



## Research

# The Joint Employer Standard and the Supply Chain

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## EXECUTIVE SUMMARY

In 2015, the National Labor Relations Board (NLRB) broadened the joint employer standard to strengthen labor protections among contract company workers because it viewed contractors as paying low wages and, consequently, contributing to wage stagnation, economic immobility, and income inequality. In doing so, however, the NLRB did not consider the negative economic and labor market consequences of its broadened joint employer standard, which is so ambiguous that it impacts the entire supply chain and inherently incentivizes companies to perform more tasks in-house. The NLRB also did not provide any evidence that contract company workers actually earn low wages.

This study attempts to fill information gaps surrounding the broadened joint employer standard by considering its impact on the supply chain. Specifically, this study estimates the total number of workers impacted by the broadened joint employer standard and examines the characteristics of supply chain workers. Of note:

- The broadened joint employer standard impacts 44 percent of private sector employees or 54.6 million workers, most of whom work in the supply chain.
- While the NLRB assumed that contractors pay low wages, the evidence indicates the opposite: Supply chain workers made on average over 50 percent more than the rest of the private sector in 2013.
- The supply chain has a high concentration of science, technology, engineering, and mathematics jobs, suggesting that its workers are highly productive and valuable to the U.S. economy.

In sum, the sheer size of the supply chain and the characteristics of its workers suggest that a reduction in outsourcing due to the new standard could displace tens of millions of highly paid, highly productive workers, increase average operating costs, and reduce productivity across the economy. Consequently, the broadened standard risks slowing economic growth in order to benefit workers who already earn high wages.

## INTRODUCTION

Throughout the American economy, businesses engage in a multitude of contractual relationships with the primary customers being other businesses. Local contractors provide employees to a company to perform a range of specific duties, including janitorial services and technical hardware maintenance. Staffing agencies provide temporary workers to other companies when needed. Manufacturers sell parts to other companies, or entire products to retail stores. Information technology professionals frequently sell programming, software development, and analytical services to independent companies. These types of businesses located in the United States embody the domestic supply chain. By specializing in specific tasks, products, and services, supply chain companies lower average operating costs and increase productivity, ultimately adding considerable value to the U.S. economy.

Today, one of the most relevant policy issues impacting the supply chain is the joint employer standard, which determines whether a company is held responsible for a separate company's employees. In 2015, the National Labor Relations Board (NLRB) aimed to strengthen labor protections in a ruling that significantly broadened the joint employer standard. The new standard is intended to increase joint employer responsibility among franchises and local contractors. Due to the highly ambiguous nature of the new joint employer standard, however, it also impacts the entire supply chain. As a result, the new standard likely incentivizes companies across the economy to perform more tasks in-house rather than outsource them to another firm. The consequence is higher operating costs, lower efficiency, and lower productivity.

But just how problematic could this be for the U.S. economy? This study reviews recent research to quantify the number of workers employed in the supply chain, the characteristics of those workers, and the implications of the joint employer standard. It finds that the supply chain plays a major role in the economy and labor force, and between supply chain companies and franchises, the broadened joint employer standard directly impacts 44 percent of the labor force. Moreover, while many claim that contract companies pay low wages, the evidence indicates the exact opposite: supply chain employees tend to be among the highest paid, highest skilled workers in the labor force. Consequently, the broadened joint employer standard could slow economic growth in order to provide additional labor protections to workers who already earn high wages.

## BACKGROUND: REGULATING JOINT EMPLOYERS

The joint employer saga began in August of 2015 when the NLRB ruled on Browning-Ferris Industries (BFI).<sup>[1]</sup> Before 2015, the NLRB had held since 1984 that a firm is a joint employer only if it exercises “direct control” of the employees in another business. For instance, decisions about hiring, firing, supervision, and wages all constituted direct control. In 2015, however, the NLRB created a new “direct or indirect control” standard when it ruled that BFI was a joint employer with a staffing firm, Leadpoint Business Services. This broadened standard is far more ambiguous and could be applied to greater array of business relationships. Soon after the NLRB's 2015 ruling, the Department of Labor (DOL) followed suit and issued an Administrative Interpretation that abandoned the traditional standard in favor of the new one in application of the Fair Labor Standards Act (FLSA).<sup>[2]</sup>

Under the Trump Administration, regulators have worked to return to the pre-BFI “direct control” standard, with varying degrees of success. The NLRB’s first attempt to rescind BFI in December 2017 was itself revoked a few months later due to conflict-of-interest issues among a majority member.[3]· [4] Now, the NLRB’s majority has opted to forgo its traditional case-decision process and instead will issue a regulation that reverses BFI and returns the joint employer regulation to the direct control standard. The NLRB announced its proposed rule on September 13th, 2018,[5] commencing a public comment period that will conclude on December 13th. [6]

Meanwhile the DOL rescinded its Administrative Interpretation in June 2017,[7] and is now planning to issue its own regulation that defines joint employer for the application of wage and hour laws. The DOL plans to release a proposed regulation in December 2018, which will presumably add more permanency to the traditional “direct control” joint employer standard.[8]

## PREVIOUS AAF RESEARCH

So why did the NLRB broaden the joint employer standard in 2015? Many believe that the growth in contractual relationships have left workers behind. They argue that as employers outsource tasks—e.g. janitorial, security, and delivery—to specialized smaller companies, firms have sidestepped taking responsibility for their workers’ pay and benefits. As a result, a broad swath of the labor force is facing a “fissured workplace,” resulting in stagnating wages and mobility, and rising income inequality.[9] The NLRB’s broadened joint employer standard is intended to remedy these problems by strengthening labor protections, expanding collective bargaining, and providing workers more leverage.[10] For instance, janitors could bargain for more generous pay and benefits from the large companies they clean than from the smaller contracting service that employs them.

The NLRB’s decision, however, did not take into account the considerable negative economic and labor market consequences of broadening the joint employer standard. In general, when a company with a contractual business relationship with a separate company is held responsible for the separate company’s workers, the relative cost of doing business with the other company increases. This inherently reduces the incentive for the company to enter a business arrangement in the first place. The separate company’s workers are the ones who will likely pay the highest price, with slower wage and job growth.

Previous American Action Forum (AAF) studies have extensively documented how the broadened joint employer standard has negatively impacted jobs in franchise sector, which is among the most impacted.[11] Under the broadened standard, a franchisor is more likely to be held responsible for a franchisee’s workers, causing the franchisor to be less likely to sell franchise licenses to independent business owners and more likely to scale back logistical support to existing franchisees. The result is fewer franchises, which have been one of the most dependable sources of job creation in the United States since the end of the Great Recession. One AAF study found that from 2012 to 2016, private sector franchise employment grew 3.4 percent annually, while non-franchise jobs only rose at a 2 percent annual rate. If the broadened joint employer standard leads to franchise employment growth simply slowing to the non-franchise growth rate, 1.7 million jobs would be lost over the next 10 years.[12]

The broadened joint employer standard’s negative consequences for franchise workers are not merely theoretical. Early evidence indicates that the new standard is already harming the industries that are particularly vulnerable to it. Specifically, a major portion of hotel workers are employed by franchises. AAF found that since the NLRB introduced the new joint employer standard, growth in hotel franchise employment has nearly

halted, while non-franchise hotel jobs accelerated slightly. The significant slowdown in franchise job growth caused the hotel industry's overall employment growth rate, including both franchise and non-franchise jobs, to slow from 1.9 percent to 1.5 percent annually.<sup>[13]</sup> It is becoming increasingly apparent that the broadened joint employer standard is placing a unique burden on hotel franchises and causing job growth in the industry to slow.

## JOINT EMPLOYERS IN THE SUPPLY CHAIN

While the negative effects of the broadened joint employer standard on franchises are problematic, a potentially much bigger issue is that it is so broad that it could up-end the entire supply chain. The ambiguity of the new standard creates considerable uncertainty among any company that has any form of contractual relationship with another firm. In particular, it is not clear what constitutes “direct or indirect control” of employment and pay of another company's workers. Would a company like Facebook be considered a joint employer for requiring contractors to pay workers a \$15 minimum wage and provide paid leave,<sup>[14]</sup> indirectly impacting contract worker compensation? Would a chemical or manufacturing company be a joint employer if it requires contract workers to abide by certain safety standards that are time-consuming and impact work hours? Would an expanding company be a joint employer if it hires a construction company to construct a new building under a specific timeline that impacts the duration of employment for the construction workers? The examples are endless. One could surmise that the “direct or indirect control” standard is so ambiguous that it could be applied to companies in any of these situations, and, at the very least, companies must now seriously consider potential joint employer responsibilities before outsourcing tasks to other companies.

The lessons from the franchise sector suggest that the broadened joint employer standard could be a major drag on the entire domestic supply chain and its workers. The new joint employer standard naturally creates incentives for companies to perform more tasks in-house rather than outsource them to a supply chain company specializing in those duties. If a firm is going to be held responsible for a contract company's workers, the cost of outsourcing tasks rises relative to the cost of performing those tasks in-house. The result would simply be less domestic outsourcing. Not only would the joint employer standard negatively impact supply chain firms, but supply chain jobs would also likely become more limited.

This outcome would also negatively impact economic growth. Companies outsource tasks because specialized contractors are able to perform the same duties more efficiently, lowering business operating costs. If the broadened joint employer standard limits outsourcing, it will raise operating costs, lower productivity, and, as a result, weigh down economic output.

In addition to the negative economic risks of the broadened joint employer standard, it is important to consider the working conditions of the supply chain employees impacted. Do supply chain workers actually earn low wages, as the NLRB assumed? The arguments in favor of the broadened standard have not provided evidence that workers in contract companies are paid less than the rest of the private sector. The research on domestic outsourcing is very limited, resulting in little evidence of the magnitude of this sector, its impact on the U.S. economy, and the condition of its workers.

Clearly, the joint employer standard has significant implications for workers and the broader economy. But how important is the supply chain to the U.S. economy and what are the conditions of its employees? Answering this question is vital for understanding the magnitude of the joint employer standard’s economic implications. In the following, this study examines the size of the supply chain, as well as the total portion of the workforce impacted by the broadened joint employer standard. This study then examines the characteristics of the supply chain workers that the broadened joint employer standard is intended to help.

## THE MAGNITUDE OF THE SUPPLY CHAIN—AND BROADENED JOINT EMPLOYER STANDARD

While research on the supply chain is limited, a recent study out of Harvard Business School sheds critical light on this sector of the economy. Specifically, Mercedes Delgado and Karen Mills recategorized U.S. industries into supply chain and non-supply chain sectors.<sup>[15]</sup> Delgado and Mills defined supply chain industries as those that sell less than one-third of their output directly to individual consumers—in other words, those that sell the vast majority of their output to other businesses. Delgado and Mills define the remaining industries—those that sell more than one-third of their output to individual consumers—as business-to-consumer.<sup>[16]</sup>

The following applies the results from Delgado and Mills’s study to private sector data to estimate the number of workers employed by supply chain companies. The percent of private sector payroll workers in the supply chain, estimated by Delgado and Mills,<sup>[17]</sup> is multiplied by average total private sector payroll employment in 2017, as reported by ADP.<sup>[18]</sup> Since the most recent estimate provided by Delgado and Mills is from 2013, this analysis assumes that the prevalence of the supply chain in the labor force is unchanged by 2017. This analysis uses payroll data from ADP, as opposed to the Bureau of Labor Statistics, because it also considers the prevalence of franchise employment, which is only reported by ADP. The analysis then adds the total number of franchise workers to the number of supply chain workers to estimate the total number of workers potentially impacted by the NLRB’s 2015 decision to broaden the joint employer standard.

Table 1 contains the estimated number of private sector payroll workers employed by a supply chain business, as well as the total number of workers impacted by the broadened joint employer standard when including franchises.

**Table 1: The Size of the Supply Chain, and the Reach of Joint Employer, 2017\***

Economic Sector	Percent of Private Sector Payroll Employees	Employees (in millions)
Supply Chain	37%	46.0
SC Local	15%	18.6
SC Traded	23%	28.6
Franchise	7%	8.6

Total	44%	54.6
*Estimates may not sum to totals due to rounding.		

Delgado and Mills suggest that supply chain industries make up a major portion of the U.S. economy. Overall, they estimate that 43 percent of U.S. firms are in the supply chain,<sup>[19]</sup> employing 37 percent of private sector payroll workers. In 2017, that translates to 46 million employees in the supply chain.

Delgado and Mills further segment the U.S. economy into local and traded industries. Local industries are spread across the country but sell products and services mainly to local clients. Traded industries tend to be in specific locations but sell to clients across the country.<sup>[20]</sup>

Within the supply chain, local companies are the types of contractors that are most frequently considered to be impacted by the broadened joint employer standard. These are firms that provide workers to perform specific tasks for a separate company, often on that company's premises. Local supply chain companies are also similar to those involved in the NLRB's BFI case. They include temporary help services such as Leadpoint Business Services, as well as contractors providing janitorial, security, and technological maintenance services that many businesses do not typically cover in-house. According to Delgado and Mills, local supply chain companies employ 15 percent of private sector payroll workers, translating to 18.6 million workers in 2017.

Due to its ambiguity, however, the broadened joint employer standard also impacts traded supply chain companies, which employ considerably more workers. These companies perform specialized services or produce specific goods for other firms. They include manufacturers, engineering services, and programming, software development, and analytical web services. Altogether, traded supply chain companies employ 23 percent of private sector payroll workers, or 28.6 million workers.

In addition to the supply chain, the broadened joint employer standard significantly impacts franchises. In 2017, franchises employed 8.6 million workers, representing 7 percent of private sector payroll workers.

When taking into account both supply chain and franchise workers, the NLRB's 2015 decision to broaden the joint employer standard impacts 54.6 million workers or 44 percent of private sector employees. While the debate around the joint employer standard is rarely in the headlines, in reality it is a policy issue that directly impacts close to half of the private sector workforce. Thus, the extensive use of domestic outsourcing in the U.S. economy means that the incentives created by the broadened joint employer standard to limit outsourcing has major implications for economic growth. If companies do decrease their use of services and products provided by other firms, tens of millions of supply chain workers will be at risk of lower wage growth or losing their jobs. Moreover, a nationwide decline in domestic outsourcing as a result of the joint employer standard could significantly raise average business operating costs and lower nationwide productivity. As a result, the NLRB's broadened joint employer standard would serve as a major drag on economic growth due simply to the immense size of the supply chain.

## THE CHARACTERISTICS OF SUPPLY CHAIN WORKERS

When the NLRB issued its decision to broaden the joint employer standard, it assumed that workers in supply chain companies are worse off than the rest of the economy. The research by Delgado and Mills, however, indicates the exact opposite: Workers in supply chain companies have significantly higher average earnings than



their counterparts in the rest of the private sector. Table 2 compares average earnings of supply chain to non-supply chain workers in 2013, as reported by Delgado and Mills.[\[21\]](#)

**Table 2: Average Earnings—Supply Chain Workers vs Business-to-Consumer Workers, 2013**

Economic Sector	Supply Chain	Business-to-Consumer	Percent Difference
Total	\$61,700	\$39,200	57%
Local	\$43,300	\$34,500	26%
Traded	\$73,800	\$56,200	31%
Traded Manufacturing	\$57,400	\$47,200	22%
Traded Services	\$80,800	\$57,800	40%

In 2013, annual earnings of all supply chain workers averaged \$61,700, 57 percent higher than the \$39,200 earned on average by everyone else. Workers employed by supply chain companies were also paid significantly higher wages than non-supply chain workers within each of the business categories Delgado and Mills identified. At the lower end, local supply chain company workers earned an average of \$43,300 in 2013, 26 percent higher than the \$34,500 average earnings in local business-to-consumer companies. At the upper end, some of the highest paid workers in the labor market are employed by traded supply chain companies, with average earnings of \$73,800 in 2013. In the same year, all non-supply chain traded firms paid workers \$56,200 on average. The workers earning the highest wages are employed by traded supply chain firms providing services (versus manufacturing products), earning \$80,800 on average in 2013.

The study by Delgado and Mills indicates that workers in the supply chain are likely the highest paid because they are also the highest skilled. Specifically, supply chain companies have the highest concentration of science, technology, engineering, and mathematics (STEM) occupations—jobs that are typically more productive than others. Table 3 contains the portion of jobs in each business category that are STEM.[\[22\]](#)

**Table 3: STEM Jobs—Supply Chain vs Business-to-Consumer, 2013**

Economic Sector	Supply Chain	Business-to-Consumer
Total	11.4%	2.1%
Local	2.8%	1.1%
Traded	17.0%	5.9%

Traded Manufacturing	11.7%	4.5%
Traded Services	19.3%	6.1%

Across all supply chain firms, 11.4 percent of workers are in STEM occupations. Meanwhile, STEM jobs account for only 2.1 percent of employees in direct business-to-consumer companies. Mirroring average earnings, STEM occupations are also considerably more prevalent in supply chain than non-supply chain companies in each business category. STEM jobs are particularly concentrated in traded supply chain firms, accounting for 17 percent of employees. In traded supply chain companies that provide services, 19.3 percent of employees are in STEM occupations.

These earnings and occupations statistics provide important lessons about the impact of the NLRB's decision to broaden the joint employer standard. Primarily, while the NLRB intended to strengthen labor protections for struggling, low-wage employees, in reality its decision impacts the highest paid workers in the labor force. Therefore, at best, the NLRB's decision to broaden the joint employer standard adds labor protections for a group of workers who do not necessarily need them.

On the other hand, should companies reduce outsourcing as a result of the broadened joint employer standard, supply chain companies will likely be forced to reduce hiring, limit raises, or cut jobs. Clearly, the United States would lose some of the best paying jobs in the labor force. In their place would likely be jobs that perform similar tasks for companies in-house. The data from table 2 suggest that these replacement jobs would likely pay considerably less. In the current era of persistent wage stagnation, burdening growth in good-paying jobs is the last thing workers need.

The jobs lost would also be among the most valuable to the economy. The STEM occupation statistics indicate that supply chain jobs are some of the highest skilled and most productive in the entire labor force. Thus, supply chain companies add tremendous value to the economy not only by the simple virtue of specializing in specific services and increasing efficiency, but also because the services they do specialize in are highly productive.

Further highlighting the value of supply chain jobs, Delgado and Mills suggest that the large number of STEM occupations are also a sign that the supply chain is a major source of innovation.<sup>[23]</sup> Innovation plays a major role in economic growth and is needed to keep the U.S. economy competitive. For instance, one study found that across the European Union, just a 1 percent increase in research and development expenditures as a share of gross domestic product (GDP) is associated with a 2.2 percentage point increase in the real GDP growth rate.<sup>[24]</sup> So, if businesses limit their outsourcing due to the broadened joint employer standard, the economy would lose both a major source of productivity and economic growth today, as well as a vital source of innovation that drives long-term competitiveness.

## CONCLUSION

This study reviews the impact of the NLRB's broadened joint employer standard on the supply chain and considers the impact on jobs, productivity, and economic growth. It finds that the NLRB's decision to broaden the joint employer standard impacts 44 percent of private sector employees, the vast majority of whom work for supply chain companies. Yet these workers impacted by the NLRB's decision are not the low-wage, struggling employees that the NLRB intended to help. Rather, workers in the supply chain earn considerably higher



average wages than the rest of the labor force.

Meanwhile, the NLRB's broadened joint employer standard raises the relative cost of hiring contractors, creating a major incentive for companies to limit outsourcing. The sheer size of the supply chain alone suggests that a reduction in outsourcing could displace tens of millions of supply chain workers, increase operating costs, and reduce productivity across the economy. Moreover, supply chain workers tend to occupy the highest skilled jobs in the labor force. Thus, the jobs put at risk of lower wages or being lost all together are highly productive and add significant value to the U.S. economy, compounding the negative short- and long-term economic implications of the broadened joint employer standard. Overall, the broadened joint employer standard appears to provide limited benefits to workers at the risk of major economic costs.

[1] "Board Issues Decision in Browning-Ferris Industries," National Labor Relations Board, August 27, 2015, <https://www.nlr.gov/news-outreach/news-story/board-issues-decision-browning-ferris-industries>.

[2] Tammy McCutchen and Michael J. Lotito, "DoL Issues Guidance on Joint Employment under FLSA," Littler, January 20, 2016, <https://www.littler.com/publication-press/publication/dol-issues-guidance-joint-employment-under-flsa>.

[3] "NLRB Overrules Browning-Ferris Industries and Reinstates Prior Joint Employer Standard," Office of Public Affairs, National Labor Relations Board, December 14, 2017, <https://www.nlr.gov/news-outreach/news-story/nlr-overrules-browning-ferris-industries-and-reinstates-prior-joint>.

[4] Chris Opfer and Hassan A. Kanu, "Labor Board Scraps Controversial Joint Employer Decision (Updates)," Bloomberg Law, February 26, 2018, <https://bnanews.bna.com/daily-labor-report/labor-board-scraps-controversial-joint-employer-decision-updated>.

[5] "Board Proposes Rule to Change its Joint-Employer Standard," Office of Public Affairs, National Labor Relations Board, September 13, 2018, <https://www.nlr.gov/news-outreach/news-story/board-proposes-rule-change-its-joint-employer-standard>.

[6] "NLRB Extends Time for Submitting Comments on Proposed Joint-Employer Rulemaking," Office of Public Affairs, National Labor Relations Board, October 30, 2018, <https://www.nlr.gov/news-outreach/news-story/nlr-extends-time-submitting-comments-proposed-joint-employer-rulemaking>.

[7] "US Secretary of Labor Withdraws Joint Employment, Independent Contractor Informal Guidance," News Release, U.S. Department of Labor, June 7, 2017, <https://www.dol.gov/newsroom/releases/opa/opa20170607>.

[8] Jaclyn Diaz, "Trump Administration Taking On Overtime Pay, Franchise Liability (2)," Bloomberg Law, October 17, 2018, <https://news.bloomberglaw.com/daily-labor-report/trump-administration-taking-on-overtime-pay-franchise-liability-2>.

[9] David Weil, "How to Make Employment Fair in an Age of Contracting and Temp Work," Harvard Business Review, March 24, 2017, <https://hbr.org/2017/03/making-employment-a-fair-deal-in-the-age-of-contracting-subcontracting-and-temp-work>.

[10] Meghan B. Phillips, “Amicus Brief of the General Counsel,” Case 32-RC-109684, National Labor Relations Board, <https://www.nlr.gov/case/32-RC-109684>.

[11] “NLRB Office of General Counsel Issues Consolidated Complaints Against McDonald’s Franchisees and their Franchisor McDonald’s, USA, LLC as Joint Employers,” National Labor Relations Board, December 19, 2014, <https://www.nlr.gov/news-outreach/news-story/nlr-office-general-counsel-issues-consolidated-complaints-against>.

[12] Ben Gitis, “The NLRB’s New Joint Employer Standard, Unions, And The Franchise Business Model,” American Action Forum, April 26, 2017, <https://www.americanactionforum.org/research/nlrbs-new-joint-employer-standard-unions-franchise-business-model/>.

[13] Ben Gitis & Emma Pettit, “Update: Trends In Hotel Employment, Hours, And Wages Since The NLRB Broadened The Joint Employer Standard,” American Action Forum, August 3, 2018, <https://www.americanactionforum.org/research/update-trends-in-hotel-employment-hours-and-wages-since-the-nlr-broadened-the-joint-employer-standard/>.

[14] Yasmeen Abutaleb, “Facebook raises minimum pay for contractors to \$15 per hour,” Reuters, May 13, 2015, <https://www.reuters.com/article/us-facebook-wages-contractors/facebook-raises-minimum-pay-for-contractors-to-15-per-hour-idUSKBN0NZ00C20150514>.

[15] Mercedes Delgado & Karen G. Mills, “A New Categorization of the U.S. Economy: The Role of Supply Chain Industries in Innovation and Economic Performance,” Harvard Business School, Working Paper 18-068, October 2018, [https://www.hbs.edu/faculty/Publication%20Files/18-068\\_2f841d2b-46b9-4448-9efe-eff76b7d6448.pdf](https://www.hbs.edu/faculty/Publication%20Files/18-068_2f841d2b-46b9-4448-9efe-eff76b7d6448.pdf).

[16] Ibid., p. 11.

[17] Ibid., Table 4, pg. 37.

[18] “ADP National Franchise Report, September 2018,” Historical Data, ADP, October 3, 2018, <https://www.adpemploymentreport.com/2018/September/NFR/NFR-September-2018.aspx>.

[19] Author’s calculation using 2012 firm estimates provided by Delgado & Mills, Figure 1, p. 34, October 2017, [https://www.hbs.edu/faculty/Publication%20Files/18-068\\_2f841d2b-46b9-4448-9efe-eff76b7d6448.pdf](https://www.hbs.edu/faculty/Publication%20Files/18-068_2f841d2b-46b9-4448-9efe-eff76b7d6448.pdf).

[20] Delgado & Mills, October 2017, p. 10.

[21] Ibid., Table 4, p. 37.

[22] Ibid., Table 3, p. 36.

[23] Ibid., pp. 20-22.

[24] Svetlana Sokolov-Mladenovic, Slobodan Cvetanovic, and Igor Mladenovic, “R&D expenditure and economic growth: EU28 evidence for the period 2002-2012,” Economic Research, Vol. 29, No. 1, pp. 1001-1020, December 22, 2016, <https://www.tandfonline.com/doi/full/10.1080/1331677X.2016.1211948>.