



# **Proposed U.S.-South Korea Free Trade Agreement and Potential Employment Effects: Analysis of Studies**

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## Summary

The Obama Administration finalized negotiations with South Korea in early December 2010 on a bilateral free trade agreement. As a result, the administration is expected to submit implementing legislation to the 112<sup>th</sup> Congress on the proposed agreement, but to date has not indicated a timeline for doing so. The 112<sup>th</sup> Congress may also be asked to consider implementing legislation for proposed free trade agreements with Columbia and Panama. Congress not only plays a direct role in approving legislation that implements the provisions of free trade agreements, but also authorizes and appropriates funding for programs that are meant to provide special assistance to firms and workers that are dislocated as a result of lower barriers to trade. Since the proposed agreement covers a wide range of trade and investment issues, it could have substantial economic implications for both the United States and South Korea. South Korea is the seventh-largest trading partner of the United States, and the United States is South Korea's third-largest trading partner.

Similar to other trade agreements, the proposed U.S.-South Korea Free Trade Agreement (KORUS-FTA) has attracted both supporters and detractors, primarily over the impact the agreement could have on employment in the economy. Supporters argue that the agreement could create as many as 280,000 jobs in the economy. Others, however, argue that the agreement could lead to an overall loss of up to 159,000 jobs in various sectors of the economy. Still others contend that the United States stands to lose exports, employment, and extended economic opportunities if it fails to sign a trade agreement, while the European Union and other nations are lining up to finalize similar agreements with South Korea.

Estimating the economic impact of trade agreements, however, is a daunting task, due to a lack of data and important theoretical and practical matters associated with generating results from economic models. In addition, such estimates provide an incomplete accounting of the total economic effects of trade agreements. This report assesses the results of a number of models that are being used to generate estimates of the effect of the KORUS FTA on employment. These studies were chosen specifically because they estimate (or can be used to estimate) data on employment effects of the trade agreement. All economic models incorporate various assumptions that are necessary in order for the model to generate results. Invariably, these approaches determine, to some extent, the results that are generated and, therefore, limit their representation of the real world economy. Currently, the various models produce widely disparate estimates of the number of jobs affected by the trade agreement, reflecting the various methods that are used in the models.

From the perspective of a large open economy such as the U.S. economy, international trade is not a major determinate of total employment in the economy, real wages in the economy, or the overall level of production. This is especially true for bilateral trade agreements with individual countries where the impact on the economy as a whole is expected to be small. Nevertheless, some sectors of the economy are likely to be affected more than others. Congress has demonstrated an on-going interest in assessing the economic impact of trade agreements and, at times, has provided assistance to those workers and firms that are disproportionately affected.

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## Introduction

Congress plays a major role in formulating and implementing U.S. trade policy through its Constitutional role in regulating foreign commerce. This role includes providing authority to the President to conclude trade agreements to eliminate and reduce tariff and non-tariff barriers to U.S. trade with other countries. For Members of Congress, trade can be a difficult issue, because decisions that liberalize trade flows have mixed effects on U.S. domestic and foreign interests, both economic and political. Historically, Congress has supported policies to open international markets to U.S. goods, services, and agriculture. It also has weighed carefully the economic impact of trade agreements to assess their benefits and costs. Congress also has enacted targeted adjustment assistance programs to provide training and other assistance to help workers and firms that may be dislocated by greater market opening adjust to new economic opportunities.

With likely congressional consideration of a proposed free trade agreement between the United States and South Korea, a number of estimates are being offered to quantify the potential effects on U.S. employment.<sup>1</sup> This report will discuss the models that are used to estimate the employment effects of the agreement and their various assumptions that are necessary in order for the model to generate results. Invariably, these assumptions determine to some extent the results that are generated and, therefore, limit their representation of the real world economy. The models also are highly sensitive to the assumptions that are used to establish the parameters of the models and are hampered by a lack of data in some areas.

In general, the various economic models provide differing estimates of the magnitude of changes in U.S. employment that could arise from a trade agreement with South Korea. Both advocates and opponents of the KORUS FTA cite results of these studies to support their position. Each of these models has strengths and weaknesses and varies in the degree to which it reflects economic reality. These models are discussed at greater length in the analyses that follow. In addition, the potential job effects need to be viewed in terms of their relative share of U.S. employment.

Estimates from the studies range from as many as 280,000 jobs potentially gained to 159,000 jobs potentially lost. Middle-range estimates include one often cited by the Obama Administration, which suggests that the KORUS FTA would support 70,000 export jobs. At the other end of the spectrum, other estimates suggest that the United States could lose 345,017 jobs if the United States does not approve and implement the KORUS-FTA but the European Union (EU) and Canada implement their FTAs with South Korea. None of these estimates represent more than 1.4% of total goods-producing employment.

None of these studies, however, draws a direct link between any expected changes in trade from a change in tariffs to changes in employment. These estimates reflect different methodologies and assumptions, and a partial accounting of the total economic effects of such agreements. For instance, the proposed agreement includes provisions on trade in goods, services, and investment, but current estimates focus only on changes in goods-producing employment. As a result, they do not serve well as an indicator of the overall impact of the agreement on the economy. The estimates selected for analysis are the following.

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<sup>1</sup> For additional information on the KORUS FTA, see CRS Report RL34330, *The Proposed U.S.-South Korea Free Trade Agreement (KORUS FTA): Provisions and Implications*, coordinated by William H. Cooper and CRS Report R41389, *Pending U.S. and EU Free Trade Agreements with South Korea: Possible Implications for Automobile and Other Manufacturing Industries*, by Michaela D. Platzer.

- U.S. International Trade Commission (USITC): *U.S.-Korea Free Trade Agreement Potential Economy-wide and Selected Sectoral Effects*<sup>2</sup>
- The University of Michigan: *Economic Effects of a Korea-U.S. Free Trade Agreement*<sup>3</sup>
- U.S.-Korea Business Council: *Failure to Implement the U.S.-Korea Free Trade Agreement: The Cost for American Workers and Companies*<sup>4</sup>
- Economic Policy Institute (EPI): *Trade Policy and Job Loss: U.S. Trade Deals with Colombia and Korea Will be Costly*<sup>5</sup>

In addition, two other estimates, derived from the USITC study and released by the Obama Administration and the Majority Staff of the Senate Finance Committee Trade Subcommittee, are reported.

Congress has demonstrated an on-going interest in concluding trade agreements to eliminate and reduce barriers to U.S. trade in goods, services, and agriculture, and it has assumed a direct role in assessing the impact of trade agreements on the U.S. economy. This report provides background and context for the analyses of the various estimates. It summarizes congressional interest in the issue and then examines the specific estimates—their findings, assumptions, methodologies, and the limitations of those methodologies. Finally, it explains the broader macroeconomic and microeconomic context in which the composition of employment within the economy is affected by a new trade agreement.

## **Estimating Employment Effects of Trade Agreements**

Although discussions of trade agreements often focus on potential employment gains or losses, most economists argue that such employment estimates represent a partial accounting of the total economic effects of trade agreements and, therefore, do not perform well as an indicator of the overall impact of the agreement on the economy. As this report attempts to explain, estimating such employment effects is imprecise and highly sensitive to the assumptions that are used. In addition, while trade agreements generally are comprehensive in nature and cover goods, services, and investment, most employment estimates focus narrowly on the goods sector and do not adequately represent the total impact of the agreements. Although it is difficult to estimate precisely, employment effects associated with liberalizing trade in services and reducing or eliminating barriers to investment flows potentially could be very large and positive, since the United States is highly competitive in a number of services sectors and U.S. direct investment abroad often spurs exports. Finally, estimates of employment, by themselves, do not account for a broad range of benefits for the economy as a whole that can provide individual consumers and

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<sup>2</sup> USITC Publication 3949, September 2007. Seven chapters plus additional material.

<sup>3</sup> Kozo Kiyota and Robert M. Stern, Research Seminar in International Economics, Discussion Paper No. 557, Gerald R. Ford School of Public Policy, April, 2007.

<sup>4</sup> Laura M. Baughman and Joseph F. Francois, November, 2009. The U.S.-Korea Business Council is affiliated with the U.S. Chamber of Commerce, 4 p.

<sup>5</sup> Robert E. Scott, February 25, 2010, 13 p.

firms with large economic benefits and yield broad productivity and efficiency gains for the economy over the long run that may well enhance employment.

Since the KORUS FTA was signed in 2007, a number of estimates of the potential effects of the KORUS FTA have been released that either estimate directly, or have been used to estimate, the effect of the proposed trade agreement on U.S. employment. The estimates range from 280,000 jobs gained to a loss of 159,000 jobs if the United States does adopt the agreement. Two of the estimates are based on standard economic modeling, two are derivative estimates based on the USITC estimates, and two represent studies based on other types of calculations. **Table 1** below summarizes all six estimates. These estimates will be discussed in greater detail below. The two standard model estimates were undertaken by the USITC and the University of Michigan. Neither of these efforts estimated the total number of U.S. jobs created or lost by the KORUS FTA.<sup>6</sup> but focused instead on potential economy-wide *trade* effects and sectoral shares of those effects. In contrast, the two non-standard approaches by the U.S.-Korea Business Council and the Economic Policy Institute, did not attempt to estimate employment effects of the KORUS FTA directly based on projected changes in trade between South Korea and the United States, but used U.S. trade with other countries and other trade agreements as proxies.

**Table 1. Estimates on the Employment Effects of KORUS FTA**

Study/Estimate	Estimated Trade or Employment Gain or Loss over Total Implementation Period (about 10 years)	Employment Estimate in Perspective
USITC: <i>U.S.-Korea Free Trade Agreement Potential Economy-Wide and Selected Sectoral Effects, 2007</i> (for the goods sector only).	No estimate. Study assumed full employment, so it projected only share shifts among goods-producing industries. Study estimates net export gains of \$3.3-\$4.0 billion in the goods-producing sectors.	No employment estimates were made.
University of Michigan: <i>Economic Effects of a Korea-U.S. Free Trade Agreement, 2007</i> (for the goods and services sector).	Like the USITC study, this study assumes full employment and therefore estimates share shifts among industries. However, it also includes jobs data by industry for 2006, so it applies estimated share changes to actual jobs data, to estimate job gains and losses by industry. In addition, this study covers services as well as goods.	85% of the projected job gains are in agricultural industries; 90% of the projected job losses are in six industry sectors: government services, trade and transportation services, and manufacturing production for textiles, apparel, transportation equipment, and metal products.
The White House: <i>Remarks by the President at the Announcement of a U.S.-Korea Free Trade Agreement, 2011</i> (for the goods sector only).	Estimates, based on USITC projections of goods trade, that the agreement could support at least 70,000 U.S. export jobs.	This estimate is equal to 0.4% of total manufactured goods employment in 2010.

<sup>6</sup> This result arises from a standard assumption in economic modeling that employment is held constant in order to estimate the sectoral effects of changes in tariff rates. The model also assumes that prices and wages will adjust to determine changes in demand for various goods as a result of changes in tariff rates.

Study/Estimate	Estimated Trade or Employment Gain or Loss over Total Implementation Period (about 10 years)	Employment Estimate in Perspective
Majority Staff of the Senate Trade Subcommittee of the Finance Committee: <i>Updated Assessment of the U.S.-Korea Free Trade Agreement (FTA), 2011</i> (for the goods sector only).	Estimates reflect recalculations using the USITC model, at the request of the Subcommittee, to reflect 2009 trade and economic conditions. From this recalculation, the Subcommittee estimates that the agreement has the potential to create 280,000 U.S. goods-producing jobs.	This estimate is equal to 1.4% of total manufactured goods-producing jobs in the United States in 2010.
U.S.-Korea Business Council: <i>Failure to Implement the U.S.-Korea Free Trade Agreement: The Cost for American Workers and Companies, 2009</i> (for the goods and services sector).	Estimates that if European Union and Canada implement their FTAs with Korea and the United States does not, the United States could lose 345,017 goods and services jobs from U.S. trade diversion to other countries.	Estimated jobs lost are equal to 0.3% of total goods and services jobs supporting exports for 2010.
Economic Policy Institute (EPI): <i>Trade Policy and Jobs Loss: U.S. Trade Deals with Colombia and Korea Will be Costly, 2010</i> (for the goods sector only).	Projects that 159,000 U.S. goods-producing jobs could be lost as a result of increased trade deficits with South Korea.	Estimate represents 0.8% of all goods producing jobs in 2010.

**Source:** Various studies listed above.

## Trade and Employment in the U.S. Economy

In a dynamic economy such as the United States, jobs are constantly being created and replaced as some economic activities expand, while others contract, reflecting broad macroeconomic developments. In this process, various industries and sectors evolve over time at different speeds, reflecting differences in technological advancement, productivity, and efficiency. Those sectors that are the most successful in developing or incorporating new technological advancements generate greater economic rewards and are capable of attracting greater amounts of capital and labor. In contrast, those sectors or individual firms that lag behind are less capable of attracting capital and labor and confront ever-increasing competitive challenges. Indeed, depending on the overall state of the economy, some sectors may need to relinquish some capital and labor in order for others sectors to grow to avoid economic stagnation. Also, advances in communications and technology have facilitated a global transformation of economic production into sophisticated supply chains that span national borders and defy traditional concepts of trade that potentially could involve a greater share of the labor force in trade-related activities.<sup>7</sup> How firms respond to these challenges likely will determine their long-term viability in the market place.

At the plant level, job openings may come from new business openings or from expansions at existing facilities, including those that are used to support increased exports. Job losses may come from voluntary departures, involuntary discharges, or from business closures for any reason, including bankruptcy, personal choice, inability to compete in the domestic market, import competition, or production shifts. The Bureau of Labor Statistics, Business Employment Dynamics (BED) Report tracks gross jobs gained and lost in the economy as a whole and in

<sup>7</sup> See CRS Report R40167, *Globalized Supply Chains and U.S. Policy*, by Dick K. Nanto.

specific sectors and reveals the dynamics underlying gross changes in employment. As **Appendix A** shows, 15% of total U.S. employment in 2010 was in the goods-producing industries, while the services-producing industries accounted for 68% of the employed population. The remaining 17% of employment was in the government sector, with employment at the State and Local government level accounting for 15%.

## **Jobs Gained and Lost for the Economy as a Whole**

**Table 2** shows the gross number of jobs gained and lost for the economy as a whole for the goods- and services-producing sectors, and for the number of jobs related to exports, during the period 2006-2009. This process of job turn-over typically affects 18-20% of the jobs in the total economy each year (when percentages of gross jobs gained and gross jobs lost are combined). This process is stronger in the goods-producing sector of the economy, where a number equivalent to 24%-27% of the jobs are typically gained or lost each year, compared with the services sector, where the comparable share is 17%-18%. Such job turn-over is amplified by economic expansions or recessions, as was the case in 2008-2009, when the economy experienced the most severe recession in the post-World War II period.<sup>8</sup>

The data in **Table 2** also indicate that

1. Jobs supported by exports represent a small share of the total number of jobs in the economy and are equivalent to about one-third of the total number of jobs gained or lost in the economy as a whole during a year. Jobs supported by exports were equivalent to a small share of the annual turn-over in jobs, ranging from 6% to 8% of the annual turnover in the economy between 2006 and 2009.
2. Within the goods-producing sector, however, such export-related jobs were equivalent to 29% to 35% of total jobs, and within the services sector they averaged about 2%. Similar to overall job gains and losses for the total economy, jobs supporting exports are sensitive to the business cycle.
3. Business cycle effects were particularly apparent between 2008 and 2009, when the global economic recession and the financial crisis sharply reduced global trade. As a result, jobs in the economy supported by trade fell by about 1.8 million jobs, or from 8% of total employment to 6% of total employment, or by about one-fourth of its share of total employment.

Some would argue that the data on jobs gained and lost throughout the whole economy do not adequately reflect the concern of workers about job losses. According to data published by the Bureau of Labor Statistics, during the last two years of the most recent economic expansion (2005-2007), 3.6 million workers were displaced from jobs they had held for at least three years. Of those workers, by the end of January, 2008, only 67% had been re-employed in full-time jobs and only 22% were in jobs where their salaries matched their previous income level.<sup>9</sup>

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<sup>8</sup> Job effects of recessions are a lagging indicator, in that job losses typically begin well after the recession is underway, as employers are slow to let go of workers, hoping the economy will recover quickly. Similarly, job gains typically accelerate when the economy is well into its recovery and employers are convinced that the recovery will continue into an expansion phase.

<sup>9</sup> Bureau of Labor Statistics. Worker Displacement, 2005-2007, August 20, 2008. "Displacement" is defined as the loss of jobs held for at least three years for reasons of plant closure, plant relocation, insufficient work, or abolition of the (continued...)



**Table 2. Jobs Gained and Lost Annually in the U.S. Economy and Job Turnover Rate, 2006-2009**

(Percentages refer to shares of total jobs in that respective sector)

Sector	Jobs Measure	2006		2007		2008		2009	
		No. of Jobs (000)	% of Total Jobs in Sector	No. of Jobs (000)	% of Total Jobs in Sector	No. of Jobs (000)	% of Total Jobs in Sector	No. of Jobs (000)	% of Total Jobs in Sector
<b>Total Economy</b>	<b>total jobs</b>	136,086	100%	137,598	100%	137,066	100%	131,997	100%
	<b>gross jobs gained</b>	14,019	10%	13,441	10%	12,704	9%	10,048	8%
	<b>gross jobs lost</b>	11,438	8%	11,941	9%	12,609	9%	15,912	12%
	<b>jobs supported by exports</b>	8,950	7%	9,540	7%	10,293	8%	8,500	6%
<b>Goods-Producing Sector</b>	<b>total goods-producing jobs</b>	22,531	100%	22,233	100%	21,419	100%	18,938	100%
	<b>gross jobs gained</b>	2,961	13%	2,677	12%	2,049	11%	1,618	9%
	<b>gross jobs lost</b>	2,512	11%	2,891	13%	3,041	14%	4,238	22%
	<b>jobs supported by exports</b>	6,576	29%	6,920	31%	7,525	35%	6,000	32%
<b>Services-Producing Sector</b>	<b>total service-producing jobs</b>	113,556	100%	115,366	100%	115,646	100%	113,059	100%
	<b>gross jobs gained</b>	11,059	10%	10,763	9%	10,296	9%	8,430	7%
	<b>gross jobs lost</b>	8,928	8%	9,048	8%	9,571	8%	11,672	10%
	<b>jobs supported by exports</b>	2,374	2%	2,619	2%	2,768	2%	2,500	2%

**Source:** BLS Business Employment Dynamics (BED) Reports, various years for job gains and losses, and Bureau of Labor Statistics (BLS): *Employment and Earnings* Table B-3 for total jobs in the U.S. economy, by sector.

**Note:** The “% of total jobs” column in shows the “churning” rate, or total employee turnover rate.

(...continued)

position or shift. For the period of the recession of December 2007-June 2009, the data indicate that 1) by January of 2010, 6.9 million workers had been displaced from jobs they had held at least three years; 2) by January of 2010, only 49% had been re-employed full-time; and 3) only 12% of the displaced workers had found jobs paying wages equal to their previous level. Bureau of Labor Statistics, Worker Displacement 2007-2009, August 26, 2010.

## **Benefits and Costs of International Trade**

In the current highly globalized economy, international trade has come to represent a complex set of transactions. Nations not only trade goods and services, but they also trade a broad range of financial products. In addition, liberalized capital flows and floating exchange rates have greatly expanded the amount of capital that flows between countries. Basically, trade represents an exchange of goods or services between two or more willing parties. Such trade allows nations to use their resources more efficiently in order to maximize the total amount of goods and services that are available to their citizens, a common definition of a nation's standard of living. As a result of this maximization process, nations trade because it serves their national interests. In the same way that individuals gain by specializing in activities that use their strongest skills and then trade with others, nations specialize in the production of certain goods and then trade with other nations for the goods they do not produce. Essentially, nations export in order to import goods and services they do not produce, or cannot produce efficiently.

### **Benefits of Trade**

Both the benefits and the costs of trade have become well-publicized. These benefits are categorized as one-time, or static, benefits, which include gains for consumers and gains for producers, and dynamic benefits that accrue over time and can positively affect the long-term rate of growth of a country. While it is not always possible to measure these effects precisely, most economists believe that the net effect of international trade on the national economy as a whole is positive, that is, that the total gains exceed the total costs. By reducing foreign barriers to U.S. exports and by removing U.S. barriers to foreign goods and services, trade liberalization helps to strengthen those industries that are the most competitive and productive and to reinforce the shifting of labor and capital from less productive endeavors to more productive economic activities.

### **Impact of Trade on the Composition of Employment in the Economy**

An important issue in estimating employment effects from increased trade and trade agreements is the difference between the microeconomic viewpoint and the macroeconomic viewpoint. In a dynamic economy such as the U.S. economy, the composition of jobs is constantly changing as some sectors grow and other sectors decline. This constant churning would continue even in the complete absence of international trade. International trade adds to the myriad of factors that determine the composition of jobs within the economy. From the microeconomic perspective, or the viewpoint of the individual firm, competitive pressures from international trade, as well as a broad range of other factors, determine the viability of individual plants or firms. Given these competitive pressures, firms face a number of choices. How such firms choose to respond to the competitive pressures likely determines the overall viability of the firm in the marketplace. As a result of these actions, some firms expand, while others contract.

In contrast, the macroeconomic viewpoint focuses on the net overall direct and indirect economic effects of trade. Direct effects include changes in the composition of employment for the economy as a whole. Indirect effects can include secondary and tertiary effects in industrial sectors that may be more difficult to estimate. It is assumed that trade agreements affect consumption as a result of the impact of the agreements on the prices of goods. Presumably, trade agreements lower the tariffs on imported goods, which result in lower prices on imported goods.

Consumers benefit directly from the lower prices of imported goods to the extent that they shift their consumption in favor of the lower-priced imported goods. They also benefit from an increase in their real incomes as a result of the lower prices of imported goods. Consumers may benefit further from lower domestic prices to the extent that domestic producers lower their prices in response to the competition from imports.

Throughout this process, however, the total number of jobs in the U.S. economy is not affected, that is, trade agreements do not affect the total number of jobs in a large open economy such as the U.S. economy, but can affect the composition of employment. The total number of jobs in the U.S. economy is determined by such macroeconomic factors as productivity growth, the growth rate of the population, and the pace of technological innovation. Changes in any of these “structural” factors, together with short-term fluctuations in the business cycle and shifts in the relative value of the dollar against other currencies, may overwhelm effects of any industry-wide job “gains” or “losses”<sup>10</sup> from trade and trade agreements.

As the U.S. economy shifts the composition of production from labor-intensive import-competing products to capital-intensive export-oriented products, more labor than capital is released. Because those displaced from labor intensive jobs may not have the skills to immediately become employed in more capital intensive jobs, labor dislocations in the economy may result.

## **Adjustment Costs of Trade**

Economists have long recognized, however, that the long-term production gains associated with greater specialization in the economy create a wide range of short-term adjustment costs as labor and capital are shifted from less efficient industries and activities into more efficient industries and activities. These adjustment costs are difficult to measure, but they are potentially large over the short run and can entail significant dislocations for some segments of the labor force, for some companies, and for some communities.<sup>11</sup> In negotiating trade agreements, governments are most mindful of the adjustment costs involved and, at times, are constrained in their ability to fashion such agreements because of opposition by groups within the economy that would bear heavy costs from trade liberalization. These costs are especially acute for labor groups within the economy that lack advanced education and training skills that provide them with the means necessary to be redeployed in other sectors of the economy.

## **Issues Involved in Quantifying the Employment Effects of Trade**

Quantifying the relationship between international trade and the composition of employment in the economy is problematical and complex. For the United States, international trade is not the primary force creating employment in the economy. While trade agreements with specific countries may well benefit certain sectors of the economy, their effect is dubious as an employment program for the economy as a whole. In addition, changes in the business cycle can affect the overall state of the economy in ways that far outweigh the effects of almost all trade agreements, given the already highly open state of the U.S. economy. In addition, significant gaps

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<sup>10</sup> The words “gain” and “loss” are in quotes because, when an economy is functioning at full employment, total jobs are neither gained nor lost for the economy as a whole, but rather shifted among industries.

<sup>11</sup> For an overview of this issue, see *Globalization, Worker Insecurity, and Policy Approaches*, by Raymond J. Ahearn, CRS Report RL 34091.

in data, particularly relative to the services sector, hinder the ability to model the effects of trade agreements that lower barriers to trade in services. These gaps are important, because the services sector accounts for 69% of output and 68% of full- and part-time employment in the U.S. economy and increased trade in services offer potentially large gains for the U.S. economy.

In addition, concerns over the impact of a trade agreement on employment often focus on a comparison of labor compensation rates between countries. For instance, some groups in the United States are concerned that U.S. employment could be negatively affected because labor compensation rates, in general, are lower in South Korea. Measures of competitiveness, however, more accurately reflect not only the rate of labor compensation, but the rate of compensation relative to the level of productivity. Rates of labor compensation in the United States could be many multiples of that in South Korea, but as long as U.S. workers remain more productive than workers elsewhere, U.S. goods would continue to be competitive in the global marketplace. In general, most estimates of employment effects do not incorporate measures of productivity in their analysis.

Various approaches typically have been used to estimate the employment effects of trade agreements, including the KORUS FTA. In most cases, these approaches share some common features. Similar to other free trade agreements, the KORUS FTA is a comprehensive agreement that includes provisions to (1) lower tariffs on trade in goods and agriculture; (2) reduce formal barriers to trade in services; and (3) encourage increased flows of investment. Barriers to trade in services, however, are extremely difficult to quantify in monetary terms, and it is equally difficult to estimate the impact of an agreement on potential flows of investment. As a result, most approaches derive their estimate of changes in employment almost exclusively from estimated changes in the value of exports and imports of goods under the agreement. Even these estimates, however, are imprecise and sensitive to the assumptions that are used. **Appendix B** explains some of the most common assumptions used in economic models.

## **Problems in Linking Changes in Production with Changes in Employment**

In the Department of Commerce report on employment in the economy supported by exports mentioned above, the International Trade Administration (ITA) argues that the job estimates should **not** be used with projected changes in trade to estimate potential employment effects from trade agreements. It says:<sup>12</sup>

**Averages derived from IO [input-output]<sup>13</sup> analysis should not be used as proxies for change. They should not be used to estimate the net change in employment that might be supported by increases or decreases in total exports, in the exports of selected products, or in the exports to selected countries or regions.** (Emphasis added)

The averages are not proxies because the number of jobs supported by exports usually does not change at the same rate as export value. The rate is not the same because other factors, such as prices, resource utilization, business practices, and productivity, do not usually change at the same rate. In addition, the material and service inputs and the labor and capital

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<sup>12</sup> U.S. Department of Commerce, International Trade Administration; *Exports Support American Jobs*, by John Tschetter (no published date, but the report was released in 2010), p. 3.

<sup>13</sup> Input-output analysis takes into consideration the outputs of one industry as inputs in another.

inputs differ significantly across types of exports. For example the labor requirements for an exported aircraft are significantly different from those of an exported agricultural product or an educational service.

Ideally, estimates of trade changes from tariff reductions would be multiplied by figures which reflect *actual* changes in employment (based on the mix of goods traded) that would occur *at the margin* as a result of changes in the volume of goods traded. According to the ITA, though, such data do not exist. The only data that are available reflect the estimated *average* number of jobs supported across the U.S. economy by a given level of exports. According to the ITA, **“As a result, multiplying trade estimates from the computable general equilibrium (CGE) models by employment averages would tend to overestimate the actual number of jobs potentially lost to trade changes.”** (Emphasis added.)

The ITA also indicated that

In addition, estimates of the average number of jobs associated with exports cannot be adjusted for fluctuations in manufacturing capacity over the course of the business cycle. As explained by the USITC, the more slack there is in the U.S. economy, the more potential there would be for job creation:<sup>14</sup>

During periods of slack business activity, increased output, such as exports, would tend to increase employment, to lower unemployment, and to increase labor force participation. Conversely, during periods of high business activity, when industry operates at or near full capacity and employment, increased output, including output for exports, tends to raise employment less—if at all—and instead mainly shifts employment to industries that pay higher wages.

In a number of cases, the estimates developed by the ITA regarding the average number of U.S. jobs supported by exports have been used, or in many cases one could argue, misused, to estimate the number of jobs that potentially could be affected by trade agreements. In some cases, the data have been used in reverse to argue that if a certain number of jobs were supported by a billion dollars of exports, then that same number could be used to argue that a certain number of jobs would be “lost” by a billion dollars of imports, so that any net increase in imports associated with a trade agreement would necessarily result in a loss of employment for the economy. The composition of U.S. imports, however, is fundamentally different from U.S. exports. While some imports and exports represent clearly substitutable items, other imports represent inputs to further processing, or are items that are not available in the economy. The ITA has issued various statements indicating that using the data in this manner is not appropriate. As the ITA has indicated, the employment estimate is not a multiplier and should not be used to estimate jobs that are associated with exports or imports in a multiplier fashion. In addition, the ITA estimates relate to the average number of jobs supported by exports across a broad section of the economy and should not be used in conjunction with trade agreements where the approach should more appropriately focus on estimating the change in the composition of employment that are associated with a change in trade as a result of a trade agreement.

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<sup>14</sup> ITA. *Exports Support American Jobs*, p. 3-4.

# Estimates of Employment Effects of the KORUS FTA

## The USITC Estimate

The USITC<sup>15</sup> used standard analysis to measure the long-term trade (but not employment) effects of a one-time full implementation of the KORUS FTA after the full implementation period of 10 years on U.S. exports and imports. The ITC used an economic model known as the Global Trade Atlas Project (GTAP), located at Purdue University<sup>16</sup> to estimate changes in trade (exports and imports) from changes in tariff rates and tariff rate quotas. The results are expressed as proportional effects (percentage increases or decreases in trade) for various sectors, relative to the projected 2008 economy. According to this estimate, if the KORUS FTA were to go into effect, U.S. merchandise exports to South Korea likely would increase by an estimated \$9.7 billion to \$10.9 billion over the first decade after enactment, while merchandise imports from South Korea likely would increase by an estimated \$6.4 billion to \$6.9 billion over the first decade. This would result in an estimated net increase in U.S. exports of \$3.3 billion to \$4.0 billion during the first decade after enactment.

## The University of Michigan Estimate

In a slightly different approach, economists at the University of Michigan used a standard macroeconomic model to estimate the effect of a negotiated reduction in tariff rates on export and import prices and then estimated changes in the volumes of goods exported and imported arising from those change in prices, as indicated in **Table 3**. They estimated, using 2006 data, that U.S. bilateral exports to Korea would increase by \$9.2 billion and that U.S. imports from Korea would increase by \$6.9 billion during the first ten years after implementation of the agreement.<sup>17</sup> The total number of jobs gained or lost in the economy is assumed to be zero, because the model begins with the assumption of full employment. Given this constraint of no changes in the overall number of jobs gained or lost, the estimates represent expected changes in the **composition of employment** among sectors in the economy. As a result, the estimates should not be viewed as projections of the exact number of jobs gained or lost by sector, but as estimates of the magnitude of the changes that could occur. Given this caveat, the estimates indicate that 85% of the projected job gains would be in the agricultural sector, and 90% of projected job losses would be in six industrial sectors: government services, trade and transportation services, manufactured textiles and apparel, transportation equipment, metal products, and machinery equipment.

Standard economic theory provides some insight into which sectors may be expected to gain, and which sectors may be expected to lose employment as a result of increased trade. Accordingly, those sectors that represent areas of greatest comparative advantage<sup>18</sup> based on the economy's

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<sup>15</sup> See complete titles and authors of this study on page 2 of this report.

<sup>16</sup> The databases are cooperatively produced and maintained by researchers and scholars. The model includes many sectors and all countries in the world.

<sup>17</sup> University of Michigan, *op. cit.*, p. 44.

<sup>18</sup> A country is said to have a comparative advantage if it can produce goods more efficiently than a competitor based on their respective endowments of the factors of production: land, labor, capital, and managerial ability. A country is (continued...)

endowment of the factors of production (land, labor, capital, technology, and entrepreneurial ability), are the ones most likely to gain employment. Compared with other countries, the United States has a comparative advantage in capital-intensive products, many services, and agricultural products that characterize U.S. exports. This is in contrast to most developing countries, that have a comparative advantage in more labor-intensive products that characterize U.S. imports.

**Table 3. University of Michigan Estimate of Potential Sectoral Employment Effects of the Korea-U.S. Free Trade Agreement**

Industry	Projected Change in Employment Relative to 2006 level	
	Change in Number of Workers	Change in Share of Total Industry Employment (%)
Rice	460	1.1
Wheat	388	0.2
Other grains	7,446	1.6
Vegetables and fruits	1,064	0.2
Oil seeds	7,151	1.7
Sugar	67	0.1
Plant-based fibers	63	0.0
Other crops	3,390	0.3
Livestock	1,092	0.1
Mining	-363	-0.0
Food, beverages, and tobacco	1,880	0.1
Textiles	-4,426	-0.5
Wearing Apparel	-3,482	-0.6
Leather products and footwear	-171	-0.2
Wood and wood products	-483	-0.0
Chemicals	119	0.0
Nonmetallic mineral products	289	0.0
Metal products	-1,077	-0.0
Transportation equipment	-2,287	-0.1
Machinery and equipment	1,438	0.0
Other manufactures	-186	-0.0
Construction	-68	-0.0
Electricity, gas, and water	-639	-0.0
Trade and transport	-5,379	-0.0

(...continued)

said to have a competitive advantage if it can produce a product at a lower cost than a competitor.

Industry	Projected Change in Employment Relative to 2006 level	
	Change in Number of Workers	Change in Share of Total Industry Employment (%)
<b>Other private services</b>	-569	-0.0
<b>Government services</b>	-5,714	-0.0
<b>TOTAL</b>	0	-0.0

**Source:** Economic effects of a Korea-U.S. Free Trade Agreement, by Kozo Kiyota and Robert M. Stern, University of Michigan, April 2007. Source of data for table is ILO (2006), UNIDO (2006) and World Bank (2006).

**Note:** Numbers of workers result from estimated share changes in trade projected onto 2006 employment data.

## Derivative Estimates

Two additional estimates of the employment effects of the KORUS FTA are based on the data developed by the ITC on the number of U.S. jobs supported by exports.

In one estimate, the White House apparently used the ITC data to estimate that an additional 70,000 U.S. workers would be supported by new exports under the proposed KORUS FTA. This estimate appears to be based on data developed by the ITC regarding the amount of additional exports that would be created by lowering tariff rates, combined with the data on the number of U.S. jobs supported by exports. As previously indicated, the ITA has stated that the data developed on the average number of jobs in the economy that are supported by exports should “not be used to estimate the net change in employment that might be supported by increases or decreases in total exports, in the exports of selected products, or in the exports to selected countries or regions.” Some could argue, however, that the White House estimate honored this caution by stating only that the proposed KORUS FTA “would support” (not create) 70,000 U.S. jobs.<sup>19</sup>

In another estimate based on data provided by the ITC, the Majority Staff of the Senate Trade Subcommittee indicated that the KORUS FTA has the potential to create about 280,000 American jobs. This estimate of job gains appear to have been derived from applying the estimates of changes in trade developed by the ITC combined with the ITA estimate on the average number of jobs in the U.S. economy that are supported by exports. The Subcommittee asked the USITC staff to “examine the agreement based on current data and economic conditions.” The Trade Subcommittee staff then found that, reflecting “2009 trade and economic conditions,” the results show that “in an economy with substantial unemployment and underused capital, the agreement has the potential to create about 280,000 American jobs.”<sup>20</sup>

<sup>19</sup> The White House. Remarks by the President at the Announcement of a U.S.-Korea Free Trade Agreement, op. cit.

<sup>20</sup> Majority Staff of the Senate Trade Subcommittee, Updated Assessment of the U.S.-Korea Free Trade Agreement (FTA), op. cit.



## **Additional Estimates**

### **U.S.-Korea Business Council Estimate<sup>21</sup>**

The U.S.-Korea Business Council estimated that the United States would experience a potential loss of 345,000 goods and services export jobs if the KORUS FTA is not implemented. The study apparently used a U.S. Department of Commerce, Bureau of Economic Analysis “National Income and Product Accounts” table of the number of full-time equivalent employees by industry for the years 2007-2009. The Council derived their estimate of jobs lost based on the assumption that both Canada and the European Union (EU) implemented their proposed trade agreements with South Korea, and the United States did not. The estimate assumes that exports to South Korea primarily from Canada and the EU would be substituted for a certain share of U.S. exports of goods and services, in an amount equal to \$35.1 billion. The Council estimate appears to incorporate a number of additional assumptions, including the following:

1. **U.S. Trade Diversion.** The estimate assumes that U.S. jobs would be lost, because exports from Canada and the EU would replace a large share of those from the United States as a result of lower tariffs on Canadian and EU goods. In deriving this result, the estimate apparently assumes that there would be a large amount of trade diversion without any trade creation effects, and it assumes that exports from Canada and the EU are completely substitutable for U.S. exports. There is no evidence provided in the estimate that either of these assumptions is likely to hold should the KORUS FTA not be approved.
2. **Total alignment of consumer preferences with tariff reductions.** The estimate also offers no corroboration for the assumption that a change in tariff rates and, therefore, in goods prices, would spur consumers in the respective countries to alter completely their consumption patterns to the detriment of U.S. exports. While some consumers are likely to alter some of their preferences based on the relatively lower prices of some goods, it is debatable whether exports from Canada and the EU would substitute for even a large share of U.S. exports
3. **No positive U.S. trade effects from potential gains in EU and Canadian real incomes.** The estimate also does not account for a broad range of associated economic effects that likely would arise with trade agreements between South Korea and Canada and the EU that potentially could have a positive effect on U.S. exports. For instance, the estimate does not account for changes in the real incomes of Canadians and Europeans that could arise from this trade agreement. As a result of the changes in their real incomes, Canadians and Europeans could be expected to increase their consumption of domestic and foreign goods, which potentially would boost U.S. exporters, who are major suppliers to both Canada and the European Union.

### **Economic Policy Institute Estimate**

The Economic Policy Institute estimated that the KORUS FTA would result in a loss of 159,000 U.S. goods-producing jobs stemming from a projected increase in the trade deficit with South

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<sup>21</sup> See complete title and authors of this study on p. 2 of this report.

Korea. This estimate was derived using an unconventional approach. The EPI did not derive its estimate directly from estimated changes in trade or the potential employment effects from a free trade agreement between South Korea and the United States. Instead, the EPI derived its estimate by *averaging* the changes that occurred in U.S. trade with Mexico between two different periods: the two seven-year periods immediately before and after the North American Free Trade Agreement (NAFTA) went into effect in 1993; and the two seven-year periods immediately before and after China joined the World Trade Organization in 2001. It then used the average rate of growth in exports and imports between these periods to estimate percentage changes in U.S. trade with South Korea under the proposed KORUS FTA. This estimate suggested that the KORUS FTA would result in a net increase in imports (a trade deficit) rather than net increase in exports. Next, the EPI study used an estimate of jobs associated with trade to estimate the number of jobs that would be lost in the United States as a result of a projected increase in the U.S. trade deficit with Mexico. The EPI approach made a number of assumptions, including

1. **Trade proxies.** This approach uses a non-trade-weighted average of U.S. trade with Mexico and China as a proxy for estimated U.S. trade with South Korea with no clear explanation of why these two cases match the Korea case. Data on U.S. trade with South Korea are readily available, so it is not clear why these data are not used to estimate potential changes. Also, U.S. trade with South Korea is about one-fourth that of U.S. trade with Mexico, and the United States and South Korea do not share a common border as is the case between the United States and Mexico.
2. **Exchange rates.** There are numerous differences between the movement in exchange rates among the three countries considered in this analysis: China, Mexico, and South Korea. For Mexico, the second seven-year period following adoption of NAFTA coincided with the devaluation of the peso. This boosted U.S. imports from Mexico and likely contributed to a decline in U.S. exports there. Unlike the peso, China's currency is linked primarily to the value of the U.S. dollar. The South Korean won is determined mainly by market forces.
3. **Trade and jobs.** The EPI estimate also uses some form of an estimate of jobs related to trade similar to that developed by the ITA on exports supporting U.S. jobs to estimate the number of U.S. jobs that would be lost as a result of a projected increase in the U.S. trade deficit with South Korea. As previously indicated, the ITA has warned that this approach to estimating jobs gained or lost from trade is not reliable.

## Conclusion

The 112<sup>th</sup> Congress likely will consider legislation to implement the KORUS FTA. So far, much of the debate surrounding the agreement has focused on the potential impact the agreement could have on U.S. employment, particularly employment in certain sectors of the economy. Given the currently high rate of unemployment, it is not uncommon for communities or workers to raise concerns over the impact of a new FTA. Indeed, for some communities that already are hard hit by high rates of unemployment or have experienced plant closings due to foreign competition, the KORUS FTA could pose additional challenges.

An analysis of the currently available estimates of the potential effects of the KORUS FTA on U.S. employment, however, raises a number of questions concerning the overall usefulness of the

estimates. Economic modeling naturally incorporates various assumptions and entails differing methodologies that can have a profound effect on the estimates that are generated. Standard models incorporate standard assumptions and use standard approaches that generally are well explained. The mark of a good economic model often is one that uses assumptions and methodologies that seem reasonable and are not geared toward generating any particular result. In contrast, non-standard models often use non-standard assumptions and approaches that are difficult to justify and that seem to have been chosen in order to generate pre-determined results. Given the current state of economic modeling and data availability, the most accurate models likely can provide only rough estimates of the magnitude of the potential changes in employment in certain sectors, but would not offer estimates of the exact size of the shifts in employment.

Estimates of employment effects of new FTAs often tend to be highly subjective and can be misleading, because they represent a partial accounting of the total economic effects of new FTAs. In most cases, FTAs are comprehensive agreements that include provisions for goods, services, and investment. Estimates of employment effects of the KORUS FTA, however, focus narrowly on employment effects in the goods sectors and neglect the potential effects in the services and investment areas. In addition, the estimates neglect a broad range of benefits for the economy as a whole that potentially can provide consumers with large economic benefits and that can yield broad productivity and efficiency gains for the economy that may well enhance employment. As a result, estimates of the employment effects of new FTAs may serve poorly as an indicator of the total impact of a new FTA on the economy as a whole.

As policymakers consider the KORUS FTA and other FTAs, they likely will weigh the results of a range of estimates of the employment effects of the FTAs to gauge the impact of the agreements. In this process, policymakers likely would be aided by estimates that clearly state the assumptions that are used and that inform policymakers about the broad implications of such agreements for the economy as a whole. In addition, policymakers likely would benefit from more reliable data on the potential magnitude of such agreements on specific sectors that would allow policymakers to craft programs that could assist those most directly affected by the agreements. As a result, policymakers may benefit from a number of initiatives to improve information and data on the impact of international trade on the economy. These might include

- increased information and data on services in the economy, including the shifting of in-house services from the manufacturing sector to the services sector and the formal and informal barriers to U.S. services posed by major trading partners;
- better data on worker dislocations including the reasons for those closings;
- better understanding of the development of global supply chains and the role they are playing in the U.S. economy.

## Appendix A. Employment Population and Shares of the Economy, by Major Industry and Sector, 2010

Sector	Employment (in thousands)	Share of total private employment (%)
<b>Total private including agriculture</b>	<b>132,414</b>	<b>100%</b>
<b>Total goods producing including agriculture</b>	<b>19,971</b>	<b>15</b>
Mining and logging	731	1
Construction	5,487	4
Manufacturing	11,568	9
Agriculture	2,185	2
<b>Services</b>	<b>90,194</b>	<b>68</b>
Trade, Transportation, and Utilities	24,742	19
Information	2,699	2
Financial Activities	7,616	6
Professional and Business Services	16,898	13
Education and Health Services	19,755	15
Leisure and Hospitality	13,065	10
Other Services	5,419	4
<b>Government</b>	<b>22,249</b>	<b>17</b>
Federal	2,852	2
State	5,142	4
Local	14,255	11

**Source:** U.S. Department of Labor, Bureau of Labor Statistics, Economic News Release, Table B-1 (employees on nonfarm payrolls) and Table A-8 (for agriculture, January 2011).

## **Appendix B. Standard Assumptions of Economic Models**

In order to assess the validity of the various estimates of the employment effects of the KORUS FTA, it is first necessary to understand how the economic models work and the assumptions that are made. The standard approach to estimating the effects on U.S. employment associated with trade agreements follows a number of steps, although most of these steps are not included in the discussion of the estimates. In general, these steps include the following:

1. Estimating the impact a change in the tariff rate would have on a change in the prices of goods. For instance, if tariff rates are lowered by 10%, would goods prices also fall by 10%? Are the changes in tariff rates accomplished at once, or are they reduced slowly, according to a set schedule? If tariff rates are adjusted over time according to a set schedule how does that affect the rate at which goods prices adjust?
2. Estimating the impact a change in goods prices would have on a change in sales of those goods. This estimate attempts to quantify the responsiveness of consumers to changes in prices. In markets with a number of close substitutes, the consumer response could be strong with consumers buying less of a particular product as its price rose relative to those of similar products. For goods with few substitutes, consumers would be less responsive to changes in prices.
3. Estimating the impact a change in sales would have on a change in output or a change in employment. A change in employment associated with a change in sales would depend, at the very least, on the level of plant utilization, the level of productivity, and the availability of labor.

In attempting to estimate these intermediary steps, most models incorporate a number of assumptions to reduce the high level of variability that is intrinsic in such estimates. Often these additional assumptions are not well explained. In general, these basic assumptions are:

1. **Changes in Tariff Rates Will Translate Directly into Price Changes.** Most models assume that any change in the tariff rate will be passed along completely to the change in the prices of traded goods. In most cases, however, tariff rates are not adjusted completely at the time of implementation, but are adjusted over a set schedule that can encompass a decade or longer. Also, there is no guarantee that the prices of traded goods would adjust at exactly the same rate as tariff rates are adjusted. They may be passed along at a differential rate or simply absorbed by the exporter.
2. **Exchange Rates Will Remain As They Are.** In most cases, the estimates do not make any assumptions concerning potential changes in the exchange rate of the dollar as a result of a trade agreement. In addition, the exchange value of currencies of competitors could also be affected in ways that could blunt the expected change in exports or imports associated with a trade agreement.
3. **Consumer Purchases Will Follow Tariff Reductions.** Most of the estimates on changes in employment are based on the assumption that reductions in the prices of goods associated with a drop in the rate of tariffs would result in a complete substitution of goods toward the FTA countries and away from other foreign

suppliers. In general, there may well be some goods within the total basket of traded goods that consumers consider easily substitutable (such as steel and fasteners), but consumer choices often are predicated on more than relative prices (such as brand names and quality) and, therefore, the rate of substitution overall can be quite low. To the extent that consumers do not shift their purchases based on changes in prices, the change in employment would be blunted. In addition, standard economic theory argues that trade agreements generally entail both trade diversion, or the substitution of lower-priced goods among the parties to the agreement for the now higher-priced goods from other suppliers, and trade creation. Trade agreements can create trade by increasing efficiency in production and by increasing the real incomes of consumers that, in turn, leads to a greater level of consumption of both domestic and imported goods. To the extent that a trade agreement creates additional trade, it could have a positive effect on employment.

4. **Employment or Wages Will Not Change.** Another assumption that often is made is whether employment or wages should be held constant. Such an assumption often is necessary in order to generate results from the economic models. By holding employment constant, the model is attempting to estimate the change in the composition of employment that would be associated with a trade agreement. This assumption would allow wages to change, although most models do not attempt to estimate changes in wages. As a result, these models generally attempt to highlight the magnitude of the impact of an agreement on various sectors in the economy, rather than attempting to generate precise estimates of the actual number of jobs that may be gained or lost by individual sectors. In contrast to these assumptions, models that hold wages constant allow employment to change in an effort to estimate changes in the number of jobs in various economic sectors. Since changes in wages often lead to changes in employment, this assumption is questionable. In either case, the estimates usually attempt to aggregate the total cumulative effects over a number of years, often a decade, in order to derive an estimate of the overall change in employment. While such an assumption is a necessary condition for generating results, the assumptions compromise the validity of the results, since the composition of employment in the economy over a decade can change quite noticeably, even in the complete absence of international trade, due to business cycle effects and the constant churning that occurs. Currently none of the estimates of the employment effects of trade agreements incorporate either business cycle or other transformational effects into the estimates.

### **Key Steps in Converting Changes in Tariffs to Changes in Employment**

In general, there are a number of steps involved in converting changes in tariffs into changes in employment. In most cases, these steps are not explicitly explained. The chart below summarizes these three steps.

**Table B-I. Key Steps Involved in Converting Changes in Tariff Rates into Changes in Employment**

Step 1	Estimate changes in trade (exports and imports) arising from a change in tariff rates. <sup>a</sup>
Step 2	Link changes in trade (exports or imports) to changes in the industrial sectors that produce those goods. <sup>b</sup>
Step 3	Link changes in industrial production to changes in employment. <sup>c</sup>

a. This step assumes that a reduction in the applied rate of tariffs would lead to a similar reduction in the prices of imported goods. As a result of the reduction in prices, it is assumed that consumer demand would shift from other goods in favor of the lower-priced goods, so that there is a one-for-one substitution of goods, or that the process of tariff reduction is a zero-sum game, with gains by the FTA partner comparable to losses by domestic or non-FTA suppliers.

b. Linking traded goods with their respective industries is complicated, because the data collected on exports and imports are entirely different from those collected on the industrial composition of the economy. Whereas exports are recorded as the number of specific goods exported at a certain price, the industrial composition of the economy is organized not by individual commodity, but by productive processes, so that it requires considerable effort to link together the goods produced for export with the industry that produced those goods. However, in recent years, classification “dictionaries” have been developed that can make these translations easier.<sup>22</sup>

c. In a joint project, the Department of Commerce (DOC), Bureau of Economic Analysis (BEA), and the Bureau of Labor Statistics (BLS), estimated the average number of jobs supported by exports in the U.S. economy based on the dollar value of output relative to the average number of jobs required to produce that output for each industry.<sup>23</sup> As a result of this joint effort, the Commerce Department determined in its 2010 update that on average \$166,000 in goods exports, \$216,000 in services exports, or a weighted average of \$180,000, supported one job in each respective sector. As indicated previously, this estimate should not be used to estimate the number of jobs lost as a result of imports, or a trade deficit.

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<sup>22</sup> U.S. Department of Commerce, International Trade Administration. *Exports Support American Jobs: Updated Measure Will Quantify Progress as Global Economy Recovers*, International Trade Research Report no. 1, 2010, p. 2-3, updated by unpublished regression-related estimates by the author.

<sup>23</sup> The Department of Commerce published results of an earlier version of this model in 1996 and published its first major update of that data in 2010 (14 years later), reflecting updated employment/output relationships for the years 1993-2008. U.S. Department of Commerce, Economics and Statistics Administration. *U.S. Jobs Supported by Goods and Services Exports, 1983-1994*, by Lester A. Davis, Research Series OMA-1-96, November, 1996. This report was the sixth in a series published since 1983 to measure the contribution of exports to the U.S. economy and employment.