



INTERNATIONAL  
**TRADE**  
ADMINISTRATION

# Manufacturing and Services Economics Brief

## **Jobs Supported by Exports, 1993–2011**

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Office of Competition and Economic Analysis

October 2012

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## **Acknowledgments**

We appreciate the helpful comments that we received from Joseph Flynn, Richard Graham, Sam Greenblatt, Elizabeth Schaefer, and members of the Working Group on Analysis and Data of the Trade Promotion Coordinating Committee. All remaining errors are our own.

## Contents

Acknowledgments.....	ii
Contents .....	iii
Executive Summary .....	v
1. Introduction.....	1
2. Methodology.....	1
3. Jobs Supported by Exports.....	2
4. Industry Jobs Supported by Exports .....	5
5. Industry Jobs Supported by Goods Exports.....	10
6. Industry Jobs Supported by Services Exports.....	13
References.....	16
Appendix A. Jobs Supported by Exports: Value Relationships .....	17
Appendix B. Jobs Supported by Exports: Original versus Revised.....	19
Appendix C. Revised Projection Estimation .....	21

## Tables

Table 1. Value of Exports and Jobs Supported by Exports, 1993–2010 .....	5
Table 2. Share and Number of Industry Jobs Supported by Exports, 2010.....	6
Table 3. Top 10 Jobs Supporting Goods Exports, 2010 .....	12
Table 4. Top 10 Jobs Supporting Goods Exports: 1993, 2000, 2010 .....	13
Table A1. Jobs Supported by \$1 Billion of Exports and Value of Exports to Support One Job, 1993–2011.....	17
Table B1. Jobs Supported by Exports: Original and Revised, 1993–2010.....	20
Table C1. Revised Estimation Results.....	21

## Figures

Figure 1. Jobs Supported by Exports, 1993–2011 .....	3
Figure 2. Jobs Supported by \$1 Billion of Exports, 1993–2011.....	3
Figure 3. Exports’ Share of GDP and Employment, 1993–2011 .....	4
Figure 4. Industry Shares of Total Jobs Supported by Exports, 2010 .....	7
Figure 5. Share of Export-Supported Jobs: Manufacturing and Professional and Business Services, 1993–2010.....	8
Figure 6. Exports-Supported Jobs as a Share of Industry Employment, 2010 .....	9
Figure 7. Share of Export-Supported Jobs: Manufacturing, Agriculture, and Professional and Business Services, 1993–2010.....	10
Figure 8. Jobs Supported by Goods Exports, 1993–2010.....	10
Figure 9. Jobs Supported by \$1 Billion of Goods Exports, 1993–2010 .....	11
Figure 10. Jobs Supported by Goods Exports by Industry, 2010 .....	12
Figure 11. Jobs Supported by Services Exports, 1993–2010.....	14
Figure 12. Jobs Supported by \$1 Billion of Services Exports, 1993–2010 .....	14
Figure 13. Jobs Supported by Services Exports by Industry, 2010 .....	15

## Executive Summary

Jobs supported by exports increased to 9.7 million in 2011, up 0.6 million from 2010 and 1.2 million from 2009. Indeed, in the years since 1993, only 2008 saw a larger number: 9.8 million jobs supported by exports.

In 2011, \$1 billion of exports supported 5,080 jobs, down 760 jobs per \$1 billion of exports from 2008. Increases in labor productivity and export prices continue to reduce the number of jobs supported by \$1 billion of exports. In 2010, the latest year for which disaggregated sectoral information is available, \$1 billion of goods exports supported about 6,100 jobs, and \$1 billion of services exports supported about 4,300 jobs, compared to 5,500 jobs supported by \$1 billion of total exports.

In 2010, jobs in the manufacturing sector accounted for 2.9 million, or almost a third, of the 9.1 million jobs supported by exports. Goods exports accounted for 96 percent of those export-supported jobs. Moreover, manufacturing jobs supported by exports accounted for 25 percent of all jobs in the manufacturing sector. Of total manufacturing jobs, the share supported by exports has been increasing over the years.

In 2010, the private services sector accounted for 5.4 million export-supported jobs. Most of these jobs—57 percent—arose indirectly from exports of goods rather than services. Of total private services jobs, the share supported by exports has also been increasing, but at a lower rate than the increase in the share of manufacturing jobs supported by exports in total manufacturing jobs.

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## 1. Introduction

U.S. exports reached all-time highs in 2011, both in dollars (\$2.1 trillion) and as a share of the U.S. economy (13.9 percent). As economic growth in many emerging and developing economies outpaces U.S. economic growth and the U.S. share of the world economy diminishes, world markets will likely continue to increase their importance to U.S. business. Exports not only introduce U.S. businesses to faster-growing world markets, but also provide substantial benefits in the United States.

Riker (2010) estimates that workers in export-intensive manufacturing industries earn 18 percent more, on average, than comparable workers in other manufacturing industries. Similarly, Riker and Thurner (2011b) estimate that workers in export-intensive services industries earn 15 to 20 percent more than comparable workers in other services industries. In addition, Riker and Thurner (2011a) demonstrate that U.S. manufacturers can find increased revenue stability and reduced volatility through overseas sales.

In this brief, we demonstrate the importance of exports to U.S. employment. We present new estimates of jobs supported by exports from 1993 to 2011. These estimates use newly released data (1993–2010) from the Bureau of Labor Statistics (BLS). Note that estimates for 2011 are projections obtained by using the methodology described in Johnson (2011). In addition, we present estimates of jobs supported by exports by industry, by goods exports, and by services exports from 1993 to 2010.

## 2. Methodology

This study takes the same approach as Tschetter (2010) in calculating jobs supported by exports from historical input–output data and the same approach as Johnson (2011) in projecting jobs supported by exports for years when historical input–output data are not available. As in those previous studies, the methodology rests on average relationships between the value of goods and services in the economy, the value of inputs used in their production, and the value of transportation and other marketing services required to bring goods and services to buyers.

The study departs from Tschetter (2010) by using the full series of updated input–output data from the BLS for 1993–2008 and new BLS data for 2009–10. BLS improved its input–

output data by using the 2002 Economic Census, which was not available when the original data were published, and by using yearly input–output data from the Bureau of Economic Analysis (BEA). BEA’s yearly data are at a higher level of aggregation than BLS’s data, and BEA uses yearly survey information in non–Economic Census years. The revised data lead to differences between Tschetter’s (2010) estimates and the estimates presented here for 1993–2008. Appendix B discusses these differences and other contributing factors in more detail.

The projection approach is used for 2011 because input–output data are not available for that year. The equation for projecting the value of exports to support one job was revised to reflect the updated estimates in this brief as well as the addition of two more years of data (for 2009 and 2010). Appendix C presents the updated formula for projecting the percentage change in the value of exports to support one job from the observed percentage changes in labor productivity and the price of exports.

### **3. Jobs Supported by Exports**

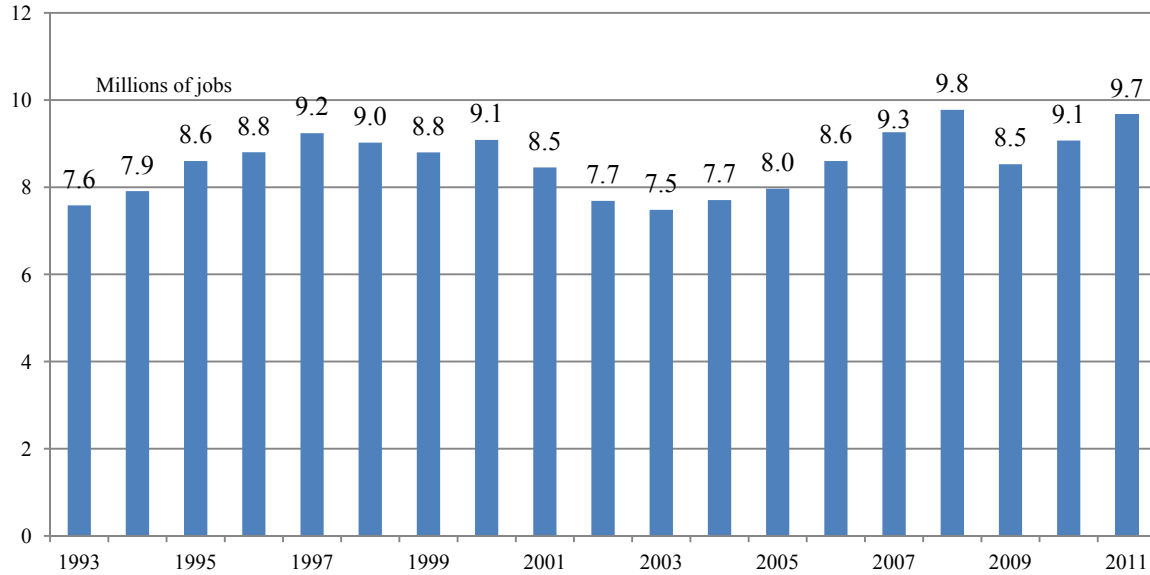
U.S. exports of goods and services supported an estimated 9.7 million jobs in 2011, the second-highest number over the period 1993–2011, 1993 being the first year for which data are available for this analysis. Between 1993 and 2011, jobs supported by exports increased by 27.6 percent, from 7.6 million to 9.7 million jobs (Figure 1).

Another way to look at the data is to calculate the number of jobs supported by \$1 billion of exports. From 1993 to 2011, the number of jobs supported by \$1 billion of exports fell nearly 60 percent, from 12,086 to 5,080 jobs (Figure 2). This number represents a compound annual rate decrease of 4.7 percent per year. According to BEA, export prices increased 26.9 percent over this period. Hence, three-quarters of the 60 percent decrease in jobs supported by \$1 billion of exports is accounted for by increases in labor productivity associated with exporting. See Appendix A for a discussion of the inverse ratio—the value of exports to support one job—which is used to project jobs supported by exports in years when the input–output data are not available.



**Figure 1. Jobs Supported by Exports, 1993–2011**

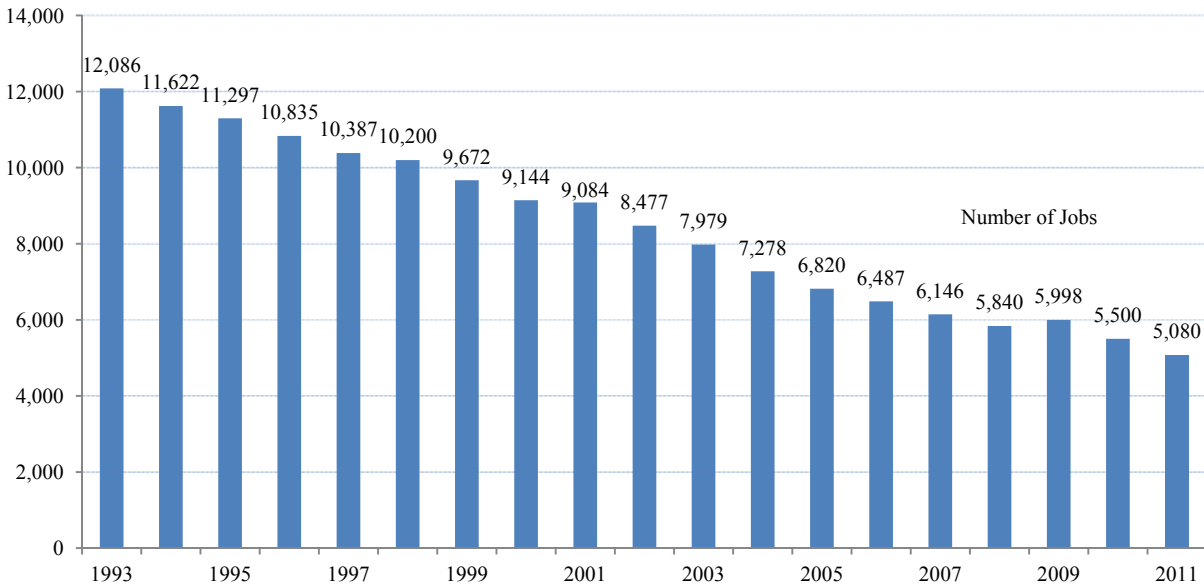
In 2011, \$2.1 trillion of exports supported 9.7 million jobs.



Source: International Trade Administration (ITA) calculations from BLS and BEA data.

**Figure 2. Jobs Supported by \$1 Billion of Exports, 1993–2011**

In 2011, every \$1 billion of exports supported more than 5,000 jobs.

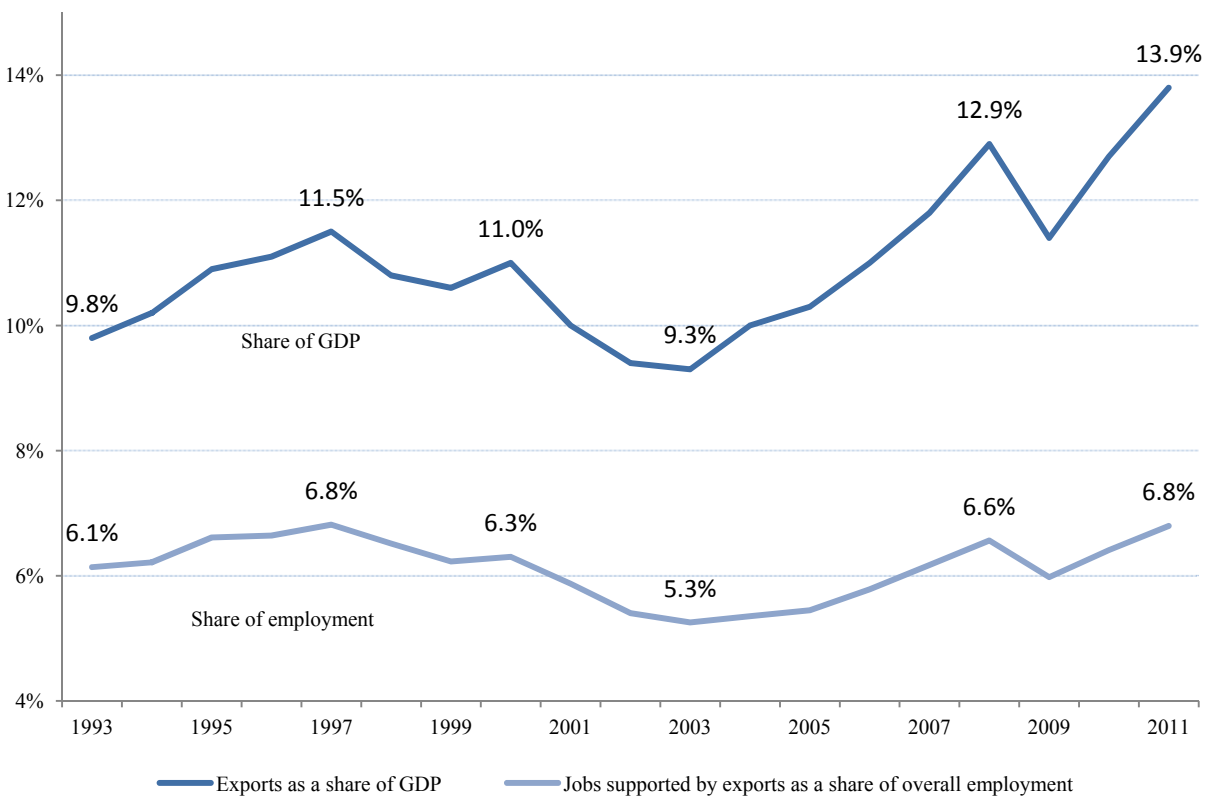


Source: For 1993–2010, ITA calculations from BLS data; for 2011, ITA calculations from BLS, BEA, and Census data.

Exports are an increasingly important part of the U.S. economy. Exports’ share of U.S. gross domestic product (GDP) is up 42 percent since 1993, and exports’ share of employment is up 11 percent (Figure 3). In 2011, exports accounted for 13.9 percent of GDP, compared to 9.8 percent in 1993. Of total jobs in the economy, the share supported by exports has also been increasing since 2003 but is not significantly different from shares observed in the 1990s. Exports’ increasing share of GDP—yet comparatively stable share of total employment—suggests that labor productivity growth in export sectors and export-supporting sectors has been faster than in the rest of the economy.

**Figure 3. Exports’ Share of GDP and Employment, 1993–2011**

Since 1993, exports’ share of GDP is up 42 percent, and exports’ share of employment is up 11 percent.



Source: ITA calculations from BLS data.

## 4. Industry Jobs Supported by Exports

At a more disaggregated level, our analysis ends at 2010, the most recent year for which detailed data are available. In 2010, exports supported 9.1 million jobs, of which 6.6 million were supported by goods exports and 2.5 million jobs were supported by services exports (Table 1). Goods exports accounted for 73 percent of jobs supported by exports but only 66 percent of export value. In contrast, services exports accounted for 27 percent of jobs supported by exports and 34 percent of export value. By comparison, in 1993, goods exports accounted for 80 percent of jobs supported by exports and 71 percent of export value, while services exports accounted for about 20 percent of jobs supported by exports and 29 percent of export value.

**Table 1. Value of Exports and Jobs Supported by Exports, 1993–2010**

In 2010, 6.6 million jobs were supported by goods exports, and 2.5 million jobs were supported by services exports.

Year	Value of exports (\$ billions)			Jobs supported (millions)		
	Total	Goods	Services	Total	Goods	Services
1993	627	448	179	7.6	6.1	1.4
1994	681	485	196	7.9	6.4	1.5
1995	761	541	220	8.6	6.9	1.7
1996	812	578	234	8.8	7.1	1.7
1997	890	632	258	9.2	7.4	1.8
1998	885	621	264	9.0	7.2	1.9
1999	910	627	283	8.8	6.9	1.9
2000	993	691	303	9.1	7.2	1.9
2001	930	640	290	8.5	6.6	1.8
2002	907	610	297	7.7	5.9	1.8
2003	938	631	307	7.5	5.7	1.8
2004	1,059	704	355	7.7	5.7	2.0
2005	1,168	779	389	8.0	5.9	2.0
2006	1,326	892	434	8.6	6.4	2.2
2007	1,507	1,005	502	9.3	6.8	2.5
2008	1,674	1,111	562	9.8	7.1	2.6
2009	1,422	904	517	8.5	6.0	2.5
2010	1,649	1,087	562	9.1	6.6	2.5

Source: ITA calculations from BLS data.

Note: The export data reported here are from input–output (I/O) accounts. Exports as reported in I/O accounts are smaller than those reported in the National Income and Products Accounts due to adjustments for items such as re-exports and re-exports. Totals may not add up because of rounding.

Exports can support jobs directly—for example, jobs in the exporting industry. Exports can also support jobs indirectly—for example, jobs in industries that produce materials and services purchased by exporters. In 2010, jobs in the manufacturing sector accounted for 2.9 million of the 9.1 million jobs supported by goods and services exports (Table 2). Similarly, jobs in the private services sector accounted for nearly 5.4 million the jobs supported by goods and services exports. Jobs in goods industries that are supported by exports are mostly supported by goods exports. Goods exports also indirectly support a greater number of jobs (3.1 million) in services industries than the number of jobs (2.3 million) in services industries that services exports support.

**Table 2. Share and Number of Industry Jobs Supported by Exports, 2010**

In 2010, 2.9 million manufacturing jobs were supported by exports, and 5.4 million private services jobs were supported by exports.

Industry of job	Share and number jobs supported by						Share of export supported jobs accounted for by goods exports (percent)
	Goods exports		Services exports		Total exports		
	Percent	Millions	Percent	Millions	Percent	Millions	
Agriculture	7.4	0.49	0.2	0.01	5.5	0.50	98
Mining	1.1	0.07	0.3	0.01	0.9	0.08	88
Utilities	0.6	0.04	0.3	0.01	0.5	0.05	80
Construction	1.0	0.06	0.8	0.02	0.9	0.08	75
Manufacturing	42.7	2.83	4.2	0.10	32.4	2.93	97
Private services	46.5	3.08	93.2	2.28	59.1	5.36	57
Government	0.7	0.05	1.0	0.02	0.8	0.07	71
Total	100	6.60	100	2.50	100	9.10	73

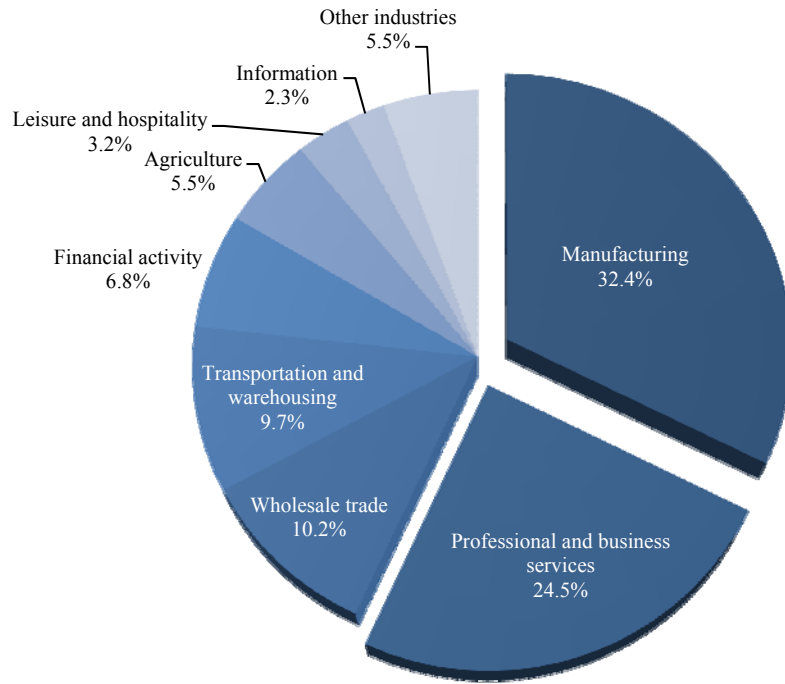
Source: ITA calculations from BLS data.

Note: Totals may not add up because of rounding. Percentages may differ from those implied by values also because of rounding.

In 2010, 32.4 percent of all jobs supported by exports were in the manufacturing sector, while 24.5 percent of such jobs were in the professional and business services sector (Figure 4). Overall, 59.1 percent of all jobs supported by exports were in private services industries.

**Figure 4. Industry Shares of Total Jobs Supported by Exports, 2010**

In 2010, the manufacturing sector accounted for nearly a third of jobs supported by exports.

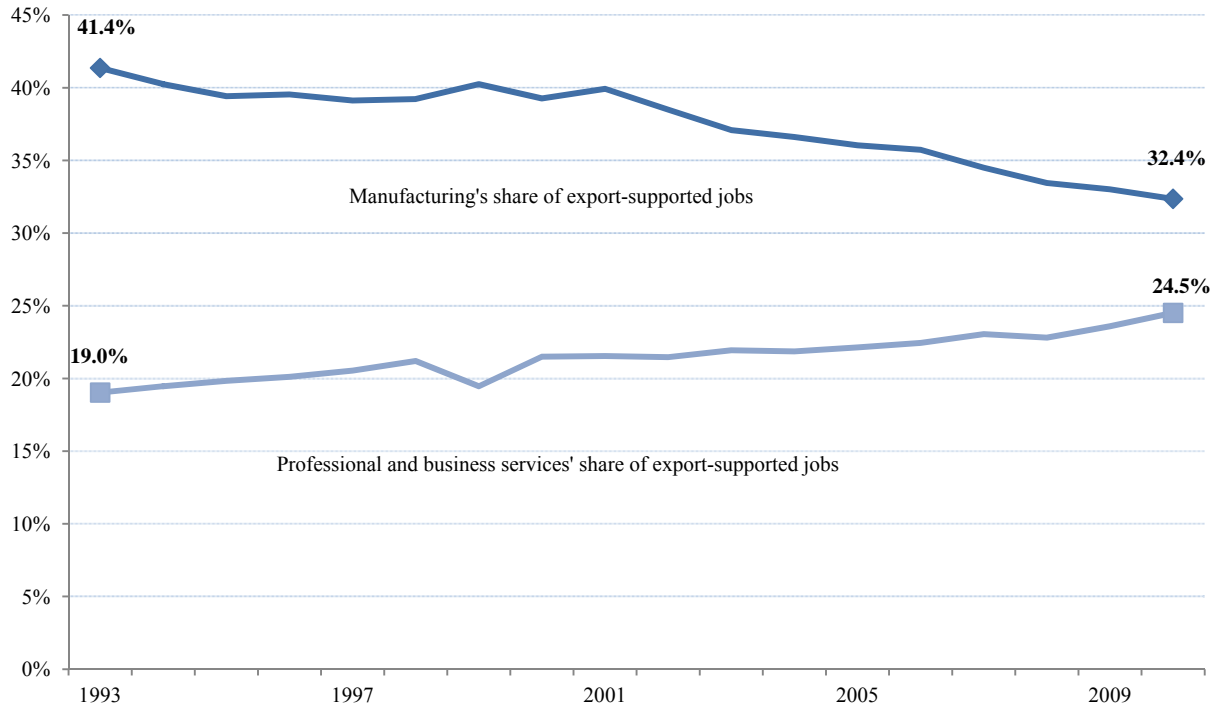


Source: ITA calculations from BLS data.

Although more jobs supported by exports are in the manufacturing sector than in any other sector, the share of manufacturing jobs in all jobs supported by exports has been declining over time, from 41.4 percent in 1993 to 32.4 percent in 2010 (Figure 5). At the same time, the professional and business services sector has increased its share of jobs supported by exports from 19.0 percent to 24.5 percent. A contributing factor to manufacturing's decreasing share and professional and business services' increasing share of jobs supported by exports is manufacturing's faster growth in labor productivity. From 1993 to 2011, manufacturing labor productivity nearly doubled, while overall nonfarm business labor productivity increased by only about 50 percent.

**Figure 5. Share of Export-Supported Jobs: Manufacturing and Professional and Business Services, 1993–2010**

Manufacturing’s share of export-supported jobs is declining, whereas professional and business services’ share is rising.

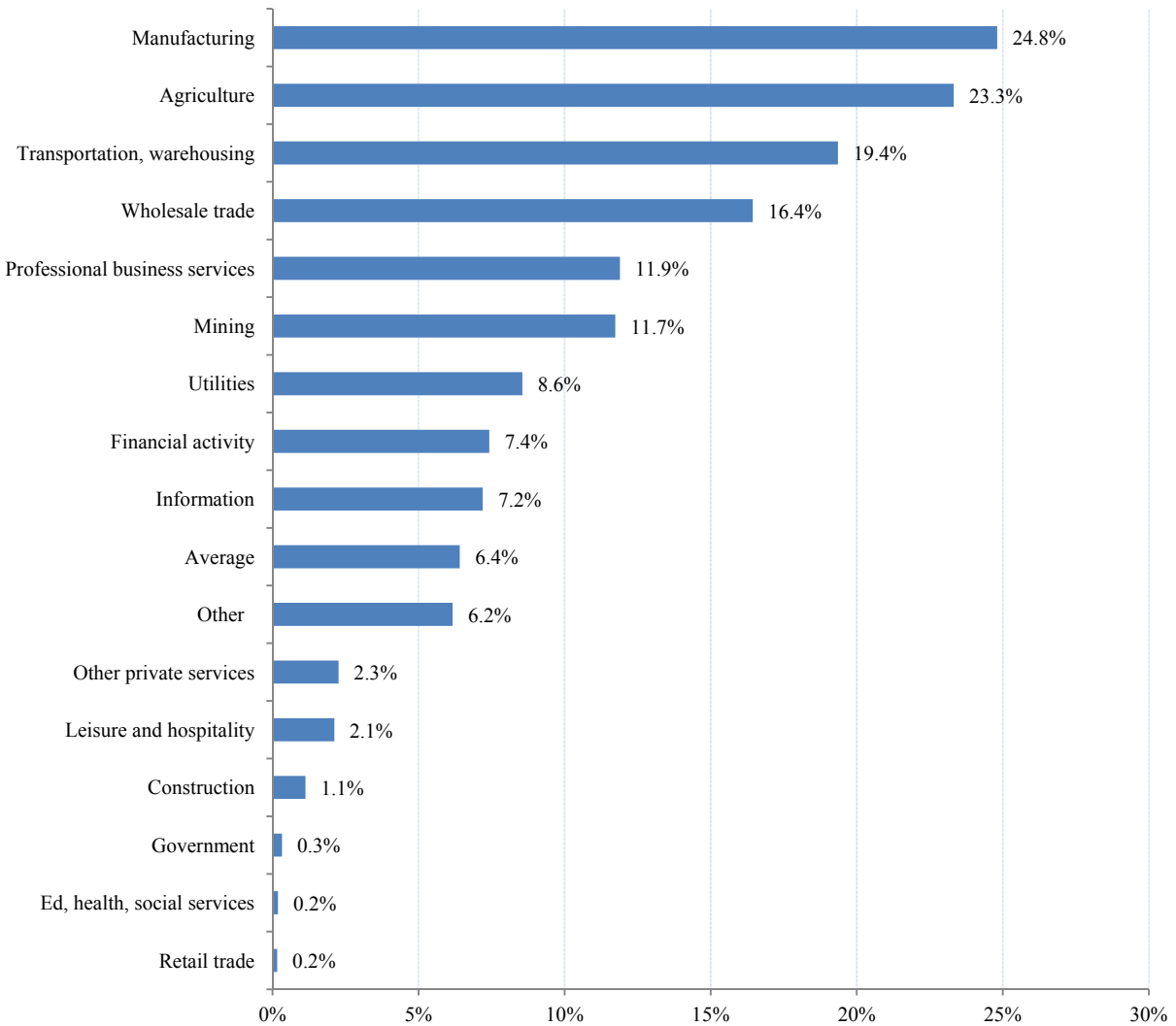


Source: ITA calculations from BLS data.

The importance of exporting to a sector’s employment can be measured by the share of a sector’s jobs that are supported by exports. Exports supported nearly a quarter of the jobs in both the manufacturing and the agriculture sectors in 2010 (Figure 6). The indirect importance of exports can be seen in the utilities sector. Nearly all utilities output is consumed domestically, but nearly 1 in 10 jobs in utilities was supported by exports in 2010.

**Figure 6. Exports-Supported Jobs as a Share of Industry Employment, 2010**

In 2010, nearly a quarter of total employment in manufacturing and agriculture was supported by exports.

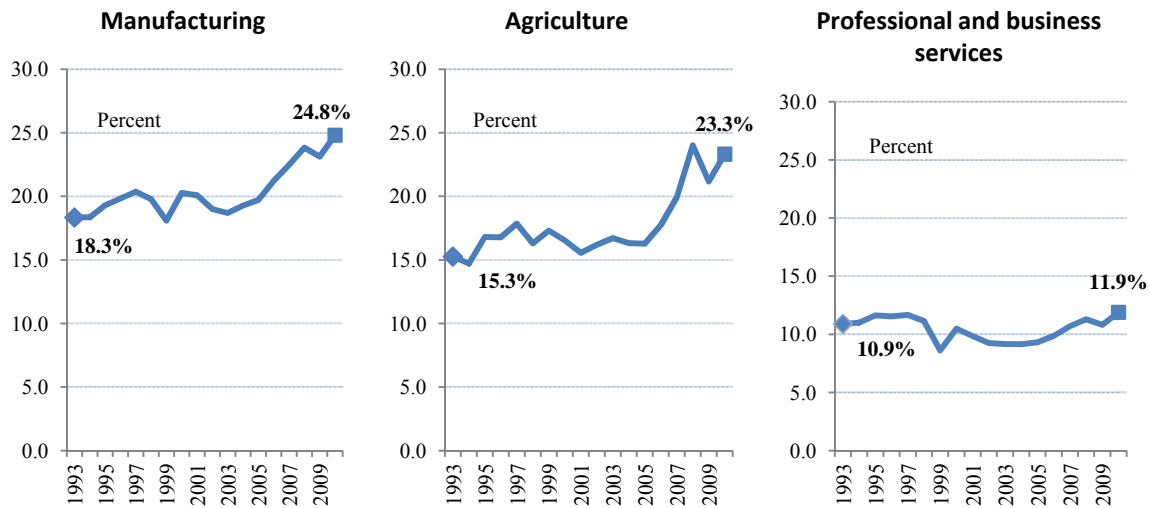


Source: ITA calculations from BLS data.

Over time, jobs in most sectors are becoming more reliant on exports. The two most prominent sectors in this regard are manufacturing and agriculture (Figure 7). Even the professional and business services sector, which has negligible goods exports, has seen an increase in its reliance on goods exports through its sales to goods industries.

**Figure 7. Share of Export-Supported Jobs: Manufacturing, Agriculture, and Professional and Business Services, 1993–2010**

Jobs in most sectors are becoming more reliant on exports.



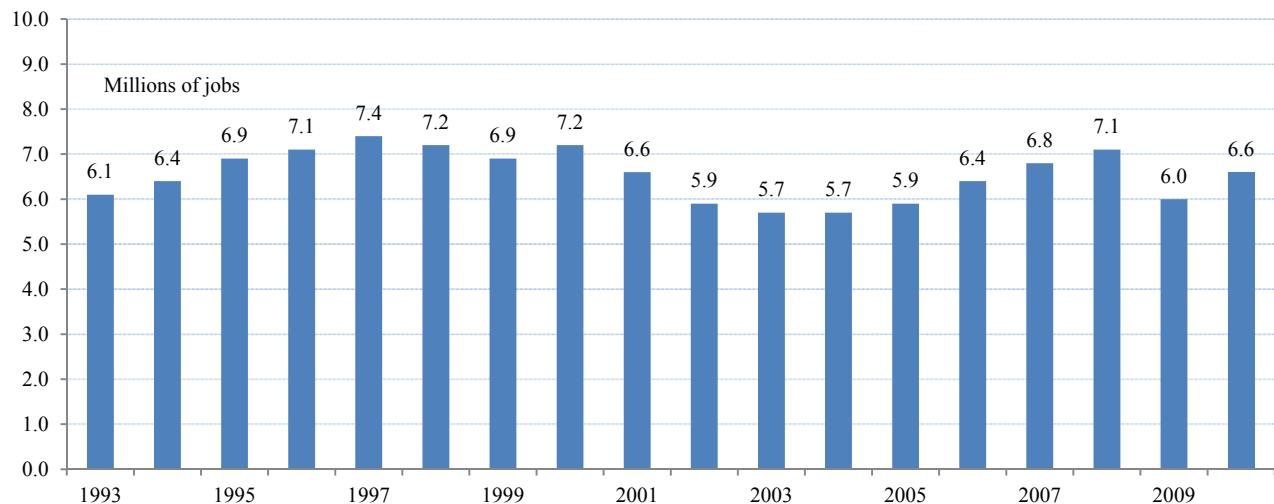
Source: ITA calculations from BLS data.

## 5. Industry Jobs Supported by Goods Exports

In 2010, 6.6 million jobs were supported by goods exports, an increase of 600,000 such jobs over 2009, but still 500,000 jobs fewer than those supported by goods exports at the prerecession peak in 2008 (Figure 8).

**Figure 8. Jobs Supported by Goods Exports, 1993–2010**

In 2010, 6.6 million jobs were supported by goods exports.



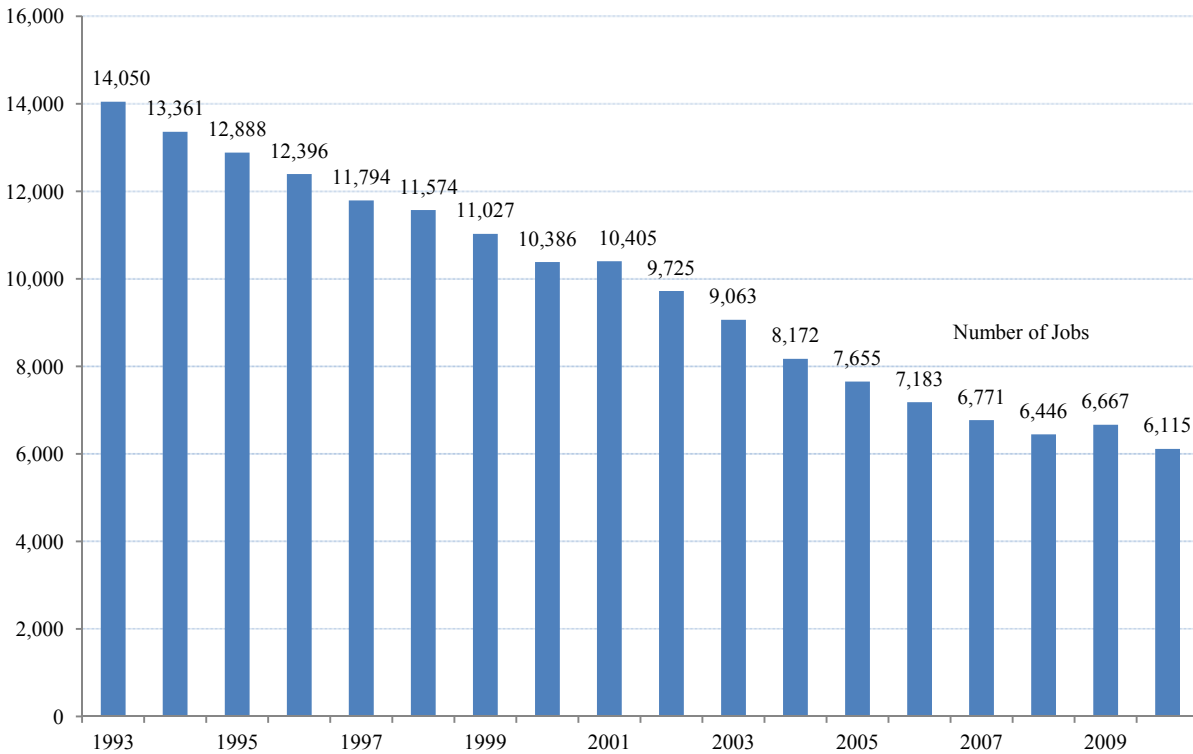
Source: ITA calculations from BLS data.



Over time, productivity gains and price increases have reduced the number of jobs supported by \$1 billion of goods exports (Figure 9). In 1993, 14,050 jobs were supported by \$1 billion of goods exports, but by 2010, only 6,115 jobs were supported by \$1 billion of goods exports, a reduction of 56.5 percent.

**Figure 9. Jobs Supported by \$1 Billion of Goods Exports, 1993–2010**

In 2010, every \$1 billion of goods exports supported more than 6,100 jobs.

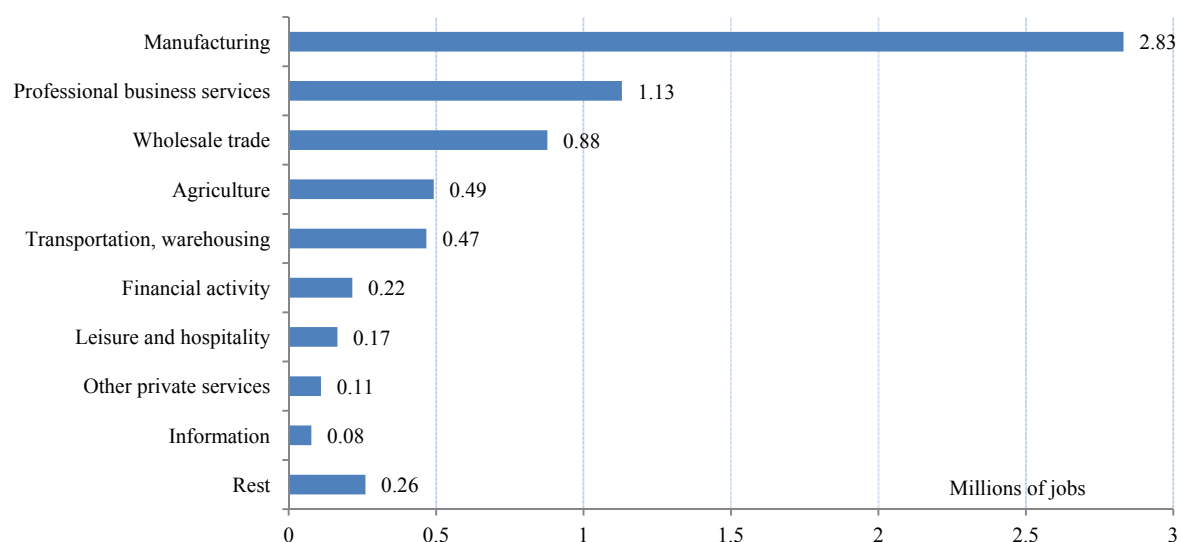


Source: ITA calculations from BLS data.

An important contributor to the decrease in the number of jobs supported by \$1 billion of goods exports is the dominance of manufacturing in jobs supported by exports and manufacturing’s above average increase in labor productivity. In 2010, 43 percent of all jobs supported by goods exports were manufacturing jobs (Figure 10), and the top six industries accounted for 91 percent of all jobs supported by goods exports. Four of the top six industries were service industries; this finding reflects how exports of goods support jobs in industries that do not produce goods.

**Figure 10. Jobs Supported by Goods Exports by Industry, 2010**

In 2010, goods exports supported 2.8 million jobs in the manufacturing sector.



Source: ITA calculations from BLS data.

At a more disaggregated level, the top 10 job-supporting goods exports accounted for 2.9 million, or 44 percent, of jobs supported by goods exports in 2010 (Table 3). The range of values of exports to support one job is quite large. Among the top 10, the number of jobs supported by \$1 billion of exports is smallest for basic chemicals (4,274 jobs per \$1 billion of exports) and largest for animal slaughtering and processing (10,309 jobs per \$1 billion of exports).

**Table 3. Top 10 Jobs Supporting Goods Exports, 2010**

In 2010, the top 10 goods exports accounted for 2.9 million (or 44 percent) of jobs supported by goods exports.

Exports ranked by jobs supported	Jobs supported	Jobs per \$1 billion exports
Aerospace products and parts	546,000	5,747
Crop production	478,000	9,009
Semiconductor and other electronic components	392,000	6,579
Motor vehicle parts	289,000	6,711
Basic chemicals	239,000	4,274
Other general-purpose machinery	226,000	6,993
Agriculture, construction, and mining machinery	216,000	7,299
Navigational, measuring, electromedical, and control instruments	187,000	6,757
Animal slaughtering and processing	183,000	10,309
Resin, synthetic rubber, and artificial synthetic fibers and filaments	166,000	4,695

Source: ITA calculations from BLS data.

The top 10 jobs supporting export sectors have changed little since 1993, although their relative rankings have changed (Table 4). Eight of the 10 industries were in the top 10 in 1993, 2000, and 2010. Only animal slaughtering and processing and resin, synthetic rubber, and artificial synthetic fibers and filaments were in the top 10 in 2010 but not in 1993 or 2000. They ranked 14th and 15th in 1993, and 12th and 13th in 2000, respectively. Computer and peripheral equipment manufacturing and motor vehicle manufacturing were in the top 10 in 1993 and 2000. In 2010, they dropped out of the top 10 industries, ranking 20th and 14th, respectively.

**Table 4. Top 10 Jobs Supporting Goods Exports, 1993, 2000, 2010**

Since 1993, the top 10 jobs supporting exports have remained relatively stable.

Export	2010		2000		1993	
	Rank	Jobs	Rank	Jobs	Rank	Jobs
Aerospace products and parts	1	546,000	2	501,000	2	483,000
Crop production	2	478,000	5	275,000	4	308,000
Semiconductor and other electronic components	3	392,000	1	676,000	1	585,000
Motor vehicle parts	4	289,000	3	407,000	3	367,000
Basic chemicals	5	239,000	9	198,000	7	201,000
Other general-purpose machinery	6	226,000	6	219,000	10	191,000
Agriculture, construction, and mining machinery	7	216,000	10	190,000	9	191,000
Navigational, measuring, electromedical, and control instruments	8	187,000	4	296,000	5	221,000
Animal slaughtering and processing	9	183,000	12	152,000	14	126,000
Resin, synthetic rubber, and artificial synthetic fibers and filaments	10	166,000	13	143,000	15	126,000

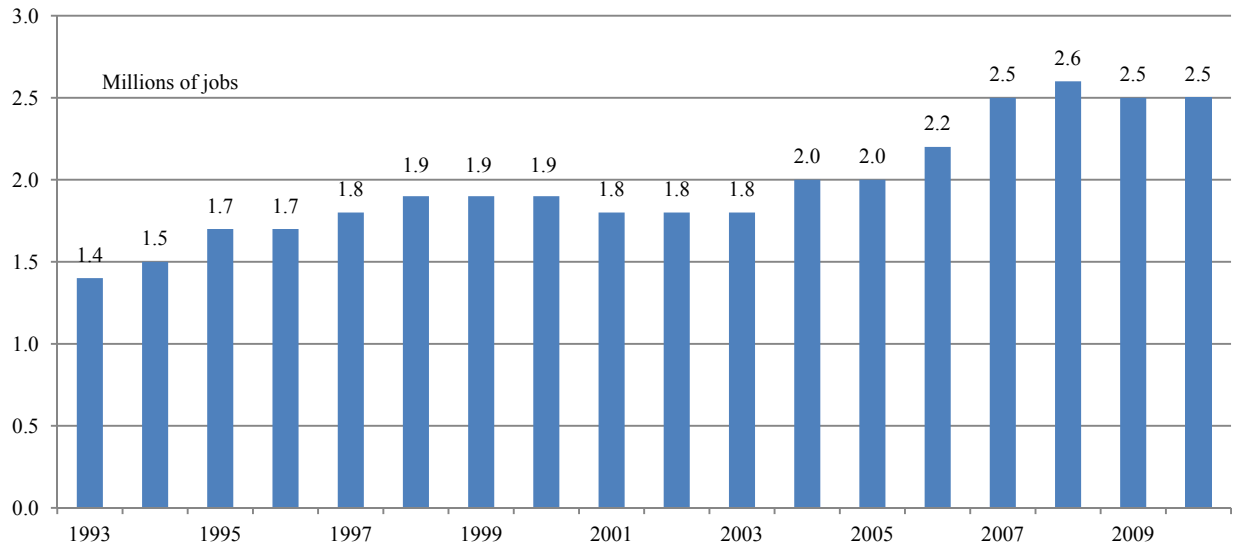
Source: ITA calculations from BLS data.

## 6. Industry Jobs Supported by Services Exports

In 2010, 2.5 million jobs were supported by services exports. Since 1993, jobs supported by services exports increased by 1 million jobs, or by 69 percent (Figure 11). At the same time, the number of jobs supported by \$1 billion of services exports decreased from 8,090 jobs in 1993 to 4,351 jobs in 2010 (Figure 12).

**Figure 11. Jobs Supported by Services Exports, 1993–2010**

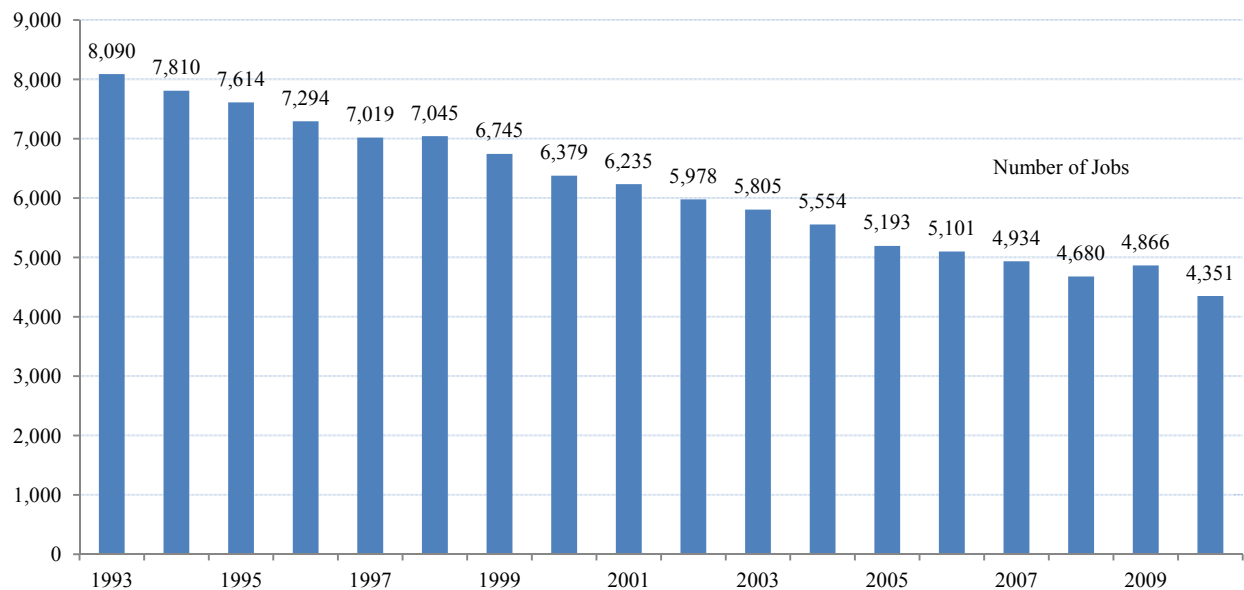
In 2010, 2.5 million jobs were supported by services exports.



Source: ITA calculations from BLS data.

**Figure 12. Jobs Supported by \$1 Billion of Services Exports, 1993–2010**

In 2010, every \$1 billion of services exports supports more than 4,300 jobs.



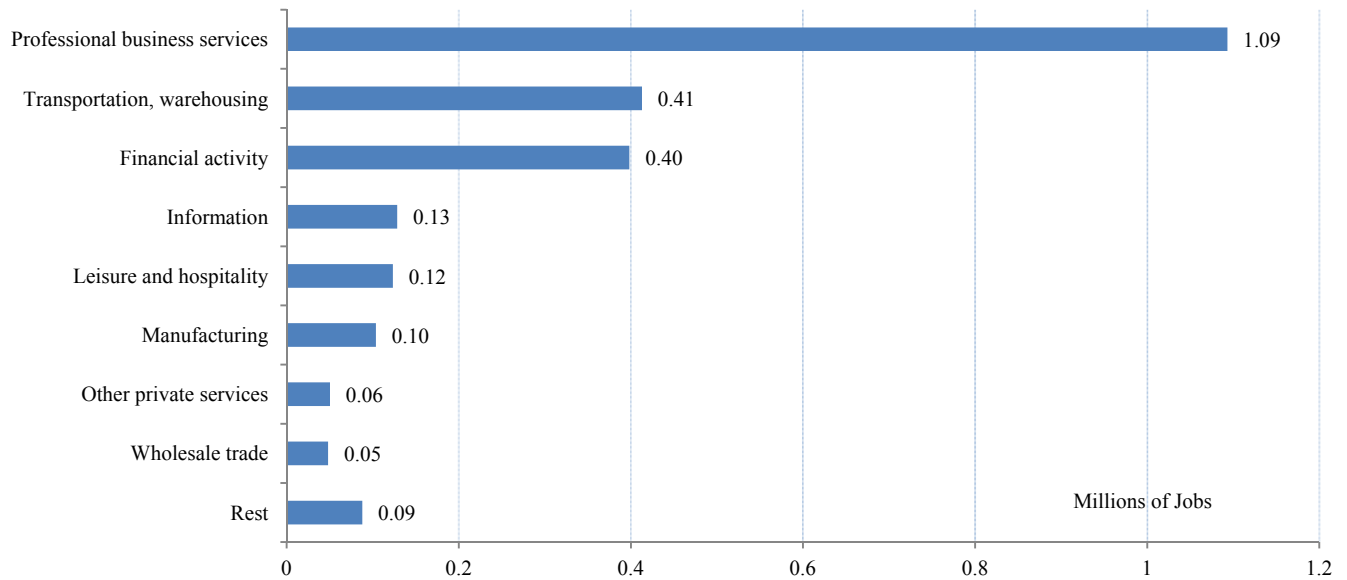
Source: ITA calculations from BLS data.

Jobs in the professional and business services sector account for 45 percent of all jobs supported by services exports (Figure 13). The top three service sectors account for 78 percent of all services export jobs. Furthermore, jobs in the top six sectors account for 92 percent of all jobs supported by services exports.

The industry breakdown of jobs supported by services exports is less precise than that for jobs supported by goods exports because the underlying trade data for goods is known at greater levels of detail and greater certainty than the underlying trade data for services.

**Figure 13. Jobs Supported by Services Exports by Industry, 2010**

In 2010, services exports supported 1 million jobs in the professional and business services sector.



Source: ITA calculations from BLS data.

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## Appendix A. Jobs Supported by Exports: Value Relationships

There are two commonly used ratios that relate exports to the jobs that they support. The first ratio, discussed in Section 2 of this brief, answers this question: How many jobs would be supported by \$1 billion of exports? The second ratio answers the following question: What value of exports is required to support one job? For convenience, the answers to these questions are reproduced in Table A1. Since 1993, the value of exports to support one job has increased 138 percent from \$83,000 to \$197,000. The two ratios are inverses: as the value of exports to support one job increases, the number of jobs supported by \$1 billion of exports decreases.

**Table A1. Jobs Supported by \$1 Billion of Exports and Value of Exports to Support One Job, 1993–2011**

Year	Jobs supported by \$1 billion of exports			Value of exports to support 1 job		
	Total	Goods	Services	Total	Goods	Services
1993	12,086	14,050	8,090	\$83,000	\$71,000	\$124,000
1994	11,622	13,361	7,810	\$86,000	\$75,000	\$128,000
1995	11,297	12,888	7,614	\$89,000	\$78,000	\$131,000
1996	10,835	12,396	7,294	\$92,000	\$81,000	\$137,000
1997	10,387	11,794	7,019	\$96,000	\$85,000	\$142,000
1998	10,200	11,574	7,045	\$98,000	\$86,000	\$142,000
1999	9,672	11,027	6,745	\$103,000	\$91,000	\$148,000
2000	9,144	10,386	6,379	\$109,000	\$96,000	\$157,000
2001	9,084	10,405	6,235	\$110,000	\$96,000	\$160,000
2002	8,477	9,725	5,978	\$118,000	\$103,000	\$167,000
2003	7,979	9,063	5,805	\$125,000	\$110,000	\$172,000
2004	7,278	8,172	5,554	\$137,000	\$122,000	\$180,000
2005	6,820	7,655	5,193	\$147,000	\$131,000	\$193,000
2006	6,487	7,183	5,101	\$154,000	\$139,000	\$196,000
2007	6,146	6,771	4,934	\$163,000	\$148,000	\$203,000
2008	5,840	6,446	4,680	\$171,000	\$155,000	\$214,000
2009	5,998	6,667	4,866	\$167,000	\$150,000	\$205,000
2010	5,500	6,115	4,351	\$182,000	\$164,000	\$230,000
2011	5,080	NA	NA	\$197,000	NA	NA

Source: ITA calculations from BLS data.

Note: Totals may not add up because of rounding. Values are different from the analogous values computed from Table 1 owing to rounding of values in Table 1. NA = not available.

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## **Appendix B. Jobs Supported by Exports: Original versus Revised**

The Bureau of Labor Statistics (BLS) recently released updated input–output data for 1993–2008 and new input–output data for 2009 and 2010. BLS used the 1997 and 2002 revised benchmarks, as well as the Bureau of Economic Analysis (BEA) annual input–output tables for 1993–2009, to construct revised input–output data for 1993–2009. BLS compiled data from other sources to develop estimates for 2010. The new data allow for revised historical calculations of jobs supported by exports for 1993–2008 and for historical estimates of 2009 and 2010.

Until 2004, the old and revised estimates of jobs supported by goods exports and by services exports are very similar (Table B1). For many of the years, the estimates—rounded to one decimal place in millions—are the same. After 2004, the estimates diverge, reflecting the use of both new data from the 2002 Economic Census, which were not available previously, and BEA’s yearly input–output data to anchor the more disaggregated input–output tables in non–Economic Census years.

The discrepancy in percentage terms between old and revised values is largest for jobs supported by services exports. In non–Economic Census years, BEA obtains services exports through surveys. As a consequence, BLS had to decide how to apply the survey services export data in its disaggregated data. In the original data, BLS assumed that manufacturing’s share of services exports was the same in every year. In the revised data, BLS assumed that each manufacturing sector’s services exports were proportional to its goods exports. Because the manufacturing sector’s share of services exports is small (compared to the services sector share of services exports and to the manufacturing sector’s share of goods exports), the total effect is small in magnitude but large in percentage terms.

**Table B1. Jobs Supported by Exports: Original and Revised, 1993–2010**

Year	Jobs supported (millions): original			Jobs supported (millions): revised		
	Total	Goods	Services	Total	Goods	Services
1993	7.4	6.0	1.4	7.6	6.1	1.4
1994	7.8	6.3	1.5	7.9	6.4	1.5
1995	8.6	6.9	1.7	8.6	6.9	1.7
1996	8.8	7.0	1.7	8.8	7.1	1.7
1997	9.2	7.4	1.8	9.2	7.4	1.8
1998	9.0	7.1	1.9	9.0	7.2	1.9
1999	8.8	6.9	1.9	8.8	6.9	1.9
2000	9.2	7.2	2.0	9.1	7.2	1.9
2001	8.5	6.6	1.9	8.5	6.6	1.8
2002	7.8	5.9	1.9	7.7	5.9	1.8
2003	7.6	5.7	1.9	7.5	5.7	1.8
2004	8.0	5.9	2.1	7.7	5.7	2.0
2005	8.3	6.1	2.2	8.0	5.9	2.0
2006	9.0	6.6	2.4	8.6	6.4	2.2
2007	9.5	6.9	2.6	9.3	6.8	2.5
2008	10.3	7.5	2.8	9.8	7.1	2.6
2009	NA	NA	NA	8.5	6.0	2.5
2010	NA	NA	NA	9.1	6.6	2.5

Source: ITA calculations from BLS data and Tschetter (2010).

Note: Totals may not add up because of rounding. NA = not available.

## Appendix C. Revised Projection Estimation

The ratio of value of exports to support one job is used to project the number of jobs supported by exports for those years when input–output data are not available to perform a historical calculation (2011 in this case). Revisions presented here required that the formula to project the percentage growth in the value of exports to support one job be revised. The revised equation performs slightly better than original (Johnson 2011) in predicting the estimated percentage change in the value of exports to support one job (i.e., a slightly higher *R*-square value). Coefficient estimates also changed, but they are significant and of the expected sign.

**Table C1. Revised Estimation Results**

	<b>Coefficient</b>	<b>Standard error</b>	<b><i>t</i>-stat</b>	<b><i>P</i>-value</b>
Intercept	−0.004	0.0063	−0.65	0.526
Year-to-year change in export price	1.269	0.1604	7.91	0.000
Year-to-year change in business labor productivity	1.178	0.2033	5.57	0.000

Source: IAN calculations and BEA and BLS data for 1993–2010.

Note:  $R^2 = 0.864$ .

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