OXFORD ECONOMICS

ASSESSING HOW FOREIGN STATE-OWNED ENTERPRISES' U.S.-BASED OPERATIONS DISRUPT U.S. JOBS

Measuring the Effects of Supply-Chain Loss Due to Expansion of Foreign State-Owned Enterprises in the U.S.

JUNE 2019

CONTENTS

Cover image courtesy of Josephamaker2018

EXECUTIVE SUMMARY

Independent research conducted by Oxford Economics assesses the net economic impact of Chinese State-Owned Enterprises (SOEs) in U.S. passenger railcar manufacturing. Because Chinese SOE railcar production relies more on imported parts and subsystems in its supply chain, compared to legacy producers operating in the U.S., we estimate that **for each U.S. job created by a Chinese SOE, the U.S. loses between 3.5 to 5.4 jobs** when factoring in the direct, indirect, and induced economic impact. The following analysis provides a more thorough explanation of this dynamic.

U.S. passenger railcar manufacturing is currently experiencing unprecedented competition from the Chinese state-owned railcar manufacturer, CRRC. This SOE recently won four contracts to supply passenger railcars in Boston, Philadelphia, Chicago, and Los Angeles; altogether totaling approximately $2.7 billion. The winning bids on these four contracts were between 7% and 21% lower than the next lowest bidder, raising concerns of anti-competitive pricing behavior. In part, this is because SOEs are not like traditional commercial enterprises. SOEs enjoy a variety of implicit and explicit government subsidies, do not face the same hard budget constraints that private firms do, and are responsive to various non-commercial policy objectives of their home governments.

As a result of these factors, U.S.-based passenger railcar production by Chinese SOEs is widely perceived by industry experts to differ from that of legacy U.S.-based producers, which are privately held companies. Chinese SOEs are thought to do less value-add production in the U.S., and to rely more on imported railcar parts and subsystems. This behavior echoes similar strategies undertaken in other countries, such as Australia.[1] The ramifications of this change in production behavior include lost jobs, GDP, and labor income in the U.S.—effectively shifting this value abroad. **Under a worst-case scenario, we estimate the economic cost of this shift to be a net loss of more than 5,000 U.S. jobs for every $1 billion in contracts won by Chinese SOEs.**

Oxford Economics studied the effects of Chinese SOE penetration of the U.S. passenger railcar market. Two specific scenarios are modeled: good faith adherence to Buy America provisions, and a "high impact" scenario where Buy America provisions are assumed not to apply. This was then compared to a baseline scenario of existing, well-integrated

1 Oxford Economics. *Will We Derail U.S. Freight Rolling Stock Production?* May 2017.

1 new Chinese SOE job in U.S. costs between 3.5 and 5.4 U.S. jobs elsewhere

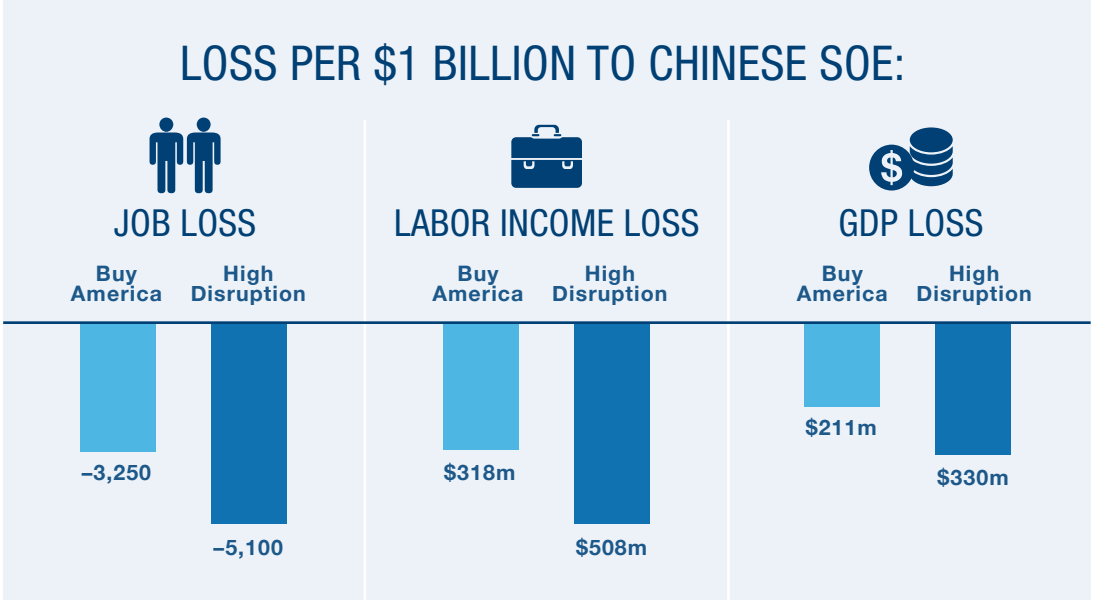
Reflects High Disruption scenario, wherein 1 new railcar SOE final assembly job created in the U.S. results in significant offshoring, causing a net loss of 5.4 jobs in the U.S.

Put another way, for every $1 billion of domestic passenger railcar contracts won by foreign SOEs, the U.S. economy could displace between 3,250 to 5,000 U.S. jobs and $320 million to $500 million in U.S. GDP.

current railcar manufacturers (Legacy Producers).[2] Three types of economic impacts are included in the estimates: direct (impacts by the railcar manufacturer itself), indirect (supply chain impacts), and induced (impact supported by spending out of wages of workers employed directly or indirectly).

Each scenario assumes a hypothetical $1 billion in passenger railcar output. Impacts from smaller or larger projects would scale linearly. Our analysis found that:

- Under the **Legacy Producers** scenario, this production has an impact of approximately 11,600 jobs, $1.2 billion in GDP, and $275 million in taxes generated (federal, state, and local).
- Under the **Chinese SOE Buy America** scenario, this production has an impact of approximately 8,300 jobs, $880 million in GDP, and $205 million in taxes generated. Thus, relative to the Legacy Producers scenario, job impacts are 28 percent lower, and GDP impacts 26 percent lower.
- Under the **Chinese SOE High Disruption** scenario, this production has an impact of approximately 6,500 jobs, $690 million in GDP, and $162 million in taxes generated. Thus, relative to the Legacy Producers scenario, job impacts are 44 percent lower, and GDP impacts 42 percent lower.



2 **Legacy Producers scenario.** This is based on economic data for the railroad rolling stock manufacturing industry, adjusted to better reflect passenger railcar manufacturing by privately held companies. Although legacy producers are foreign owned, they typically localize production and sourcing of materials and subsystems.

Chinese SOE Buy America scenario. This is a lower-displacement Chinese SOE scenario with a 70 percent "Buy America" domestic content restriction on parts and subsystems.

Chinese SOE High Disruption scenario. This model assumes no domestic content requirement and quantifies.

The assumptions underlying all three scenarios are carefully laid out in section 2.3.

1. INTRODUCTION

This report focuses on passenger rolling stock manufacturing in the U.S., and the recent entry of foreign state-owned enterprises (SOEs) into the industry. In particular, we consider impacts on the U.S. economy from the entry of Chinese state-owned railcar manufacturers into the U.S. passenger railcar market.

7 to 21 Percent

Amount CRRC undercut next lowest bidder

Suggests anti-competitive pricing behavior, demonstrated in other countries.

Likely because the U.S. is not a large purchaser of passenger railcars on the global stage, most passenger railcar manufacturing in the U.S. (unlike other segments of the U.S. railroad rolling stock industry) is already undertaken by foreign-owned enterprises operating with extensive supply chains and investments in the U.S.[3] However, the entry of foreign SOEs present new challenges and concerns for U.S. policymakers. Unlike other firms, SOEs often receive implicit or explicit subsidies from their home governments, which allow them to engage in long-run strategic pricing behavior with anti-competitive effects.[4] Additionally, SOEs are responsive to non-commercial policy objectives of their home governments.[5]

Essentially all passenger rolling stock in the U.S. is purchased by governmental or quasi-governmental local transportation authorities through competitive bidding processes. As shown in 0, Chinese state-owned railcar producer, CRRC, has won several high-profile passenger railcar projects for some of the largest public transportation providers in the U.S., substantially undercutting the second-place leading bidders by 7-21 percent. As a condition of these projects to date, final assembly of the train cars has or will be done in the U.S., much of it at the company's existing facility in Springfield, MA.[6]

Either because of the characteristics of SOEs described above, or because of other factors specific to the Chinese railcar manufacturing industry (e.g., an overhang of excess capacity), it is widely perceived by U.S.-based manufacturers that Chinese SOE railcar production in the U.S. is qualitatively different from that of the other, privately held railcar manufacturers—hereinafter referred to as "legacy producers." Specifically, within the limits prescribed by bidding requirements, Chinese SOE railcar production is thought

3 Some of the largest firms include Bombardier (Canada), Hyundai Rotem (South Korea), Siemens (Germany), Alstom (France), and Kawasaki (Japan).

4 See, for example: OECD (2016), "State-Owned Enterprises as Global Competitors: A Challenge or an Opportunity?", OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264262096-en. This report discusses preferential financing obtained by SOEs and "special advantages granted by governments in return for public policy obligations at home," as well as the obstacles that foreign non-SOEs face in competing with an SOE in the latter's home market.

5 CRRC's articles of incorporation acknowledge the company's non-commercial pollical obligations. (See, for example, article 161.) http://www.crrcgc.cc/Portals/73/Uploads/Files/2018/6-4/636637164457871915.pdf.

6 The winning bid for the CTA contract was submitted by China South Locomotive & Rolling Stock Corp. (CSR), a predecessor to CRRC. As part of this bid, CSR agreed to open a Chicago assembly plant that would directly employ about 170 people.

to rely less on U.S.-based value-added production, and more heavily on imported pre-fabricated train parts and subsystems.

FIG. 1: Summary of CRRC winning bids for passenger railcar projects

Buyer	Winning bid ($ m)	Second place bid ($ m)	Difference (% of 2nd place bid)	Number of cars ordered	Buy America requirement
MBTA (Boston)	$567	$721	21%	284	No
SEPTA (Philadelphia)	$138	$172	20%	45	Yes
CTA (Chicago)	$1,309	$1,536	15%	846	No
LA Metro (Los Angeles)	$637	$683	7%	282	No*
Total	**$2,651**	**$3,112**	**15%**	**1,457**	

Source: News reports and industry interviews, collated by Oxford Economics

* The LA Metro did not require Buy America provisions, however CRRC stated that it has met the Buy America standards with 60 percent of components to be made in the U.S.

In this report, based on available public materials and interviews with industry experts from major U.S.-based passenger and other railcar manufacturers, Oxford Economics modeled the full economic impacts of Chinese SOE passenger railcar manufacturing in the U.S., as compared with legacy U.S.-based passenger railcar manufacturers. This analysis quantifies the net economic impact, in jobs, GDP, labor income, and taxes, of Chinese SOE passenger railcar manufacturing in the U.S. Section 2 presents the assumptions underlying this modeling work. Section 3 presents the results of this modeling. Section 4 summarizes of our findings and offers concluding statements.

2. MODEL AND ASSUMPTIONS

In this section, we lay out the assumptions behind three economic models of passenger railcar production—Legacy Producers, Chinese SOE Buy America, and Chinese SOE High Disruption.

The basic structure of the input-output model used in this work, which traces the supply chain linkages of various industries through the U.S. economy, is described below. In Section 2.2, we present a brief discussion of the Buy America Act and its impact on our modeling. In Section 2.3, we present the assumptions for the three scenarios

2.1 MODEL STRUCTURE

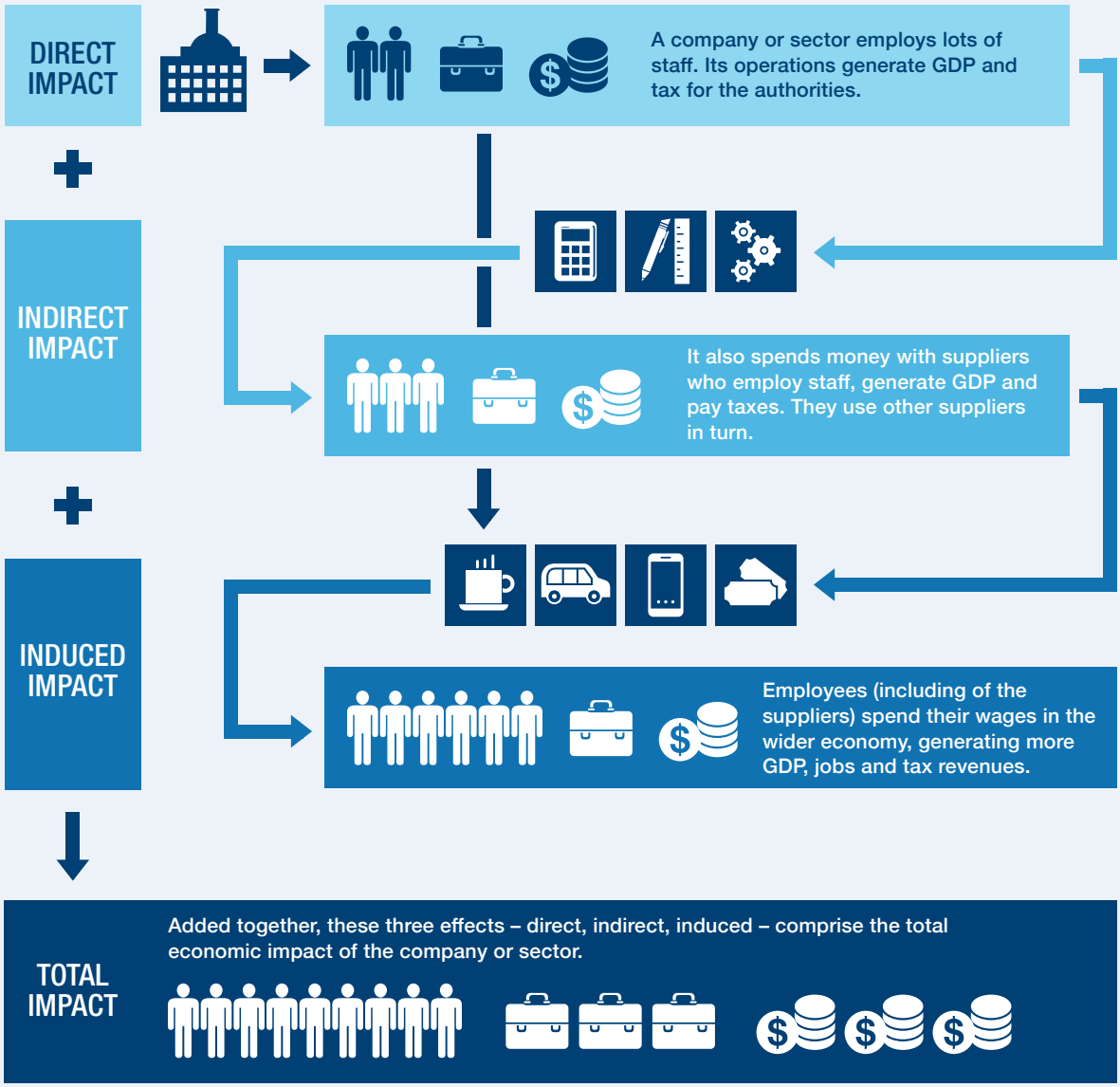
This analysis uses IMPLAN economic impact software. IMPLAN is widely used and recognized by government organizations, nonprofits, economic development organizations, workforce planners, education institutions, and consultants across the U.S. and Canada.

The model is designed to capture the inter-industry relationships, consumer spending, and ripple effects that result from the direct economic activity generated by passenger railcar manufacturers. The impacts are measured across three channels:

1. **Direct Impact:** direct employment and spending by the industry's business operations
2. **Indirect Impact:** supply-chain effects, stemming from industry's operations (e.g. legal services, utilities, etc.)
3. **Induced Impact:** describes impact resulting from employees spending their incomes in the U.S. economy

Fig. 2, on the following page, characterizes the impact model structure.

FIG. 2: The channels of economic impact



2.2 BUY AMERICA ACT

70% U.S. Content

Required under Buy America requirements starting in FY2020. Current U.S. content provision is 65%

Provisions only apply to railcar contracts that draw upon Federal dollars.

In some cases (generally when federal funds are involved),[7] local transportation authorities looking to purchase new passenger rolling stock are required to comply with domestic content provisions under the Buy America Act.[8] Historically, in addition to requiring final assembly to take place in the U.S., the Buy America Act has required at least 60 percent of the value of parts to be domestically sourced. For FY2018 and FY2019, this threshold has been raised to 65 percent, and to 70 percent from FY2020 onward. Because U.S. taxpayers are the source of funds for railcar purchases, the provisions are designed to ensure that the value generated from railcar manufacturing accrues to Americans.

The precise details of the accounting behind Buy America Act domestic content provisions are complex and well beyond the scope of this report. However, it is worth noting that a variety of accounting practices (e.g., the manipulation of transfer prices) can be used to meet Buy America Act requirements while importing a larger share of real economic value than the Act intends.

With this understanding, our economic impact modeling below for the Chinese SOE Buy America scenario takes the 70 percent domestic content provision literally and assigns domestic shares to Chinese production that allows it to meet this threshold.

2.3 OUR ASSUMPTIONS

The underlying basis for our assumptions about U.S. and Chinese passenger railcar manufacturing supply chains is the Input-Output data on the railroad rolling stock industry collected by the Bureau of Economic Analysis (BEA), as aggregated by IMPLAN for 2016.[9] The production process for any industry is a profile breaking the total value of the final output of that industry into spend on intermediate goods and services, and industry value-add (the last of which can be broken down into employee compensation, capital income, and directly paid taxes). To reflect the key categories of inputs used in railcar manufacturing, we have categorized the intermediate goods into four categories (metallic parts, non-metallic parts, motors and electrical equipment, trade and transport margins on parts; the last of which is a service but is capitalized into the cost of goods), and the intermediate services into two categories (utilities and business services). Each

7 For context, three of these four contracts presented in Fig. 1 above are entirely funded by state and local governments, meaning that Buy America provisions requiring a significant percentage of parts to be of U.S. origin do not apply. However, other municipality-mandated provisions may be stipulated.

8 See Congressional Research Service (September 12, 2016). “Domestic Content Restrictions: The Buy America Act and Complementary Provisions of Federal Law.”

9 The U.S. railroad rolling stock industry (NAICS code 336510) is a roughly $20 billion industry (in annual output) directly employing approximately 21,000 workers in the U.S. It consists of the following activities: railcar manufacturing, which includes passenger, freight, and locomotive; railcar parts and subsystem manufacturing (for downstream use in the industry); and railcar rebuilds.

of these inputs is also associated with a domestic content share, which is the share of the spend in that category spent on parts sourced in the U.S.[10]

Fig. 3 and Fig. 4 present the assumptions used for the core economic modeling in this report. Fig. 3 presents the production process associated with different types of manufacturing; that is, each row represents the share of final output accounted for by production inputs of a particular type. Fig. 4 presents the domestic content share of each of the intermediate parts and services used.

The columns labeled (1) in Fig. 3 and Fig. 4 present the raw economic data for the railroad rolling stock industry as a whole. From this, we make slight adjustments in columns (2) to better reflect the legacy passenger railcar manufacturing subindustry, increasing the share of non-metallic components for components such as signage and seating. In columns (3) and (4), we present assumptions for two scenarios for Chinese railcar manufacturing. In both, we decrease the share of domestic value-add and increase the share of differentiated railcar parts and subsystems to reflect less

FIG. 3: Production assumptions, shares of intermediate goods and services and value-add as a share of final output

Category	Production inputs	Railroad rolling stock 2016 industry data (1)	Passenger car manufacturing assumptions		
			U.S. legacy producers (2)	Chinese SOE Buy America scenario (3)	Chinese SOE High Disruption scenario (4)
INTERMEDIATE PARTS	Metallic parts	28%	26%	20%	20%
	Non-metallic parts	5%	7%	5%	5%
	Motors and electrical equipment	7%	6%	5%	5%
	Differentiated train parts (rolling stock)	17%	17%	30%	30%
	Trade & transport margins on parts	9%	9%	9%	9%
INTERMEDIATE SERVICES	Utilities	1%	1%	1%	1%
	Business services	19%	19%	19%	19%
VALUE-ADD	Employee compensation	11%	11%	8%	8%
	Capital income	3%	3%	2%	2%
	Directly paid taxes	1%	1%	1%	1%

Source: Industry data from IMPLAN, based on BEA data; assumption by Oxford Economics

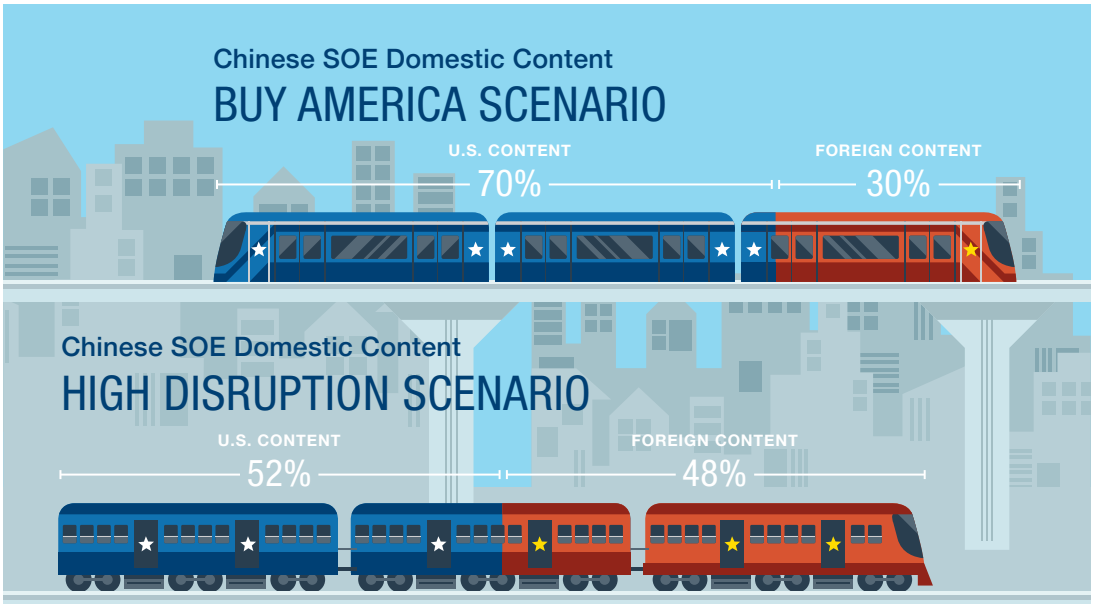
10 It's worth noting that, while these domestic shares ("regional purchase coefficients" in IMPLAN terminology) are being used as a proxy for Buy America requirements here, they are not synonymous. In particular, Buy America places additional restrictions on the domestic content of U.S.-assembled parts. It's also worth noting that the domestic shares of the railroad rolling stock industry (column 1) presented in Fig. 4 on p. 11 are based on cross-industry economic data specific to the parts categories, and are not specific to the railroad rolling parts industry except in the shares of different detailed parts categories it uses.

real value-added manufacturing work occurring in the U.S. relative to legacy non-SOE manufacturers. Additionally, to reflect a greater share of imports, we decrease the domestic share of parts. In column (3), under the Chinese SOE Buy America scenario, we approximate binding requirements of the Buy America Act (see Section 2.2 above), requiring the domestic share of intermediate parts and subsystems to be at least 70 percent. In column (4), under the Chinese SOE High Disruption scenario, we assume the Buy America Act is not binding (perhaps because a particular project does not fall under its scope) and increase the SOE's import shares significantly. The image below further illustrates the origin of content for railcars under the Buy America scenario and the High Disruption Scenario.

FIG. 4: Domestic content assumptions

Category	Production inputs	Railroad rolling stock 2016 industry data (1)	Passenger car manufacturing assumptions		
			U.S. legacy producers (2)	Chinese SOE Buy America scenario (3)	Chinese SOE High Disruption scenario (4)
INTERMEDIATE PARTS	Metallic parts	77%	77%	67%	50%
	Non-metallic parts	70%	70%	67%	50%
	Motors and electrical equipment	56%	56%	56%	50%
	Differentiated train parts (rolling stock)	95%	95%	67%	30%
	Trade & transport margins on parts	98%	98%	98%	98%
	Overall parts	**82%**	**82%**	**70%**	**48%**
INTERMEDIATE SERVICES	Utilities	99%	99%	99%	99%
	Business services	97%	97%	25%	25%

Source: Industry data from IMPLAN, based on BEA data; assumption by Oxford Economics



3. IMPLICATIONS FOR PUBLIC TRANSIT AND PASSENGER RAILCAR MANUFACTURING

Because the impact results presented here are general purpose, and not specific to a particular project, all results are scaled to $1 billion in final output of passenger railcars. That is, the impacts reflect the full annual[11] economic impacts of $1 billion of passenger railcar output by one of the three types (scenarios) of producers—legacy U.S.-based producers, Chinese SOEs operating under binding Buy America 70 percent domestic content provisions, or Chinese SOEs operating without such provisions ("High Impact"). If a particular project, or set of projects, were larger or smaller than this $1 billion assumption, the total impacts could then be scaled linearly (e.g., impacts for a $3 billion project would be three times as large).

44%
fewer jobs

Reflects high disruption scenario, relative to private sector, Legacy Producers

Also results in a 42% reduction in GDP compared to the value generated by Legacy Producers.

Fig. 5 presents the impacts—direct, indirect, induced, and total[12]—of the three scenarios described above, as measured in employment, GDP, labor income, and taxes generated (federal, state, and local) for $1 billion of hypothetical output. 0 presents the differences (losses) in economic impacts in each category under the two Chinese SOE scenarios relative to the Legacy Producers scenario.

3.1 LEGACY PRODUCERS

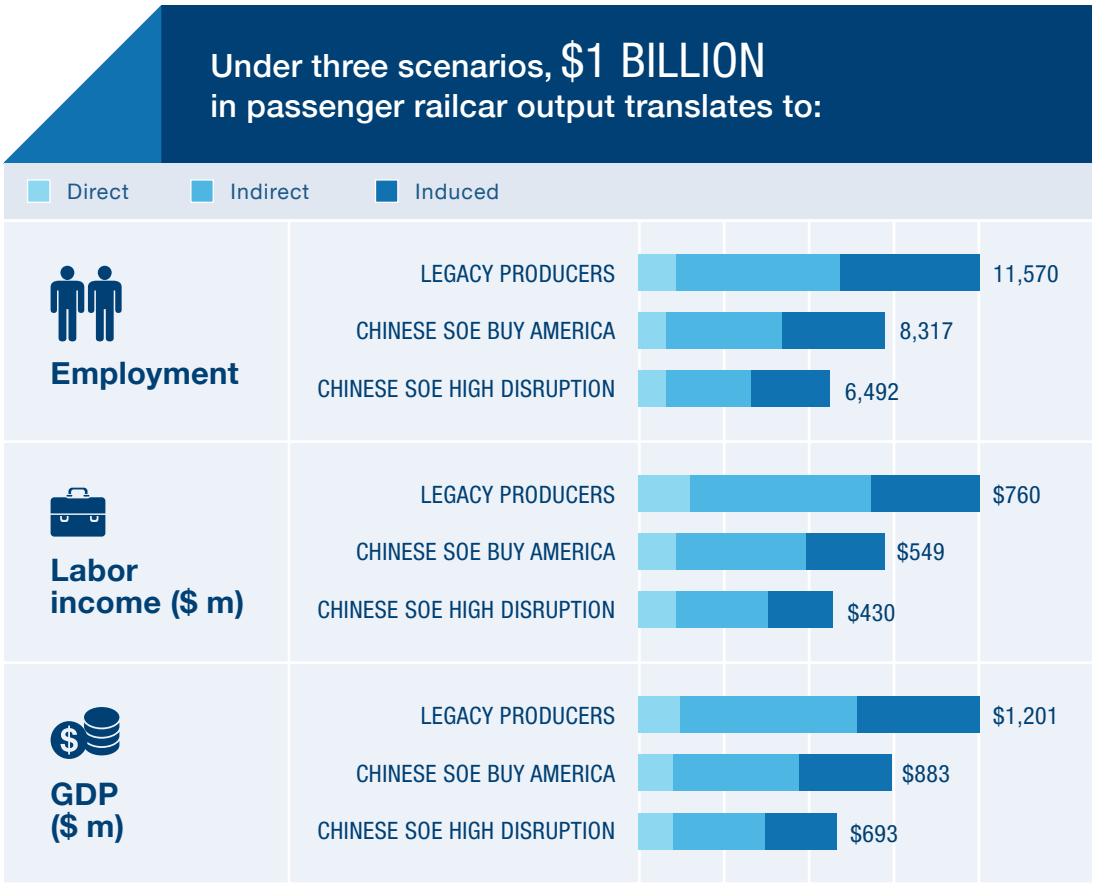
As shown in Fig. 5, the total economic impact of $1 billion of railcar production completed by private sector, non-SOE businesses under the Legacy Producers scenario is $1.2 billion of GDP, 11,570 jobs paying a total of $760 million in labor income, and $275 million in federal, state, and local tax impacts.

11 I.e., each job reflects one person-year of employment. If $1 billion of output were produced in 6 months instead of a year, the raw number of jobs would double but would only last half as long. Note that employment impacts are measured by headcount jobs, not full-time equivalents.

12 See Section 2.1 for a description of these terms.

FIG. 5: Economic impacts of a hypothetical $1 billion of passenger railcar production under three scenarios

Scenario	Impact type	Direct	Indirect	Induced	Total
LEGACY PRODUCERS	Employment	1,301	5,514	4,756	**11,570**
	GDP ($ m)	$147	$618	$436	**$1,201**
	Labor income ($ m)	$111	$404	$245	**$760**
	Taxes ($ m)	$34	$140	$101	**$275**
CHINESE SOE BUY AMERICA	Employment	938	3,943	3,436	**8,317**
	GDP ($ m)	$116	$452	$315	**$883**
	Labor income ($ m)	$80	$292	$177	**$549**
	Taxes ($ m)	$27	$105	$73	**$205**
CHINESE SOE HIGH DISRUPTION	Employment	938	2,866	2,688	**6,492**
	GDP ($ m)	$116	$331	$246	**$693**
	Labor income ($ m)	$80	$211	$139	**$430**
	Taxes ($ m)	$27	$78	$57	**$162**



Source: Oxford Economics calculations using IMPLAN software

3.2 CHINA BUY AMERICA

As shown in Fig. 5, the total economic impact of $1 billion under the China Buy America scenario is $883 million of GDP, 8,317 jobs paying a total of $549 million in labor income, and $205 million in federal, state, and local tax impacts. This represents approximately 28 percent less employment impact relative to the legacy producers, and approximately 26 percent less GDP impact (see Fig. 6).

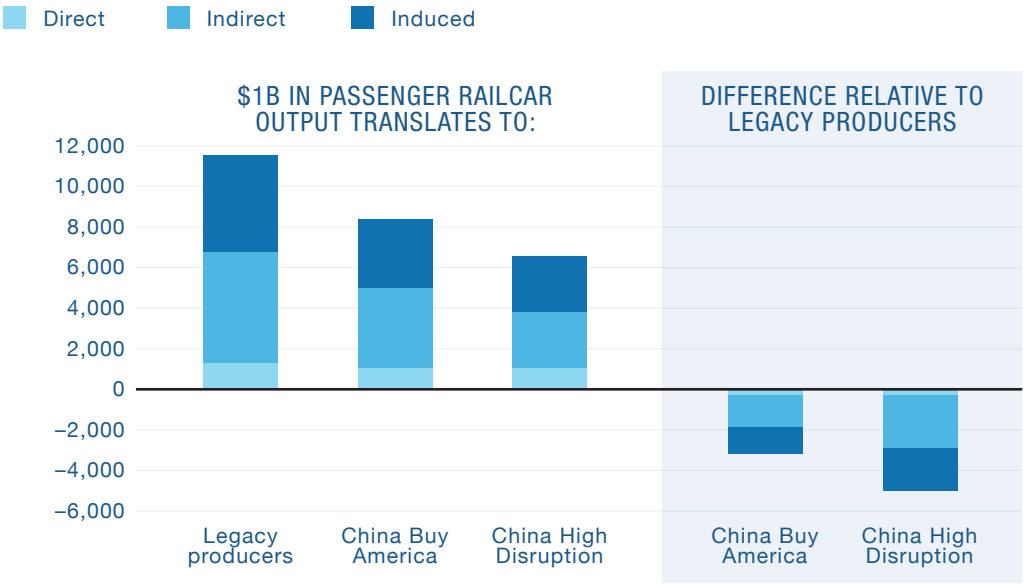
Relative to the Legacy Producers total employment impacts of 11,570, **total employment impacts under this scenario are 3,253 fewer jobs** for every $1 billion of production output lost to an SOE. Thus, for every one of the 938 direct jobs created under this scenario, we estimate approximately 3.5 fewer U.S. jobs on net.

FIG. 6: Impact differences relative to impacts under Legacy Producers scenario

Scenario	Impact type	Direct	Indirect	Induced	Total
CHINA BUY AMERICA	Employment	-28%	-28%	-28%	**-28%**
	GDP	-21%	-27%	-28%	**-26%**
	Labor income	-28%	-28%	-28%	**-28%**
	Taxes	-21%	-25%	-28%	**-26%**
CHINA HIGH DISRUPTION	Employment	-28%	-48%	-43%	**-44%**
	GDP	-21%	-46%	-43%	**-42%**
	Federal tax	-28%	-48%	-43%	**-43%**
	State/local tax	-21%	-45%	-43%	**-41%**

Source: Oxford Economics calculations using IMPLAN software

FIG. 7: Net Job Loss from $1 Billion in Chinese SOE Disruption



1 new job cost 5.4 U.S. jobs

Reflects high disruption scenario, wherein 1 new job by Chinese SOE results in significant offshoring, causing a net loss of 5.4 jobs in the U.S.

Fig. 7 illustrates the net loss of jobs associated with each of the two China impact scenarios relative to the Legacy Producers scenario. While the Buy America scenario preserves more U.S. jobs, modeling results still show a net loss of 28%. The High Disruption scenario results in still more net loss of U.S. jobs (44), as more of the U.S. supply chain is moved overseas.

3.3 CHINA HIGH DISRUPTION

As shown in Fig. 5, the total economic impact of $1 billion of impact under the China High Disruption scenario is $693 million of GDP, 6,492 jobs paying a total of $430 million in labor income, and $162 million in federal, state, and local tax impacts. This represents approximately 44 percent lower employment impacts relative to the Legacy Producers scenario and approximately 42 percent lower GDP impact (see Fig. 6).

Relative to the total employment impacts under the Legacy Producers scenario, total employment impacts under this scenario are lower by 5,078 jobs. Thus, for every one of the 938 direct jobs created under this scenario, we estimate approximately 5.4 fewer U.S. jobs on net.

4. CONCLUSION

Chinese state-owned railcar manufacturer, CRRC, has recently won several major bids for passenger railcar manufacturing in the U.S., significantly undercutting its competition. This is potentially concerning to U.S. policymakers for several reasons:

- **SOEs do not face the same budget constraints as other manufacturers and thus have a greater ability to engage in anti-competitive strategic pricing behavior.**
- **SOEs are responsive to non-commercial objectives of their home governments.**
- Notwithstanding Buy America Act provisions (see Section 2.2) in many passenger railcar contracts, industry experts widely perceive **Chinese SOE passenger railcar production to perform less value-add manufacturing in the U.S.**, relying instead on imported semi-finished railcar parts, resulting in less economic activity in the U.S.
- Losses in the domestic U.S. passenger railcar manufacturing industry will **affect other U.S. industries** that rely on some of the same supplier industries.

Based on a hypothetical output of $1 billion of passenger railcars, **we modeled the full economic impact (direct, indirect, and induced—see Section 2.1) of three types of passenger railcar production**: production by legacy (non-SOE) U.S. manufacturers, production by Chinese SOEs under a binding Buy America 70 percent domestic-content threshold, and production by Chinese SOEs without a domestic-content requirement. Assumptions for this modeling are clearly laid out in Section 2.3; full results are presented in Section 3.

We find that total (i.e., direct plus indirect plus induced) **job impacts under the China SOE scenario with a binding 70 percent domestic content threshold modeled on the Buy America Act are 28 percent lower than those in the Legacy Producers scenario, and GDP impacts are 26 percent lower.** Under the China High Disruption scenario with no binding domestic content requirement, job impacts are 44 percent lower than those in the Legacy Producers Scenario, and GDP impacts 42 percent lower.

Relative to the Legacy Producers, for each direct (i.e., directly employed by the SOE itself) U.S. job created under the Buy America scenario, we estimate approximately 3.5 fewer total (direct plus indirect plus induced) U.S. jobs on net. Relative to the Legacy Producers, for each direct U.S. job created under the China High Disruption scenario, we estimate approximately 5.4 fewer total U.S. jobs on net.

OXFORD ECONOMICS

Oxford Economics was founded in 1981 as a commercial venture with Oxford University's business college to provide economic forecasting and modeling to UK companies and financial institutions expanding abroad. Since then, we have become one of the world's foremost independent global advisory firms, providing reports, forecasts, and analytical tools on more than 200 countries, 250 industrial sectors, and 7,000 cities and regions. Our best-of-class global economic and industry models and analytical tools give us an unparalleled ability to forecast external market trends and assess their economic, social and business impact.

Headquartered in Oxford, England, with regional centers in London, New York, and Singapore, Oxford Economics has offices across the globe in Belfast, Boston, Cape Town, Chicago, Dubai, Frankfurt, Hong Kong, Houston, Johannesburg, Los Angeles, Melbourne, Mexico City, Milan, Paris, Philadelphia, Sydney, Tokyo, and Toronto. We employ 400 full-time staff, including more than 250 professional economists, industry experts, and business editors—one of the largest teams of macroeconomists and thought leadership specialists. Our global team is highly skilled in a full range of research techniques and thought leadership capabilities, from econometric modeling, scenario framing, and economic impact analysis to market surveys, case studies, expert panels, and web analytics.

Oxford Economics is a key adviser to corporate, financial and government decision-makers and thought leaders. Our worldwide client base now comprises over 1,500 international organizations, including leading multinational companies and financial institutions; key government bodies and trade associations; and top universities, consultancies, and think tanks.

June 2019

The modeling and results presented here are based on information provided by third parties, upon which Oxford Economics has relied in producing its report and forecasts in good faith. Any subsequent revision or update of those data will affect the assessments and projections shown.

To discuss the report further, please contact:

Erik Olson
Vice President, Rail Security Alliance

1341 G Street, N.W. – Sixth Floor
Washington, DC 20005
Tel: +1 202.466.8700
Email: eolson@vennstrategies.com

OXFORD
ECONOMICS

Global headquarters
Oxford Economics Ltd
Abbey House
121 St Aldates
Oxford, OX1 1HB
UK
Tel: +44 (0)1865 268900

London
Broadwall House
21 Broadwall
London, SE1 9PL
UK
Tel: +44 (0)203 910 8000

New York
5 Hanover Square, 8th Floor
New York, NY 10004
USA
Tel: +1 (646) 786 1879

Singapore
6 Battery Road
#38-05
Singapore 049909
Tel: +65 6850 0110

Europe, Middle East and Africa

Oxford
London
Belfast
Frankfurt
Paris
Milan
Cape Town
Johannesburg
Dubai

Americas

New York
Philadelphia
Mexico City
Boston
Chicago
Los Angeles
Toronto
Houston

Asia Pacific

Singapore
Sydney
Melbourne
Hong Kong
Tokyo

Email:
mailbox@oxfordeconomics.com

Website:
www.oxfordeconomics.com