improving the lives of ordinary workers, reshaping globalization through trade agreements is not going to solve the problem because addressing the grievance is the way forward and not the other way around. One of the reasons for the backlash against liberal globalization is the generation of inequitable consequences over the last three decades, and a revised trade agreement requires the accommodation of the stakeholders with economic grievances. The changes brought in the revised agreement of USMCA pertain to domestic labour law reforms for Mexico, putting limits on ISDS with a drastic reduction in rights of investors and explicit stimulation of production across North America with the intention of preventing job losses in the United States through regulation of the auto industry.

USMCA and Workers

Santos (2019) also argues that the labour provisions in NAFTA showed evolution in three axes. First, a shift from domestically defined labour rights to internationally defined labour rights based on core values of ILO, that is, standards related to collective bargaining, child labour, freedom of association, non-discrimination, and forced labour. Second, USMCA includes a chapter on labour rights as part of the trade agreement, which reflects on the higher value of being a stakeholder in the process of negotiations and deals. Technically, dispute settlement systems and other trade obligations apply to labour rights, which previously did not apply. Lastly, if a party violates labour rights, then the reaction

in the form of trade sanctions is the eventual outcome, which includes the imposition of a tariff on the part of the affected party or compensation for the breaching party. Furthermore, labour provisions in the Trans-Pacific Partnership (TIPP) paved the way for enacting USMCA, which provided a 'gold standard,' stated Hillary Clinton, within trade agreements for the protection of workers' rights.

Legally, Santos (2019) highlights the critical role of the International Labor Organization (ILO) in reflecting the concerns of workers within the global economic order. The author argues that the ILO, over the last twenty-five years, since the end of the Cold War and the emergence of liberal globalization, has worked to address workers' concerns through the incorporation of a chapter on minimum standards for labour within trade agreements. However, the evolution of labour provisions in the North American Free Trade Agreement (NAFTA) reflects on the shift from locally defined labour rights to "… internationally defined ILO core labour standards on freedom of association and collective bargaining, forced labour, child labour, and non-discrimination (Santos, 2019; pp. 407)." Additionally, the introduction of the chapter on labour rights in trade agreements also highlights the mechanism for dispute settlement, which is similar to that of trade obligations. Lastly, violation of labour obligations may result in trade sanctions on the part of the affected party, which includes the imposition of tariffs or compensation on the part of the party in breach.

USMCA and Economic Competitiveness of U.S.

The regional integration of North American countries, namely Mexico, the United States of America (USA), and Canada, is an opportunity to integrate in terms of economics and infrastructure. USMCA aims to enhance U.S. economic competitiveness vis-à-vis other Global Economic Powers like China. For example, supporting the auto industry through spatially limiting the seventy-five per cent production in the U.S. economy, coupled with a supply chain ranging from Canada in the North to Mexico in the South of North America, increases U.S. economic competitiveness vis-à-vis China.

Research Methodology

The research design of the paper adopts qualitative research techniques, which involve a literature review of the existing published work of experts and organizations in the field. Digital tools are also adopted for effective search and research of the content, which positively contributes to the quality of research, and the data is primarily secondary. Research papers for the research analysis are based on peer endorsement from a professor in the class, coupled with guidance and direction available in the existing literature for research exploration.

Discussion & Findings

Gowa's (1989) research explores the impact of bipolar and multipolar world orders on free trade and argues that the bipolar power structure of international politics has an advantage over its multipolar

counterpart in relation to reducing barriers for open markets between states at the international level. Furthermore, existing literature preceding the publication of Gowa (1989) relies on the prisoner's dilemma structure for states and their respective preferences vis-à-vis trade, which results in scarcity of international markets. Gowa's (1989) analysis provides an argument against the limitation of the prisoner's dilemma structure in an anarchic international system for an objective assessment of states' behaviour within Free Trade Agreements (FTAs). That is to say, the author argues that a bipolar global power structure has strong incentives for states to adopt altruism within their alliances and, consequently, less credible threats of exiting alliances.

Simmons (2000) argues the nature of international legal commitments that sovereign governments undertake and the subsequent effect of these commitments on the behaviour of the state. The author examines the patterns related to compliance and commitment with respect to international monetary law. For example, "reputational concerns explain patterns of compliance" during "the signal governments try to send by committing themselves through international legal commitments." The findings of the research highlight an understanding of government commitments through the status of legal obligations of other countries to the agreements within their respective regions. The author also argues that the overt policy pressure from the International Monetary Fund (IMF) is not a useful 'enforcement' mechanism, although competitive market forces do. Nevertheless, 'legal commitments' have significantly positive effects on the governments that facilitated the process of restrictive policies as part of free markets; moreover, governments desire to have a reputation for compliance and also reestablishes.

Skonieczny's (2001) article relies on empirical evidence from newspaper advertisements to demonstrate that "myths contributed to the discursive construction of NAFTA." NAFTA got approval from the U.S. House of Representatives in 1993 with "discursive construction of the trade accord", as the author states, confirming decades-old American myths. However, Mexico was formally acknowledged with the 1993 trade accord as an equal trading partner vis-à-vis northern states of the Americas, that is, Canada and America. However, the acceptance of Mexico as an equal trading partner challenged the already established notion of the country, and Latin American countries in general, that is, as dependent, inferior, suspicious, and childlike (Johnson, 1993; Cottam, 1994). One of the reasons for the lack of NAFTA's effectiveness is a deeply ingrained image of Mexico in the United States, which creates obstacles in legislation and the policy-making process at the congressional level for accepting economic integration at equal levels with Mexico. The author argues that NAFTA is the product of discursive construction due to the dilemma of treating Mexico as an equal trading partner due to accepting Mexico at a simultaneous level as an inferior country. NAFTA was a policy success for President Clinton, embodies deep-rooted American myths, and became the first international trade arrangement between countries that accepted Mexico as an equal trading partner vis-à-vis developed, wealthy, and powerful nations.

Manufacturing Sector of the U.S. Economy

Hicks and Devaraj (2015) explores the effect of domestic demand (cause variable), and productivity change (cause variable), on employment levels in the United States manufacturing sector. The manufacturing sector includes the production and shipment of goods, which comprise a large part of the domestic and national economy. The industry continues to grow at a sustainable growth rate; however, demand for labour is the most debated aspect of the industry due to the dependence of lower strata of society on manufacturing work opportunities, especially in economic terms. The author argues the effect of foreign trade, productivity change, and domestic demand on the employment levels in the United States. Manufacturing is a growing sector within the U.S. economy, and the employment levels for the sector have faced stagnation for several years in the post-Cold War era of liberal globalization. One of the primary reasons for the stagnation of employment levels in the manufacturing sector is productivity growth in the manufacturing sector's production processes. Trade, domestic demand, and productivity are the three factors that contribute to the changes taking place within the manufacturing sector of the United States. Out of the three variables of trade, domestic demand, and productivity, the impact of productivity change on manufacturing employment is most significant. Empirical evidence also suggests that eighty-eight per cent of the job loss in the manufacturing industry is due to the growth taking place in productivity capacity. On the other hand, domestic demand has a modest effect on manufacturing jobs. Growth in demand for manufacturing goods at home roughly accounts for 1.2 per cent job growth in the sector. Lastly, trade plays a critical role in negatively or positively impacting the growth of domestic production and employment levels in the United States (U.S.). Over the last decade, before the publication of Hicks and Devaraj (2015), net exports remained negative and contributed to approximately 13.4 per cent of the job losses. There is no denying the robustness of manufacturing production; however, productivity growth in manufacturing processes remains the largest facilitator of job displacement, which explains the consideration of domestic policy reforms.

Manufacturing Base

Eaton et al. (2011) suggest that the cyclical downturn (recession) adversely affects demand for durable consumption goods, coupled with business equipment and plants, which are evident in Figure 1, during the Great Recession (2017-2009). The decline in manufacturing production due to the Great Recession owes a great deal to the sensitivity of the sector due to its operations encompassing business plants, equipment, and durable and consumer goods, which also resulted in large-scale unemployment in the regions where manufacturing operations take place in the United States.

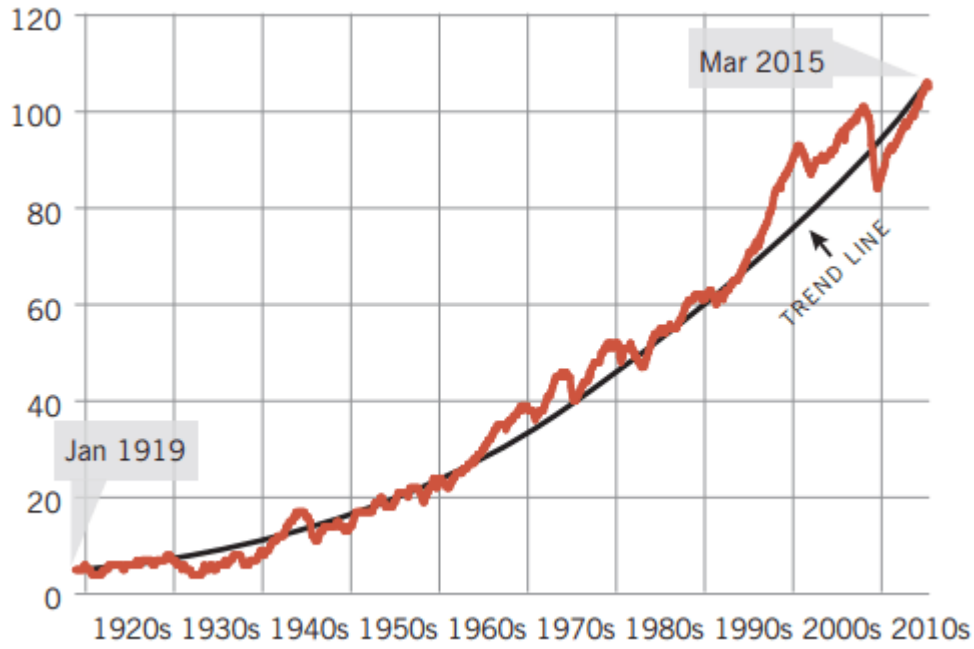

Figure 1: Manufacturing Index for the U.S. Economy
Source: Board of Governors of the Federal Reserve System

The complete recovery of the manufacturing economy took place by the year 2014 when the level of production was record-breaking, which supplements the notion of distinctive and long-term growth features of the sector over the past century of American history. American manufacturing has remained healthy for most of America's history, and the total value of goods produced (GDP) has also grown sustainably. Nevertheless, the relative stagnation of manufacturing employment owes to the sector's resilience to sustain trade agreement regimes and recession time periods, especially in the context of the last seven decades.

The statistics from BLS 'Current Employment Statistics,' (CES) program comprise approximately 140 thousand government agencies and 440 thousand websites, which are monthly based on establishment or payroll surveys. The employment level of the United States Manufacturing Industry since April 2020 suggests that there has been significant growth in the month of June while fluctuating around the figure of between 1.5 and 2 per cent growth within the range of 12,000 and 12,400 (Figure 2).

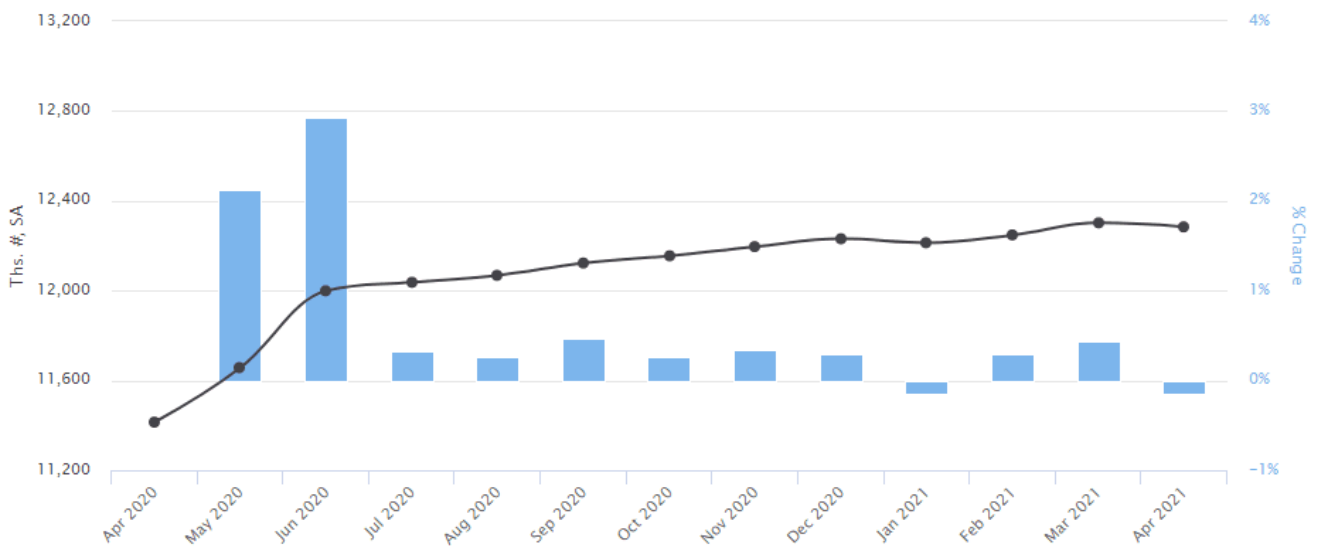

Figure 2: Employment Level Manufacturing Industry (United States) During COVID First Year
Source: https://www.economy.com/united-states/manufacturing-employment

Manufacturing Jobs

Fisher (2004) argues that manufacturing jobs in the United States have been on the decline for the last five decades, and the major cause of the occurrence of the phenomenon is labour-saving technology, while state tax policy and economic conditions at the international level have played a relatively minor role. The percentage of the employed population in the U.S. manufacturing industry has reduced from 25 per cent during the 1960s to 12.5 per cent during the 2000s. Fisher's (2004) central argument and concluding note state that future prosperity is dependent on advances in technology for a service-oriented economy. This is evident from the fact that the United States has the reputation of having the highest long-term economic growth rate in the world, and according to conservative estimates, the standard of living every thirty years doubles for the average American.

Transformation of the U.S. Manufacturing Industry

Charles, Hurst, and Schwartz (2019) investigate the causes of the decline in the employment rate in the manufacturing sector and focus the analysis on post-2000, which is declining. The author argues that the decline in the manufacturing rate also owes to local opioid use and associated deaths. Other factors for the decline of manufacturing sector employment include mediating factors, that is, sectoral switching, private and public transfer receipt, and inter-region mobility.

Manufacturing Sector Jobs During COVID-19

Kluver (2021) is the director of Organizational Development at Alexandria Industries and states in early 2021, within the context of manufacturing jobs during COVID-19, “those of us in the manufacturing industry, however, this challenging time has generated opportunities to resolve our ongoing worker shortage issue.” As per statistics, the manufacturing industry is going to be short of six million employees around the year 2030.

Lucas and Bennett’s (2021) article suggests that the pursuit of capital-intensive corporate policies at the industry level within the manufacturing industry is creating a ‘skills mismatch,’ which reflects the gap between worker’s existing skills vis-à-vis skill demands of the manufacturing sector. The overall workforce participation rate for the manufacturing sector declined to 61.2 per cent in the year 2021 due to the factor of the Boomer generation getting older than 65 years and less likely to participate in employment opportunities, although the total output of manufacturing increased by a five per cent annual growth rate. As per the analysis of Charles, Hurst, and Schwartz (CHS), the decline in manufacturing jobs between the years 1980 and 2016 amounts to 7.5 million (2019). The lower level of manufacturing employment relied on men and women within the age bracket of 21 to 55, and an education level of less than a high school degree created a social strata of lower-income generating class. Subsequently, the 7.5 million manufacturing job loss created instability in the lower social strata of society, which rely on manufacturing jobs due to low education levels, and the phenomenon consequently reduced the overall labour force participation rate.

As per conservative estimates, the total job loss in the manufacturing sector between April 2020 and February 2021 amounts to 582,000 individuals, which reduced the overall participation rate from 63.4 per cent in February 2020 to 60.2 per cent in April month, which is the lowest figure since 1973 in the history of United States. The author states, “While the manufacturing sector largely avoided the disastrous impact of COVID-19 that the service sector experienced, it is being affected by a long-term decline in employment levels of older, skilled workers and an unexpected dip in labour force participation in all age groups coincident with the pandemic.”

Conclusion

The program was announced this year under the Biden administration’s objectives of increasing the available skilled workers required to meet the manufacturing sector demand. The expansion of apprenticeship programs, along with the relaunch of the Federal Advisory Committee for Apprenticeship. Additionally, the National Apprenticeship Act 2021 also provides statutory authority for the Department of Labor to create an ecology for increasing manufacturing participation rate through the introduction of skilled labour for a rapidly changing capital-intensive industry.

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Appendices

Appendix No. 01: Manufacturing Sector Performance, 2006-2013

Sectors	Recession 2006-2009	Recovery 2009-2013	Overall 2006-2013
All manufacturing	*-11.5%*	*32.9%*	*17.6%*
Durable goods manufacturing	*-18.9%*	*36.8%*	*10.9%*
Wood products	-43.0%	35.9%	-22.5%
Nonmetallic mineral products	-28.8%	13.6%	-19.1%
Primary metals	-28.6%	80.4%	28.8%
Fabricated metal products	-11.1%	23.6%	9.8%
Machinery	-12.5%	45.7%	27.5%
Computer and electronic products	-14.4%	3.3%	-11.6%
Electrical equipment, appliances, and components	-13.1%	17.5%	2.0%
Motor vehicles, bodies and trailers, and parts	-39.0%	87.8%	14.6%
Other transportation equipment	17.5%	29.9%	52.7%
Furniture and related products	-30.0%	11.1%	-22.3%
Miscellaneous manufacturing	-0.7%	15.1%	14.4%
Nondurable goods manufacturing	*-3.6%*	*29.4%*	*24.7%*
Food and beverage and tobacco products	16.6%	17.5%	37.0%
Textile and textile product mills	-35.1%	21.3%	-21.3%
Apparel, leather, and allied products	-48.7%	67.8%	-13.9%
Paper products	-4.4%	6.3%	1.6%
Printing and related activities	-17.0%	-5.5%	-21.6%
Petroleum and coal products	-10.1%	66.0%	49.1%
Chemical products	-5.5%	26.0%	19.1%
Plastics and rubber products	-20.3%	30.7%	4.2%

Source: U.S. Bureau of Labor Statistics and U.S. Bureau of Economic Analysis

Appendix No. 02: Average Product of Labor, Productivity Growth, and GDP Growth, 1998-2012

Sector	Avg Product of Labor 2013	Change in APL 1998-2012	GDP Growth 1998-2012
All manufacturing	*$149,299*	*90%*	*32%*
Durable goods manufacturing	*$137,515*	*130%*	*61%*
Wood products	$60,304	64%	-4%
Nonmetallic mineral products	$97,525	6%	-24%
Primary metals	$122,629	80%	15%
Fabricated metal products	$94,038	13%	-9%
Machinery	$128,824	48%	10%
Computer and electronic products	$244,473	829%	462%
Electrical equipment, appliances, and components	$131,452	71%	10%
Motor vehicles, bodies and trailers, and parts	$170,427	121%	37%
Other transportation equipment	$172,147	46%	23%
Furniture and related products	$62,438	17%	-35%
Miscellaneous manufacturing	$122,776	73%	44%
Nondurable goods manufacturing	*$170,999*	*49%*	*3%*
Food and beverage and tobacco products	$129,311	15%	11%
Textile and textile product mills	$59,555	31%	-50%
Apparel, leather, and allied products	$45,930	63%	-50%
Paper products	$135,377	16%	-30%
Printing and related activities	$76,263	76%	4%
Petroleum and coal products	$733,861	11%	3%
Chemical products	$395,718	60%	30%
Plastics and rubber products	$99,297	31%	-10%

Source: U.S. Bureau of Economic Analysis

Appendix No. 03: Potential Manufacturing Productivity Employment Effects, 2010

Sector	Potential 2010 Employment at 2000 Productivity Levels	Actual 2010 Employment	Jobs Not Filled Due to Productivity	Actual Job Losses 2000-2010
All manufacturing	20,269,410	12,102,900	8,166,510	-5,647,700
Durable goods manufacturing	13,580,191	7,424,800	6,155,391	-3,737,200
Wood products	572,628	389,500	183,128	-274,900
Nonmetallic mineral products	416,758	391,500	25,258	-177,000
Primary metals	517,519	372,100	145,419	-248,500
Fabricated metal products	1,448,268	1,330,100	118,168	-478,200
Machinery	1,452,225	1,037,700	414,525	-447,400
Computer and electronic products	5,037,889	1,118,900	3,918,989	-693,700
Electrical equipment, appliances, and components	581,560	369,600	211,960	-233,700
Motor vehicles, bodies and trailers, and parts	1,270,690	684,700	585,990	-627,100
Other transportation equipment	900,717	666,200	234,517	-89,400
Furniture and related products	413,311	391,500	21,811	-327,700
Miscellaneous manufacturing	1,091,628	673,000	418,628	-139,600
Nondurable goods manufacturing	6,946,974	4,678,100	2,268,874	-1,910,500
Food and beverage and tobacco products	2,076,249	1,687,100	389,149	-119,200
Textile and textile product mills	312,183	255,100	57,083	-345,200
Apparel, leather, and allied products	338,835	232,300	106,535	-370,500
Paper products	447,955	396,500	51,455	-210,300
Printing and related activities	852,049	553,000	299,049	-318,600
Petroleum and coal products	159,194	112,900	46,294	-9,100
Chemical products	1,233,424	807,100	426,324	-186,500
Plastics and rubber products	826,979	634,100	192,879	-351,100

Source: U.S. Bureau of Economic Analysis and U.S. Bureau of Labor Statistics.

Appendix No. 04: Impact of Productivity, Trade, and Domestic Demand for Manufactured Goods, 2000-2010

Sector	Production Change Per Worker	Actual Job Losses	Job Loss Share		Job Gain Share
			Trade	Productivity	Domestic Demand
All manufacturing	*67.5%*	*5,647,700*	*13.4%*	*87.8%*	*1.2%*
Durable goods manufacturing	*82.9%*	*3,737,200*	*12.3%*	*88.2%*	*0.5%*
Wood products	47.0%	274,900	14.4%	81.9%	-3.6%
Nonmetallic mineral products	6.5%	177,000	12.8%	90.4%	3.2%
Primary metals	39.1%	248,500	-3.3%	76.7%	-26.7%
Fabricated metal products	8.9%	478,200	6.9%	97.7%	4.5%
Machinery	39.9%	447,400	0.8%	99.6%	0.4%
Computer and electronic products	350.3%	693,700	18.8%	117.7%	36.5%
Electrical equipment, appliances, and components	57.3%	233,700	19.0%	88.1%	7.1%
Transportation and motor vehicles	64.1%	716,500	5.5%	85.5%	-9.0%
Furniture and related products	5.6%	327,700	40.2%	81.1%	21.3%
Miscellaneous manufacturing	62.2%	139,600	21.7%	76.7%	-1.6%
Nondurable goods manufacturing	*48.5%*	*1,910,500*	*12.3%*	*90.0%*	*2.3%*
Food and beverage and tobacco products	23.1%	119,200	4.3%	96.8%	1.1%
Textile and textile product mills	22.4%	345,200	9.5%	97.6%	7.0%
Apparel, leather, and allied products	45.9%	370,500	44.6%	58.5%	3.1%
Paper products	13.0%	210,300	1.7%	93.2%	-5.0%
Printing and related activities	54.1%	318,600	-2.1%	101.8%	-0.3%
Petroleum and coal products	41.0%	9,100	13.3%	77.1%	-9.6%
Chemical products	52.8%	186,500	1.4%	101.1%	2.5%
Plastics and rubber products	30.4%	351,100	7.4%	100.5%	7.9%

Source: Hicks & Devaraj (2015) calculations using data from the U.S. Census Bureau.