



THE ECONOMIC IMPACT OF ZIM SHIPPING'S OPERATIONS IN THE COMMONWEALTH OF VIRGINIA

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Abstract

ZIM Integrated Shipping Services Ltd. (ZIM Shipping) is a container shipment carrier that operates a modern fleet of ships and services global routes through a network of shipping lines. We estimate that the total economic impact of ZIM Shipping's operations in the Commonwealth are approximately \$1,158.7 million in 2019 dollars over the 2009 to 2019 time period.

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Executive Summary

ZIM Integrated Shipping Services Ltd. (ZIM Shipping) is a container shipment carrier that operates a modern fleet of ships and services global routes through a network of shipping lines. ZIM Shipping offers cargo sea and land carrier transportation services for dry, refrigerated, and other goods. ZIM Shipping, headquartered in Israel, operates multiple global offices including a branch in Norfolk, Virginia. Since 2001, the Norfolk location has served as the US headquarters for ZIM Shipping.

International shipping benefited greatly from the introduction of standardized shipping containers, with ZIM Shipping being one of the first carriers to adopt these containers. These steel containers interlock with each other and sit atop shipping vessels. There are different types of cargo that can be transported within these shipping containers: container cargo, dry bulk, liquid bulk, and breakbulk. Container cargo refers to products such as toys and televisions. Dry bulk refers to commodities like grain. Liquid bulk refers to types of oils. Breakbulk refers to products like steel rolls and parts of wind turbines.

At the end of 2019, the ZIM Shipping location in Norfolk employed approximately 280 employees. Most of the employees were involved in the booking, movement, and delivery of cargo for customers, and worked an average of 40 hours a week. The company continues to maintain the facility, has not incurred significant building expenses during the study period, and has no plans for further expansion in Virginia. ZIM Shipping also purchases approximately \$20 million in products and services from Virginia sources.

We use the Bureau of Labor Statistics Regional Input-Output Modeling System (RIMS-II) for this analysis. RIMS-II contains employment and spending multipliers that allow the generation of static estimates of economic impact. A lack of specific information on the type of employees and composition of spending constrains the final analysis.

Gross output is a measure of the value of the production of goods and services in an area during a given period, including the production of intermediate and final goods. We explicitly assume that ZIM Shipping employees earn the median wage of the Port and Harbor Operations industry. We also assume that other than the spending explicitly noted by ZIM Shipping occurring in the Commonwealth, that inputs are sourced from outside the Commonwealth and sales are made to customers outside Virginia. This approach also provides a more conservative estimate of the impact of ZIM Shipping's operations on gross output in the Commonwealth.

We estimate the total economic impact of ZIM Shipping's operations in the Commonwealth of Virginia to be approximately \$1,158.7 million in 2019 dollars over the 2009 to 2019 time period. In other words, ZIM Shipping added approximately \$1.16 billion to gross output over the study period. The impact of ZIM employment and spending increased nonfarm payrolls in the Commonwealth by approximately 415 in 2019. In other words, there were 415 more jobs in Virginia in 2019 due to the presence of ZIM Shipping. On average, for every ZIM Shipping employee, an additional 0.46 jobs are created in Virginia.

Introduction

ZIM Integrated Shipping Services Ltd. (ZIM Shipping) is a container shipment carrier that operates a modern fleet of ships and services global routes through a network of shipping lines. ZIM Shipping offers cargo sea and land carrier transportation services for dry, refrigerated, and other goods. Like many cargo carriers, ZIM Shipping provides container tracking technology that allows customers to obtain real-time updates on cargo location and status. ZIM Shipping, headquartered in Israel, operates multiple global offices including a branch in Norfolk, Virginia. Since 2001, the Norfolk location has served as the US headquarters for ZIM Shipping.

In this research note, we estimate the total economic impact of ZIM Shipping's operations in the Commonwealth of Virginia from 2009 to 2019. Total economic impact is an estimate of the incremental increase in economic activity and employment in Virginia, that is, how much ZIM Shipping contributed to output¹ in Virginia over this period. ZIM Shipping had two distinct impacts during the study period: employment and spending. First, ZIM Shipping employs Virginia residents, who, in turn, spend money in the Commonwealth, creating additional jobs and increasing economic activity. Second, ZIM Shipping purchases goods and services from businesses and individuals in Virginia. This spending ripples throughout the economy, raising economic activity and employment.

We estimate that the total economic impact of ZIM Shipping's operations in the Commonwealth of Virginia to be approximately \$1,158.7 million in 2019 dollars over the 2009 to 2019 time period. This estimate includes the impact of ZIM Shipping employment and spending

¹ The Bureau of Economic Analysis defines gross output as "a measure of an industry's sales or receipts, which can include sales to final users in the economy (GDP) or sales to other industries (intermediate inputs). Gross output can also be measured as the sum of an industry's value added and intermediate inputs."

in the Commonwealth. For every job created by ZIM Shipping, approximately 0.46 additional jobs are created in Virginia.

The remainder of this note is structured as follows: In the second section, we briefly review the operations of ZIM Shipping in Virginia; We then discuss the methodology and the assumptions underlying the economic impact estimates in the third section; finally, the fourth section presents the economic impact estimates.

A Brief Background on Container Shipping

International shipping benefited greatly from the introduction of standardized shipping containers, with ZIM Shipping being one of the first carriers to adopt these containers. These steel containers interlock with each other and sit atop shipping vessels. The ships are on and off loaded by crane, and the steel containers move by truck, rail, or barge to their final destination. The two industry standard measures are the twenty-foot equivalent unit (TEU), about 6 meters, and the forty-foot equivalent unit (FEU), which is sometimes referenced as 2 TEU.² These reference both the container's capacity as well as a ship's capacity, i.e., how many TEUs the vessel holds. This industry standard for size allows for ease in pricing.

There are different types of cargo that can be transported within these shipping containers: container cargo, dry bulk, liquid bulk, and breakbulk. Container cargo refers to products such as toys and televisions. Dry bulk refers to commodities like grain. Liquid bulk refers to types of oils. Breakbulk refers to products like steel rolls and parts of wind turbines.³

² <https://www.logisticsglossary.com/term/teu/>

³ <https://www.portofantwerp.com/en/types-goods>

The global market for container shipping was valued at \$6,742 million USD in 2018 and is expected to reach \$11,406 million by 2025, boasting a 7.8% CAGR over the forecasted period.⁴ The market is not without challenges. Demand for ships with cleaner emissions has led to increases in fuel prices. Many shipping companies are offsetting these increases by raising prices to carry cargo. Another ongoing issue plaguing international trade is the imposition of tariffs in trade between the US and China and the uncertainty of future trade, causing carriers to adjust to shrinking markets. More recent reports, however, find that the industry has started to recover, with many shipping companies reporting increases in volume in 2019.

A Brief Background on ZIM Shipping

Founded in 1945 in Israel, ZIM Shipping launched freight and passenger services in 1953. ZIM Shipping discontinued its passenger transportation services in the 1960s to focus on international cargo shipping. In the 1970s, ZIM moved into the container shipping industry and expanded ship capacity again in the 1980s. ZIM Shipping is currently privately owned with its largest shareholder, Kenon Ltd, holding a 32% stake in the company.⁵ ZIM Shipping has over 170 offices in 100 countries around the world. ZIM Shipping operates out of over 180 ports of call with 100 lines and services on about 70 operated vessels. In 2018, ZIM Shipping's annual turnover was \$3,247 million and its vessels carried 2.914 million TEU's. When compared to September 2018 numbers, September 2019 total revenues increased by 3.2%.⁶ ZIM Shipping offers container services for dry cargo, reefer cargo (refrigeration needs), and project cargo (breakbulk).

⁴ <https://www.marketwatch.com/press-release/shipping-container-market-2019-share-trends-segmentation-and-forecast-by-2025-2019-08-01>

⁵ <https://www.zim.com/about-zim/company-overview>

⁶ <https://www.zim.com/about-zim/facts-figures>

ZIM Shipping's Operations in the Commonwealth of Virginia

In 2001, ZIM Shipping started scouting locations to build a facility that met customer demand and put the company in the best place to fulfil its long-term business goals.⁷ Choosing Norfolk was an attractive choice for ZIM Shipping, offering a place where the company could accomplish both sea and land transportation while enjoying tax benefits and lower workforce costs. ZIM Shipping invested approximately \$6.2 million in the construction and furnishing of the Norfolk facility in 2001. The company continues to maintain the facility and has no plans for further expansion in Virginia.

ZIM Shipping's branch in Norfolk serves as the company's US Headquarters for shipping operations. This branch provides services relating to the booking, movement, and delivery of cargo. "The Norfolk office also contains ZIM's regional and national logistics, trade, and IT operational controls."⁸ ZIM Shipping expended in Virginia approximately on average \$7 million annually from 2009 to 2014 on goods and services. Starting in 2015, ZIM Shipping spending in Virginia increased to an average of \$20 million annually due to an increase in the number of port calls to Norfolk.

At the end of 2019, the ZIM Shipping location in Norfolk employed approximately 280 employees. Most of the employees were involved in the booking, movement, and delivery of cargo for customers, and worked an average of 40 hours a week. The Bureau of Labor Statistics tracks average weekly wages of all employees in support activity for the water transportation sector, as well as average weekly wages in total private nonfarm employment. Average weekly

⁷ Dragas Center Survey Questionnaire

⁸ Dragas Center Survey Questionnaire

wages in the support activity for water transportation in Norfolk were higher than average weekly wages in total private nonfarm employment in Norfolk, in part due to the presence of ZIM Shipping's operations. In 2018, average weekly wages in the support activity for water transportation were \$1,610 in Norfolk compared to \$990 for total private nonfarm employment.⁹

ZIM Shipping and the Shipping Industry's Presence in the Commonwealth of Virginia

The Port of Virginia is a pillar of the economy of southeastern Virginia and, by some estimates, is responsible for over five percent of economic activity in the Commonwealth on an annual basis. The Port of Virginia utilizes the world's largest natural deep-water harbor and is the third largest container port on the East Coast.¹⁰ Expanding the capacity and operations of the Port are of continued interest to policymakers, practitioners, and the public alike.

With the state's desire to become a global gateway, the Port of Virginia's global shipping capabilities play a crucial role in maintaining market share. In November 2019, Governor Northam unveiled an International Trade Strategic Plan for the Commonwealth of Virginia. The Port of Virginia is the centerpiece of this plan. The Port assists the Commonwealth in attracting trade-intensive import and export businesses, which, in turn, have positive spillovers on the economy of the Commonwealth.¹¹

ZIM Shipping, because of its role in facilitating imports and exports through the Port of Virginia, supports the objectives of the International Trade Strategic Plan. Not only are ZIM Shipping containers a common sight throughout the Commonwealth, ZIM Shipping continues to

⁹ Bureau of Labor Statistics, Quarterly Census of Employment and Wages

¹⁰ <https://www.yesvirginiabeach.com/Business-Environment/transportation/Pages/The-Port-of-Virginia.aspx>

¹¹ <https://www.governor.virginia.gov/media/governorvirginiagov/secretary-of-commerce-and-trade/pdf/An-International-Trade-Strategic-Plan-for-the-Commonwealth-of-Virginia.pdf>

generate significant economic benefits to Virginia's economy. Lastly, average weekly wages (tracked by the Bureau of Labor Statistics) are higher in the shipping industry than total private nonfarm employment. In 2018, average weekly wages in the support activity for water transportation were \$1,610 in the city of Norfolk compared to \$990 for total private nonfarm employment.¹² In all likelihood, the average pay of ZIM Shipping jobs is higher than the average pay of private nonfarm employees, supporting the Commonwealth's goal of creating and sustaining higher paying jobs.

A Short Primer on Economic Impact Analysis

To estimate the impact of ZIM Shipping's operations for its Norfolk facility, we quantify the direct, indirect, and induced economic impacts. Our analysis consists of two components. The first component focuses on the impact of ZIM Shipping's average annual employment from 2009 to 2019. We conservatively use the lowest average levels of employment for our estimates to provide a lower-bound on the economic impact of ZIM Shipping on the Virginia economy. The second component focuses on the impact of ZIM Shipping's spending in the Commonwealth during the study period. We explicitly assume, as we do not have data on input purchases and sales, that other than the spending explicitly noted by ZIM Shipping to occur in Virginia, inputs are sourced from outside the Commonwealth and sales are made to customers outside Virginia. We argue that these conservative assumptions provide a lower-bound on ZIM Shipping's economic impact.

To understand our approach, it is helpful to imagine a pebble dropped into a puddle of water to visualize how the economy reacts to a change in spending or employment. The impact

¹² Bureau of Labor Statistics, Quarterly Census of Employment and Wages

represents the initial round of economic activity on output, earnings, and employment. The initial round of economic activity ripples through the rest of the economy like the waves moving through the puddle. These ripples represent the indirect and induced impacts that come about through the interconnectedness of the local economy. The indirect economic impact comes from economic activity by companies frequented by ZIM Shipping employees or companies that provide services to ZIM Shipping. The induced impact comes from industries directly and indirectly affected by ZIM Shipping's employment in Norfolk or spending in Virginia.

These spillovers can create a total economic impact that is larger than the direct impact. The notion of an economic multiplier summarizes the total economic impact of a change in economic activity. If a firm invests \$1,000,000 (direct impact) that generates \$300,000 in indirect economic impacts and \$200,000 in induced economic impacts, then the economic impact multiplier effect is $(\$1,000,000 + \$300,000 + \$200,000) / \$1,000,000 = 1.5$.

There are two important considerations when evaluating economic multipliers. First, the size of the multiplier inherently depends on how much of the economic activity continues to recycle within the region. If a firm obtains most of its materials from outside the region (a "leakage"), then the actual multiplier effect will necessarily be smaller. Second, the multiplier effect, where spending spills over to a variety of other sectors, is great when the direct impact is positive, however, it is equally painful when there is a reduction in direct economic activity. From an economic impact perspective, "new" money that is "injected" in a state has a greater economic impact than "old" money that is "redistributed" from existing spending in a state.

We present static estimates of the estimated total economic impact of ZIM Shipping's employment in Virginia. We use the Bureau of Labor Statistics Regional Input-Output Modeling

System (RIMS-II) for this analysis. RIMS-II contains employment and spending multipliers that allow the generation of static estimates of economic impact. The static estimates of the estimated total economic impact “lump” the spending and employment into an annual period and there is no feedback mechanism. We also caution the reader that we employ data on average employment and spending within one year.

We also must assume that the multipliers do not change over the period of analysis. The estimated impact on output may be sensitive to changes in these assumptions and the estimates should be viewed as conditional on the data and our assumptions. We argue this approach avoids the possibility of double counting the impact of ZIM Shipping’s operations on the Virginia economy and provides a more conservative estimate of the overall economic impact of ZIM Shipping’s operations on the Commonwealth’s economy.

Estimating the Economic Impact of ZIM Shipping

To estimate the total economic impact of ZIM Shipping’s operations in the Commonwealth of Virginia from 2009 to 2019, we must first estimate ZIM Shipping’s employment over this period. Table 1 illustrates our estimates regarding employment, as well as ZIM Shipping’s stated average spending in Virginia over time. We provide the detailed incremental estimates for nonfarm payrolls and nominal gross output in Table 2.

As noted previously, gross output is a measure of an industry's sales or receipts, which can include sales to final users in the economy (GDP) or sales to other industries (intermediate inputs). Figure 1 displays the annual incremental change in nominal gross output in the Commonwealth of Virginia from 2009 to 2019 as the result of ZIM Shipping’s operations in

Norfolk. The incremental impact of ZIM Shipping on the Virginia economy ranges from approximately \$97.6 million in 2009 to \$105.8 million in 2019.

To estimate the cumulative economic impact on output across time, we must convert the nominal impacts in Figure 1 to real (inflation-adjusted) terms. Here we use the annual average Consumer Price Index (CPI) from the Bureau of Labor Statistics (BLS) to convert the nominal impacts into constant-year dollars which are comparable across time. Given that we employ RIMS-II multipliers from 2019, we choose 2019 as a base year for our analysis. We must also account for the concern that economic impacts in the past should be converted to equal values in the present. We use a discount rate of 2 percent and convert historic impacts into 2019-equivalent impacts.¹³ Given that the federal government discount in 2019 was 3.4 percent, our conservative discount rate understates the value of historic economic impacts.¹⁴

Figure 2 displays the real (inflation-adjusted) impact of ZIM Shipping's operations on gross output in Virginia. We estimate the total economic impact of ZIM Shipping's operations in the Commonwealth of Virginia to be approximately \$1,158.7.0 million in 2019 dollars over the 2009 to 2019 time period.

Figure 3 displays the impact of ZIM Shipping's continued operations on private nonfarm employment (jobs). ZIM Shipping's direct employment decreased from 385 in 2009 to 285 in 2019. On the other hand, ZIM Shipping's spending impact increased from 52 jobs in 2009 to 153 jobs in 2019. In total, nonfarm employment in Virginia was 568 jobs higher in 2019 due to the presence of ZIM Shipping's facility in Norfolk.

¹³ As an example, we take the nominal economic output for 2010 and convert the nominal value in 2019 by using the future value formula, where future value = present value * (1+discount rate)^number of periods.

¹⁴ <https://www.whitehouse.gov/wp-content/uploads/2019/12/discount-history.pdf>

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Table 1
Estimated Employment and Spending
ZIM Shipping's Operations in Virginia
2009 – 2019

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Employment	385	385	285	285	285	285	285	285	285	285	285
Spending (in Millions)	\$7.0	\$7.0	\$7.0	\$7.0	\$7.0	\$7.0	\$20.0	\$20.0	\$20.0	\$20.0	\$20.0

Source: ZIM Shipping and the Dragas Center for Economic Analysis and Policy. Spending is in millions of nominal dollars.

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Table 2
Estimated Incremental Economic Impacts
ZIM Shipping's Operations in the Commonwealth of Virginia
2009 – 2019

Year	Increase in Nonfarm Payrolls from ZIM Employment	Increase in Nonfarm Payrolls from ZIM Spending	Increase in Gross Output from ZIM Employment	Increase in Gross Output from ZIM Spending
2009	560	54	\$87,691,270	\$9,983,999
2010	560	54	\$89,126,397	\$9,983,999
2011	415	54	\$68,048,124	\$9,983,999
2012	415	54	\$69,458,889	\$9,983,999
2013	415	54	\$70,477,137	\$9,983,999
2014	415	54	\$71,615,673	\$9,983,999
2015	415	153	\$71,701,242	\$28,525,711
2016	415	153	\$72,611,854	\$28,525,711
2017	415	153	\$74,162,801	\$28,525,711
2018	415	153	\$75,968,960	\$28,525,711
2019	415	153	\$77,346,249	\$28,525,711

15 Source: Dragas Center for Economic Analysis and Policy (2020). Estimates are in nominal dollars and are based on assumptions
16 regarding ZIM Shipping's employment and sales bases on averages provided by ZIM Shipping. Estimates include employment and
17 spending impacts. Estimates include direct, indirect, and induced impacts and assume that the multipliers are constant for the
18 period of analysis.

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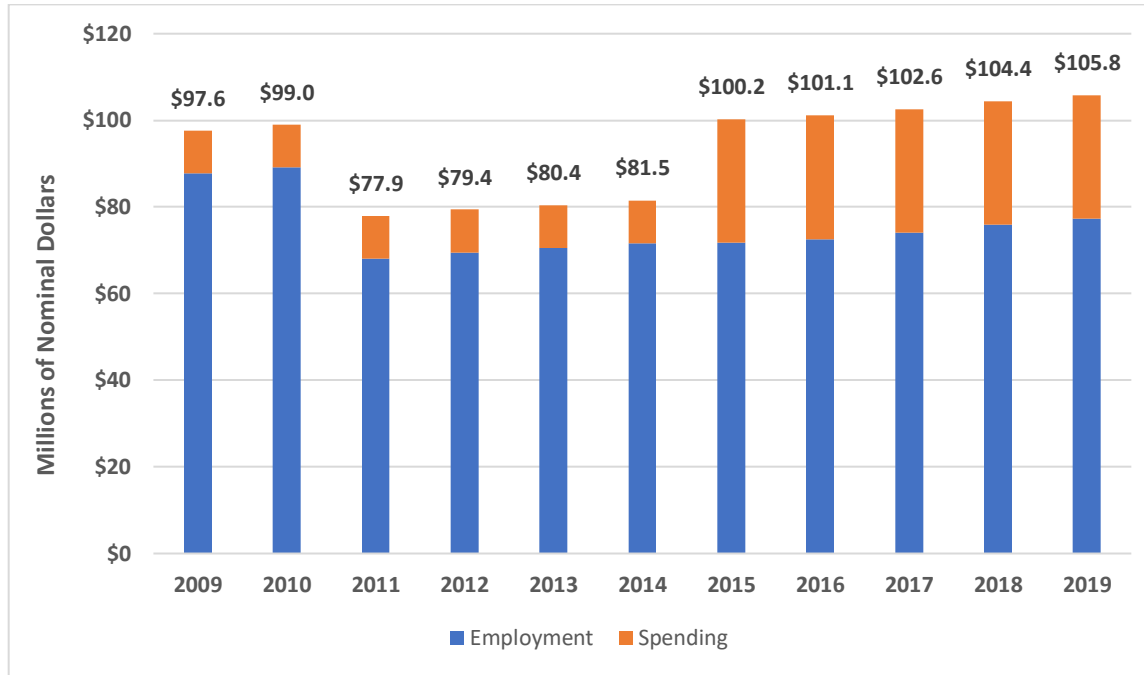
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Figure 1
Estimated Impact on Gross Output
ZIM Shipping's Operations in the Commonwealth of Virginia
Millions of Nominal Dollars
2009 – 2019



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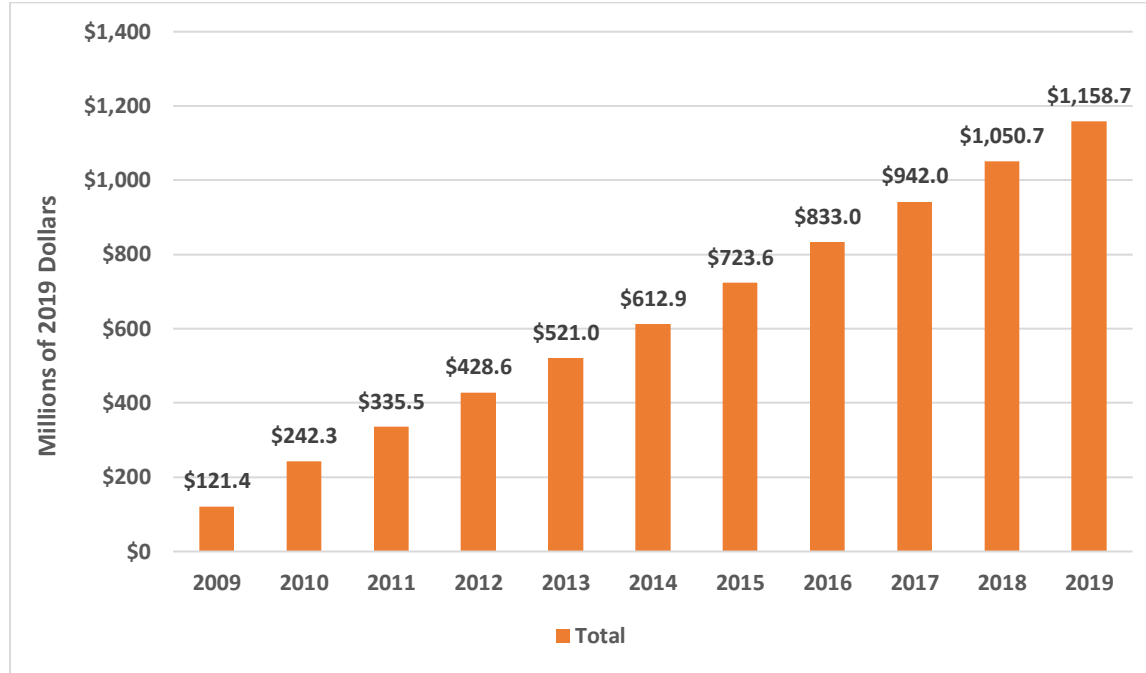
30 Source: Dragas Center for Economic Analysis and Policy (2020) and Bureau of Economic Analysis (2020). The estimates represent the
31 contributions of employment and spending to gross output in the Commonwealth of Virginia for each year. The estimates assume
32 that the multipliers for employment are constant for the period. Data on average employment and average spending obtained from
33 ZIM Shipping.

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Figure 2
Cumulative Impact on Gross Output
ZIM Shipping's Operations in the Commonwealth of Virginia
Millions of 2019 Dollars
2009 – 2019



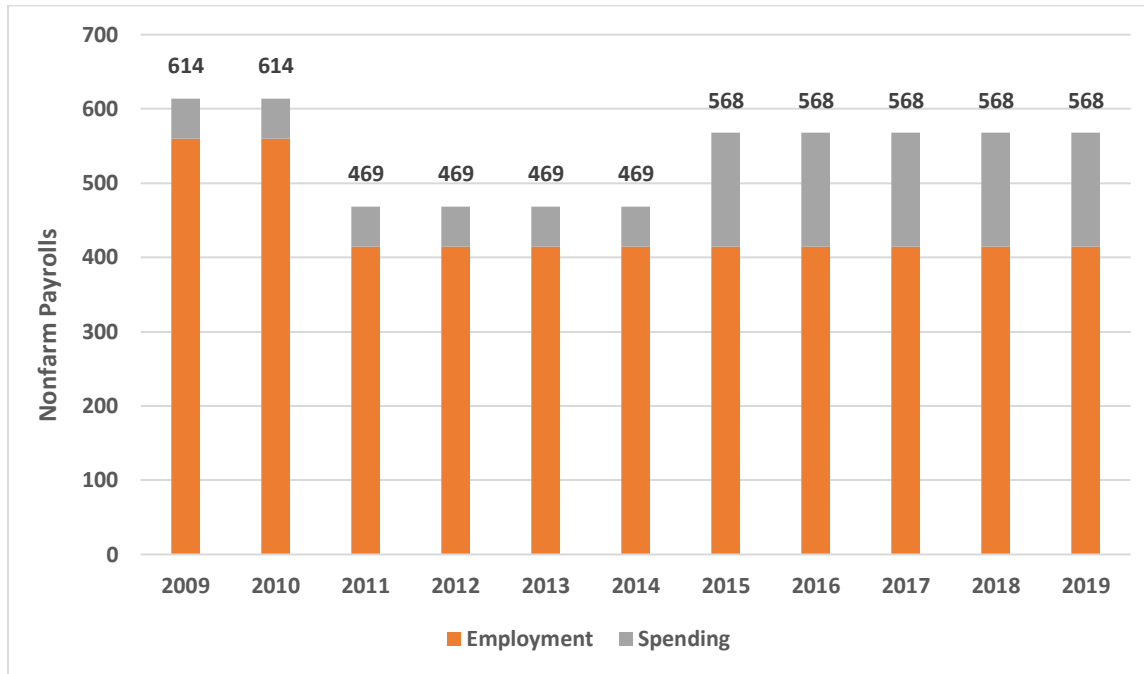
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43 Source: Dragas Center for Economic Analysis and Policy (2020) and Bureau of Economic Analysis (2019). The estimates represent the
44 contribution of employment and spending to gross output in the Commonwealth of Virginia for each year. The estimates assume
45 that the multipliers for employment and spending are constant for the period. Data on average employment and spending obtained
46 from ZIM Shipping. A discount rate of 2 percent is used to convert historic economic output to 2019 nominal values. Data on the
47 average annual value of the Consumer Price Index (CPI) obtained from the Bureau of Labor Statistics.

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Figure 3
Estimated Annual Impact on Private Nonfarm Payrolls (Jobs)
ZIM Shipping's Operations in the Commonwealth of Virginia
2009 – 2019



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56 Source: Dragas Center for Economic Analysis and Policy (2019). The estimates represent the contribution of employment and spending
57 to gross output in the Commonwealth of Virginia for each year. The estimates assume that the multipliers for employment and
58 spending are constant for the period. Data on average employment and spending obtained from ZIM Shipping. A discount rate of 2
59 percent is used to convert historic economic output to 2019 nominal values. Data on the average annual value of the Consumer Price
60 Index (CPI) obtained from the Bureau of Labor Statistic