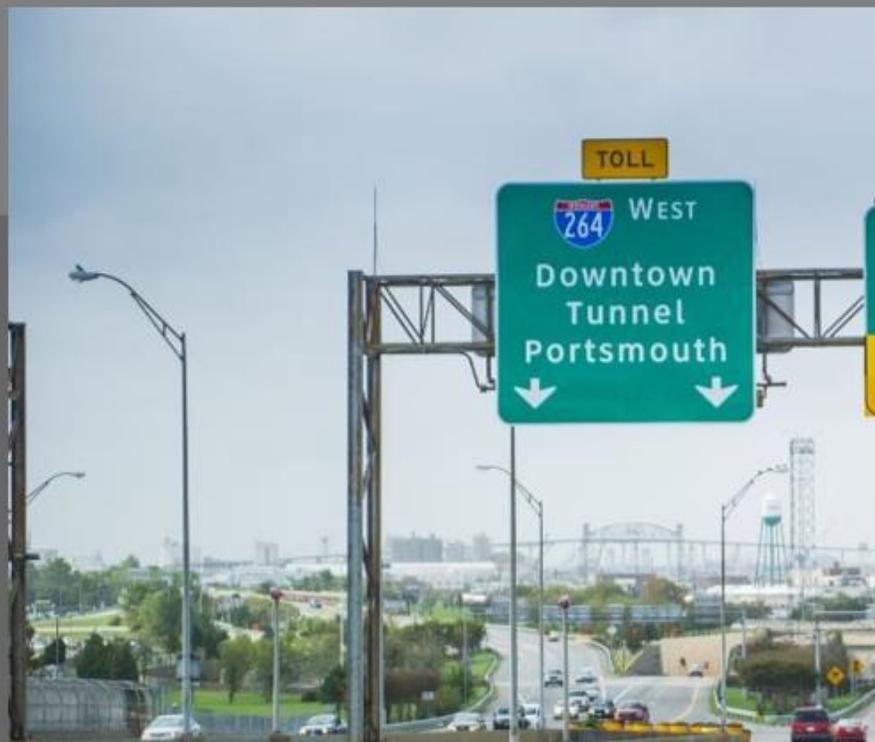




The Impact of Tolls On the City of Portsmouth

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THE IMPACT OF TOLLS ON THE CITY OF PORTSMOUTH
EXECUTIVE SUMMARY

Many different factors including the amount of defense spending in Hampton Roads influence the volume of vehicle travel through the Midtown and Downtown tunnels. Tolls, however, were responsible for a 10.5 percent overall decline in vehicle travel through the two tunnels in 2017. Declines were larger on weekends than weekdays and larger for the Midtown Tunnel (MTT) than for the Downtown Tunnel (DTT). Traffic levels in the DTT have recovered much more robustly from their 2014 lows than traffic levels in the MTT.

Even though vehicle traffic overall has not recovered to pre-toll levels, a positive factor has been a decline in the number of often unpredictable and inadequately publicized traffic disruptions because of construction and repair. Traffic disruptions affect not only that day's traffic, but succeeding days as well. Drivers remember bad experiences. Taking other factors into account, disruptions reduced vehicle traffic by up to 70 percent on a daily basis and had a lingering negative impact on traffic for several days thereafter.

Not surprisingly, the impact of tolls upon taxable sales in Portsmouth has been negative. I estimate that taxable sales city-wide have been reduced by more than \$2.2 million per quarter (\$8.8 million annually) because of the tolls. The net effect in 2017 was a \$488,000 reduction in tax collections by the City.

Tolls have not had a statistically significant negative impact on the number of residential home sales or median sales prices of residential homes (existing or new) in the City. On the other hand, there is tentative evidence that assessed valuations of property, both residential and commercial, could have been retarded by the tolls. More years of experience will be needed, however, before a firm judgment can be rendered in this regard.

Portsmouth remains the single most vulnerable city in the region with respect to the tolls. Based upon the number of workers who must use the tunnels as they come and go from their jobs in Portsmouth or travel east of the Elizabeth

River to work, the City is 6.3 times more exposed to toll effects than is Virginia Beach and 3.8 times as much as Norfolk.

A typical resident of Portsmouth also pays a larger share of his/her income in tolls than the typical resident of other regional cities, even when they use the tunnels the same number of times. Portsmouth's economic ability to pay the tolls is not as high as that of other cities.

THE TOLLING SITUATION IS COMPLICATED

Few reasonable individuals doubt that the tolls imposed on the Midtown and Downtown tunnels have had adverse effects on the City of Portsmouth. The salient question is, “how much?”

My April 2015 report revealed that Portsmouth was proportionately more vulnerable to “harmful toll effects” than any other city in the region. Four major factors were responsible for this: (1) the exposure of the City’s 44,000+ job base to increases in commuting costs; (2) the impact of the tolls on the approximate 11,500 Portsmouth residents who travel east through the tunnels on a daily basis to their jobs; (3) the easily demonstrated ill effects of often unpredictable tunnel closures and repairs on tunnel traffic and business activity in downtown Portsmouth; and, (4) the large number of lower income residents in the City.

Now, in 2018, it is appropriate to revisit the situation. The 2015 report could rely upon only one year of tolled tunnel activity. Four years now are available. Further, the tolls have increased several times, but have been eliminated on the Martin Luther King Freeway. This makes it easier to see the impact of tolls on travel patterns.

There have been other important changes in the environment as well. Recent months have seen fewer tunnel closures and repairs and this has reduced the fears of travelers or shoppers that they will be stuck in unanticipated traffic. Finally, we’ve now had tolls for four-plus years and this is a long enough period for both drivers and passengers to make adjustments---perhaps to find different commuting paths, or to change jobs, churches, restaurants, clubs, and even where they live.

As we revisit the toll situation, however, it is important to understand that there are multiple reasons why individuals choose to drive through (or not drive through) the tunnels. Tolls, while important, are only one factor that influence potential travel through the Midtown Tunnel (MTT) and Downtown Tunnel (DTT).

Citizens on both sides of the tunnels have reasons to travel that relate to their jobs, friends, recreation and vacations, or churches, clubs, and organizations. In addition, several well-defined commercial and educational activities are travel generators: activity at the Port of Virginia, and enrollment at Old Dominion University, Norfolk State University and Tidewater Community College.

Further, let’s not forget the season of the year, the days of the week and even the weather as factors that influence travel through the MTT and DTT.

Finally, we would be foolish not to consider the impact of defense spending upon the region and tunnel traffic. Approximately 40 percent of our regional economic activity can be traced to defense spending, which has been stagnant in recent years and has declined in real terms after one takes price inflation into account.

The major point is that there are lots of moving parts in the tunnel story. Consequently, commentators are off base if they seek to attribute all the changes we have observed in tunnel traffic, or ups and downs in sales in downtown Portsmouth, to tunnel tolls. Yes, the tolls definitely make a difference and their overall impact upon the City has been negative. But, tolls aren't the only variable in this game.

None of us enjoys paying tolls, but most of us ultimately decide to pay them anyway. Why is this? The answer is that value the time it would take us to avoid the tolls more than the price of the tolls.

The Bureau of Labor Statistics informs us that the average wage in Hampton Roads in May 2017 was \$22.79 per hour. If the peak time EZ Pass toll is \$2.09 for a two-axle passenger vehicle, then it is \$4.28 for a round trip for me if I am a typical commuter. Suppose Ann is a commuter who has decided not to pay the tolls and therefore devises a route around them (perhaps using the Gilmerton Bridge). However, this will cost her an extra 15 minutes one way, or 30 minutes per day. If Ann values her time at \$22.79 per hour, then in economic terms, she has just imposed \$11.40 in additional costs on herself. Most individuals, when faced with this situation, will grump and groan, but then decide to pay the tolls because of the value they place on their own time (we'll disregard the additional gasoline and operating costs of driving more miles).

Ann's wage rate would have to fall to \$8.56 per hour before it would be economically rationale for her not to pay the toll. Of course, if her trip were optional, she might decide to stay home.

REVIEWING TUNNEL TRAFFIC

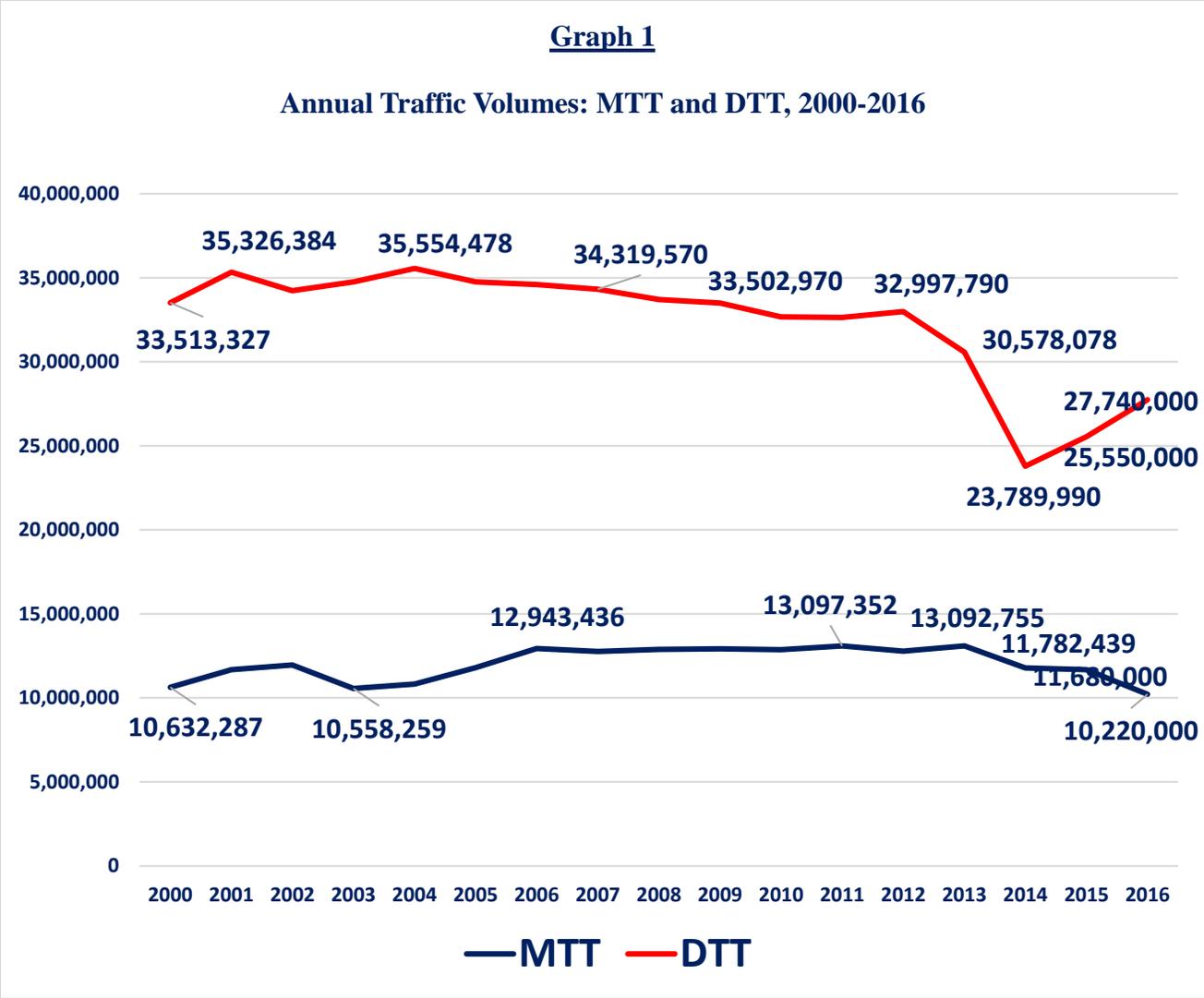
Graph 1 reports the total number of vehicles that traveled through the MTT and DTT tunnels, 2000-2016. It presents a useful picture because it illustrates the immediate negative impact of tolls on tunnel vehicle traffic and the subsequent recovery of some of that traffic loss in the more heavily used DTT.

It is important to note that even before tolls were imposed in 2014, the volume of traffic through the DTT gradually was declining. Statistical analyses reveal that the primary culprit here was stagnant federal government spending, especially defense (DOD) spending. Approximately 40 percent of the value of our regional economic activity is dependent upon defense spending and approximately 55 percent of our regional activity is dependent upon federal spending overall. When federal spending (and DOD spending in particular) decline, our regional economy shifts into neutral, or in some years actually contracts.

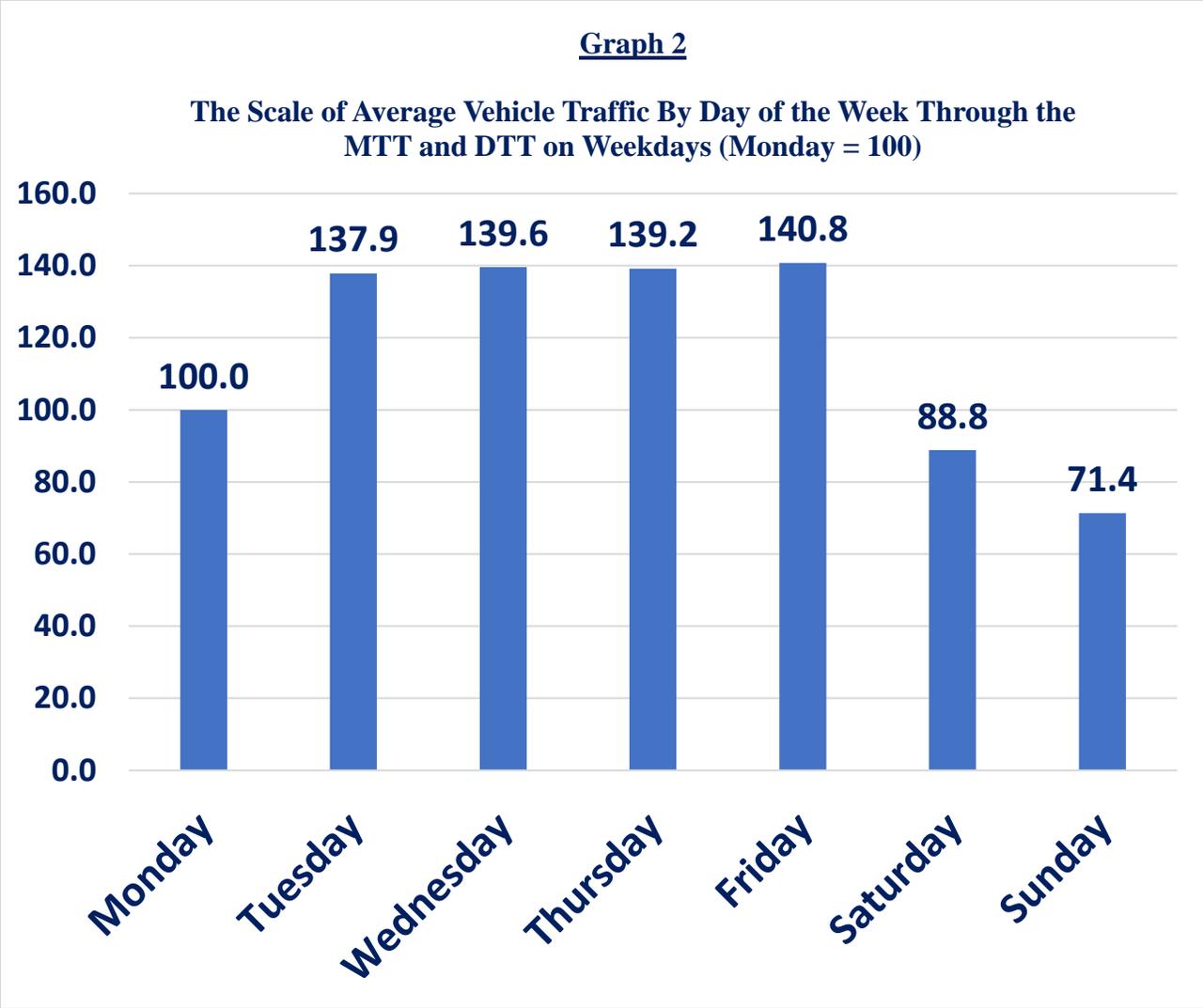
With respect to the DTT, however, Graph 1 also reveals that there was a noticeable rebound in traffic through the DTT in 2015 and 2016. While the tolls remain unpopular, most job commuters have come to terms with them. They may car pool and they may find ways to telecommute more often. In the end, however, overwhelming majorities decide to pay the tolls because alternative non-tolled routes require too much time.

The MTT tunnel, however, is a different story. There has been a significant decline (about 28 percent) in vehicle traffic through the MTT since 2013. It's not entirely clear why this has been so because activity at one of the MTT's major traffic generators, the Port of Virginia (POV), has increased.

Port analysts suggest that larger proportions of Port traffic now are being diverted by newly completed I-564 and that the percentage of POV traffic being served by rail has crept upward. Also, the maturation of the Virginia International Gateway along Route 164 in western Portsmouth has meant that many trucks no longer need to use the MTT. In any case, MTT tunnel traffic has not recovered like the DTT.



As Graph 2 illustrates, rather large variations in tunnel traffic exist with respect to days of the week. For example, the volume of vehicle traffic on a Friday (the busiest day) is almost twice that of a Sunday and 40 percent larger than on a Monday. Tuesdays through Fridays are the busiest days for tunnel travel. As one might expect, large proportions of weekend travel involve discretionary trips rather than work trips.

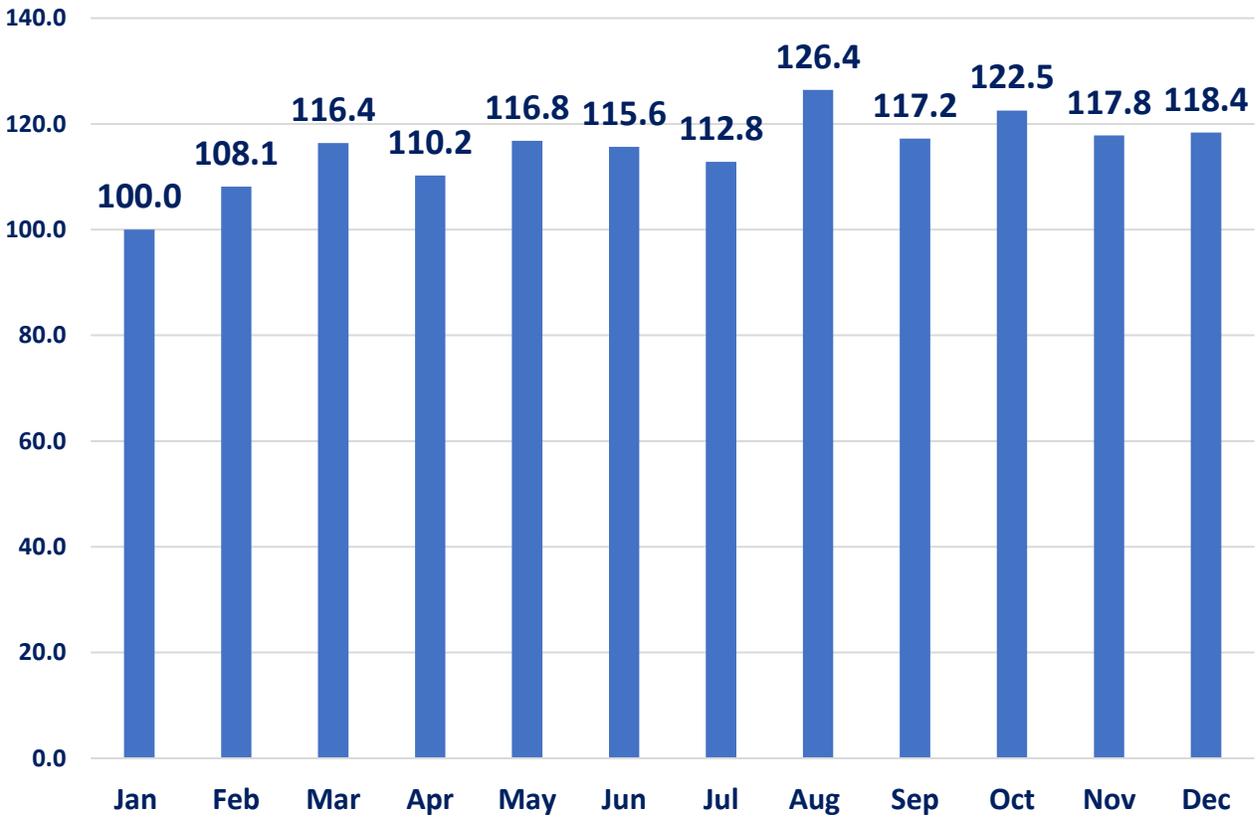


Seasonal (monthly) variations in vehicle travel through the tunnels are not as large as those based upon days of the week, but still are substantial. January is the least active month in terms of the volume of tunnel traffic. Graph 3 indexes January traffic volume at 100. One can see that August, the most active month, has average traffic volume that is 26.4 percent larger. Presumably this reflects increased vacation and discretionary travel, though August also is one of the more active months at the Port.

While actual evidence on the issue is sparse, it is plausible that vacation travelers are not particularly sensitive to tolls because they may only pay the tolls twice (coming and going) and those tolls constitute a very small proportion of their overall vacation expenditures.

Graph 3

**The Scale of Average Monthly Vehicle Traffic
Through the MTT and DTT
(January = 100)**



EXPLAINING VEHICULAR TRAFFIC THROUGH THE TUNNELS

Imitating my practice in the 2014 report, I developed a statistical regression model to test hypotheses that relate to the volume of traffic that passes through the MTT and DTT. Let's assign the letter N to the number of daily vehicle trips through either the MTT or DTT. We want to explain N by means of factors such as the number of jobs in Portsmouth, the number of jobs in Hampton Roads, defense spending, the month of the year, the day of the week, whether academic institutions such as ODU, NSU and TCC are in session, the level of Port activity, traffic disruptions due to construction and repair, and of course the tolls.

Symbolically, $N = f(\text{JOBSP}, \text{JOBshr}, \text{DOD}, \text{MONTH}, \text{DAY}, \text{UNIV}, \text{PORT}, \text{DISR}, \text{TOLLS})$. Our goal is to see the effect that each of these variables has upon

the volume of vehicle travel through the tunnels. More specifically, we want to see if tolls have made a difference, and whether the gradual increases in tolls have changed things.

Table 1 summarizes the statistical determinants of the volume of vehicle travel through the MTT. Taking all the above factors into account, tolls were responsible for a 12.4 percent decline in vehicle traffic through the MTT in 2017. Toll and the general economic prosperity of the region (represented by the number of jobs in Hampton Roads) were quantitatively the two most important factors determining MTT vehicle traffic. Defense spending and port activity were next most important.

Tunnel disruptions due to construction and repair were extremely important on days when they occurred, yet were not an everyday phenomenon. Tunnel disruptions could diminish MTT tunnel traffic by as much as 65 percent on the days they occurred. Interestingly, the effect of the disruption lingered for several days. Drivers have memories.

The negative influence of tolls on MTT tunnel traffic has remained roughly constant in recent years---12.9 percent in 2016, 12.5 percent in 2015, and now 12.4 percent in 2016. There is no evidence that tolls are responsible for recent declines in MTT traffic. Drivers who have been using the tunnels apparently have become inured to the tolls and a \$.25 increase is not sufficient to cause them to change their behavior.

Table 1
**Statistical Determinants of the Volume of Daily Vehicle Traffic
 Through the MTT, 2000-2017**

Jobs in Portsmouth	Only marginally important and not as important as jobs in the region
Jobs in Hampton Roads	More important than jobs in the City, but highly correlated with DOD spending
Month of Year	Only January (a distinct negative) and August (a positive) stand out
Day of Week	Monday traffic is surprisingly light; Saturdays and Sundays also are light; Friday is the traffic king
Univ in Session	ODU’s schedule makes a small difference
Port TEUs	An important positive influence on MTT tunnel traffic

Traffic Disruptions	A very important determinant of daily traffic flows; MTT disruptions can reduce MTT traffic by up to 65%
Tolls	Quite important factor; tolls by themselves reduced MTT tunnel traffic by 12.4% in 2017

One driver whom I interviewed regaled me with the oft-cited parable of a frog that is thrown into a container full of water that very slowly is being brought to a boil. However, the temperature increases are slow and never quite dramatic enough to cause the frog to hop out and save itself. The frog simply makes do and ultimately perishes in boiling water. Perhaps a bit morbidly, the driver suggested that this is what will happen to tunnel users because of the agreement between the Commonwealth and the Elizabeth River Company (ERC). Metaphorically, drivers are slowly imitating the unfortunate frog.

In my 2015 report, I displayed the tolling mathematics associated with this agreement. One-way peak hour tolls will be \$11.79 in 2070 if they rise at the 3.5 percent annual increase the ERC’s contract permits it to implement. However, the agreement also permits the ERC to increase tolls more than 3.5 percent annually if the annual increase in the Consumer Price Index (CPI) exceeds 3.5 percent. If the next 50 years’ experience with the CPI replicates the past 50 years, then this will generate a much higher toll (\$21.56) by 2070. It is not for nothing that this agreement has been labeled one of the worst the Commonwealth ever has negotiated.¹

Table 2 reveals that the explanatory story with respect to the determinants of DTT traffic is substantially the same as that for the MTT. However, it is differentiated in three ways. First, DTT traffic has recovered much more from its nadir in 2014 than MTT traffic. Second, Port activity (as measured by twenty-foot equivalent container throughput (TEUs)) is much less important at the DTT than at the MTT and is not a statistically significant determinant of DTT vehicle traffic. Third, traffic disruptions have been even more destructive to vehicle traffic at the DTT than at the MTT, perhaps because some alternative routes exist and drivers can

¹ Governor Terry McAuliffe told reporters that “I think it was one of the worst deals ever negotiated,” in “Gov. proposes toll fee cap of \$2,200 for Hampton Roads residents,” *WTKR Channel 3 News* (March 23, 2017), <http://wtkr.com/2017/03/22/gov-mcauliffe-to-announce-easement-of-toll-burdens-in-hampton-roads>.

switch their commuting paths. DTT Traffic fell up to 70 percent on the worst disruption days.

After taking into consideration the same influences used in the MTT analysis (DOD spending, etc.), I estimate that tolls reduced vehicle traffic through the DTT by 9.8 percent in 2017. This is down from 11.1 percent in 2016 and 13.8 percent in 2015. There is no evidence that recent increases in tolls have had significant impact upon DTT vehicle traffic.

Table 2

Statistical Determinants of the Volume of Daily Vehicle Traffic Through the DTT, 2000-2017

Jobs in Portsmouth	Not as important as jobs in Hampton Roads
Jobs in Hampton Roads	More important than jobs in the City, but highly correlated with defense spending
DOD Spending	A very important determinant of DTT traffic because 40% of the region’s economy is related to defense spending
Month of Year	Only January (a negative) and August (a positive)
Day of the Week	Mondays are surprisingly weak days for tunnel travel; Friday is the heaviest day; traffic slackens on weekends
Univ in Session	The schedules of the Norfolk higher education institutions don’t make much difference in travel patterns
Port TEUs	In contrast to the MTT, Port activity is not a significant determinant
Traffic Disruptions	When they occur, they can reduce DTT traffic by up to 70% on a given day
Tolls	Most important factor of all; in 2017, they reduced DTT traffic by 9.8%

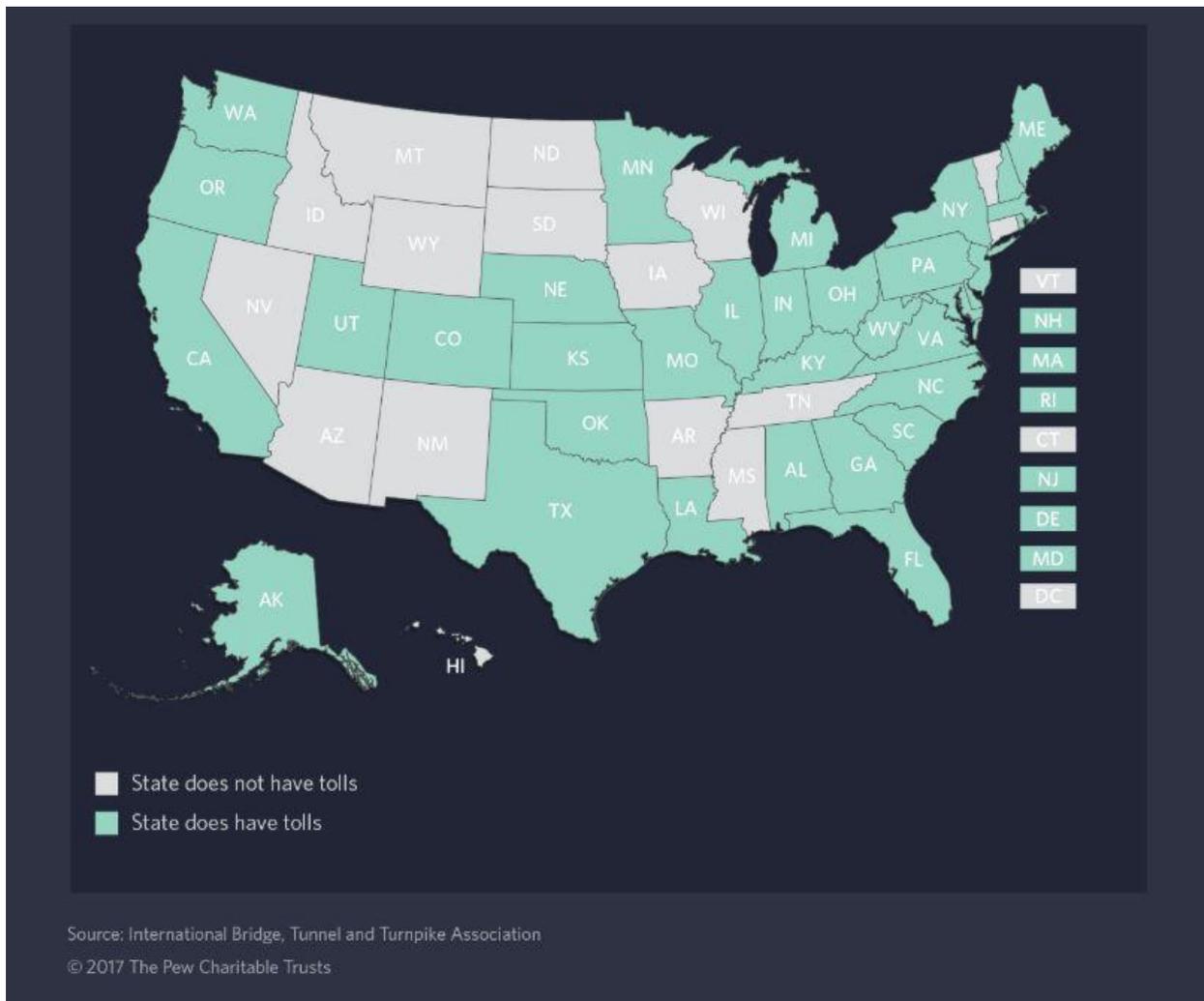
HOW DO THESE TRAFFIC IMPACT RESULTS COMPARE TO THOSE FOUND ELSEWHERE?

A 2017 study by the Pew Charitable Trusts found that 34 of the 50 states in the United States have established tolls on some of their roads, bridges and tunnels. Tolls on tunnels, however, are distinctive because they are concentrated in coastal states.

Tunnel tolls also are distinctive in that they usually exist in circumstances where few if any alternate travel routes exist. That is, drivers have little or no practical choice in routes. This is different from the situations involving vehicle tolls that exist on I-66 and I-95 in Northern Virginia, or on the Powhite Parkway and Downtown Expressway in Richmond. In these latter locations, viable alternative routes exist. The degree of exclusivity (which an economist would label monopoly power) is much higher for the typical tunnel that is tolled.

Graph 4

**States That Have Tolls on Road, Bridge or Tunnel Traffic:
Pew Charitable Trusts, 2017**



A half dozen studies of the impact of tolls on tunnel traffic have been completed in the United States. The studies focus on the New York metropolitan area, where nine river crossings are tolled and EZ Pass exists. Further, similar to the MTT and DTT, the monetary difference between a toll paid via EZ Pass and one paid in cash is quite large (similar to the MTT and DTT).

The two most prominent studies of the New York situation are Hirschman et al. (1995)² and Agyenim and Kamga (2015).³ Both concluded that the demand of drivers for passage through a tolled tunnel was “highly price inelastic,” meaning that drivers were not extremely sensitive to tolls per se, or changes in the level of tolls. Estimated elasticities were as low as $-.03$, which suggests that a 10 percent increase in a toll would elicit only a .3 percent decline in vehicle traffic. The median elasticity was $-.10$, meaning that a 10 percent increase in a toll would cause a still modest 1.0 percent decline in vehicle traffic. Remember once again, however, that in this case they were talking about tolled routes for which there were few viable alternatives.

The declines in traffic that resulted when tolls were imposed on the MTT and DTT were much larger than this. Why? The major reason is that these two venues were not tolled previously. Some considerable degree of shock applied to the imposition of tolls. The New York evidence reflected increases in existing tolls and so was not directly comparable to the MTT and DTT experiences.

The Hampton Roads Transportation Planning Organization (HRTPO) completed a study published in June 2015 that attempted a “before” and “after” examination of the impact of tolls on the MTT and DTT.⁴ The study compared May through December 2013 vehicular traffic to May through December 2014 vehicular traffic. Without controlling for other causal factors such as Port activity or defense spending, the HRTPO study found MTT traffic to be down 8 percent on weekdays and 5 percent on weekends. DTT traffic was down 20 percent on weekdays and 29 percent on weekends. The HRTPO study found traffic on alternative routes to be

² Ira Hirschman, Claire McKnight, John Pucher, Robert E. Paaswell and Joseph Berechman, “Bridge and Tunnel Toll Elasticities in New York: Some Recent Evidence,” *Transportation*, 22 (2), 97-113.

³ Oti Agyenim and Camille Kamga, “Traffic Impacts of an Electronic Payment Biased Toll Pricing Initiative on Toll Bridges and Tunnels in New York City,” Transportation Research Board 94th Annual Meeting (2015), <http://dos.trb.org/prp/15-5253.pdf>.

⁴ Hampton Roads Transportation Planning Organization, “Analyzing and Mitigating the Impact of Tolls at the Midtown and Downtown Tunnels (June 2015),

substantially higher during this time period, for example, 53 percent higher during weekdays and 67 percent higher on weekends over the Gilmerton Bridge.

The HRTPO study was particularly useful in demonstrating that many drivers clearly opted to drive alternate routes in order to avoid the new tolls. However, as we have seen, their willingness to endure longer commutes predictably wavered in subsequent years. As they weighed the value of their time and extra vehicle operating costs against the tolls they have to pay to travel through the MTT and DTT, many drivers grumbled, but eventually decided to pay.

One measure of this adjustment process is the increased use of EZ Pass by drivers. Since 2016, this percentage has grown by 8.5 percent and now more four of every five vehicles traveling through the tunnels utilize an EZ Pass.

Table 3
Growth in the Use of EZ Pass at the MTT and DTT:
All Vehicles, 2015-2018

<u>Year</u>	<u>Percent Use of EZ Pass</u>
2015	72.2%
2016	73.5%
2017	78.5%
2018	82.0%

Source: Elizabeth River Company

I should also note two additional studies with regional relevance, one completed by Virginia’s Joint Legislative Audit and Review Commission (JLARC)⁵ in 2003 and the other by Virginia Department of Transportation (VDOT) in 2007.⁶ The JLARC study focused on the Chesapeake Bay Bridge Tunnel and is notable for concentrating on the level of tolls required to pay for current operations and future anticipated improvements. Interestingly, the JLARC study essentially assumed that price elasticity of demand was very low---that is, that the level of tolls would

⁵ Joint Legislative Audit and Review Commission of Virginia, “The Future of the Chesapeake Bay Bridge-Tunnel,” House Document No. 18 (2003), <http://jlarc.virginia.gov/pdfs/reports/Rpt287.pdf>.

⁶ Virginia Department of Transportation, “Midtown Tunnel Corridor Project Toll Feasibility study: Final Report,” <https://driveert.com/wp-content/uploads/2012/12/MTCP-Toll-Feasibility-Study- Final -Dec2007.pdf>.

have little or no effect on the number of vehicles that would cross the Bridge Tunnel. Indeed, JLARC reported that those likely to be most affected averred that “tolls have little direct impact on employment, business decisions, or the future of economic growth.” This was a strong statement and in light of future events, empirically false.

The VDOT study in 2007 did admit to the possibility of a “low demand” scenario in which vehicle traffic would be only 75 percent of forecasted traffic, but VDOT’s estimated tolls were below those now in effect and this is one reason why its forecasted traffic estimates were quite healthy. Further, the focus of the VDOT study, similar to the JLARC study, was upon what level of tolls would be required to generate a cash flow sufficient to attract a private investor to partner with the Commonwealth. The study skated over the impact that tolls would have on commuters, upon individuals with different levels of income, upon employers, and upon the City of Portsmouth (or any other city). Using hindsight (always a wonderful privilege), we can say that VDOT’s focus was too narrow.

IMPACT OF THE TOLLS ON TAXABLE SALES

In FY 2017, the City of Portsmouth’s received the following amounts of revenue from its taxable sales:

- \$13.66 million in state share sales tax revenue to be used for education (which was 1.92 percent of the value of taxable sales rather than the basic 1.0 percent because the Commonwealth’s school funding formula favors economically stressed communities such as Portsmouth)
- \$7.10 million in local option sales taxes (which amounted to 1.0 percent of taxable sales)
- \$5.77 million in Public Education Standards of Quality payments, which amounted to an estimated 0.8 percent of the City’s taxable sales, 0.3 percent higher than the statewide tax for this purpose, again because of a statewide funding formula)

The City of Portsmouth also assesses a 6.5 percent tax on the prices of meals and beverages purchased at restaurants within Portsmouth.

Taken together, when the 12.5 percent total applicable tax (6.0 percent state and 6.5 percent local) is applied to restaurants, Portsmouth's share revenue share of the various sales-related taxes amounts to approximately 10.92 percent.⁷ This amounts to a \$5.92 tax on a \$50 pre-tax restaurant tab at a Portsmouth restaurant. When an approximate \$4.00 roundtrip toll is added to this, the total is \$9.92, or almost 20 percent of the original pre-tax restaurant bill. This is an amount full sufficient to get a prospective diner's attention. A prospective diner easily can decide not to patronize a specific Portsmouth merchant, especially if a restaurant or bar is involved, or one is contemplating the purchase of art and antiques along with dinner.

Customers who reside "east of the river" in Norfolk or Virginia Beach are the ones most likely to make such choices. Healthy proportions of the customers of many downtown restaurants and businesses travel to those establishments from east of the river. Restaurants such as Bier Garden, Roger Brown's and Café Europa provide restaurant examples, while the Carriage House, Way Back Yonder and Skipjack provide art/antique examples.

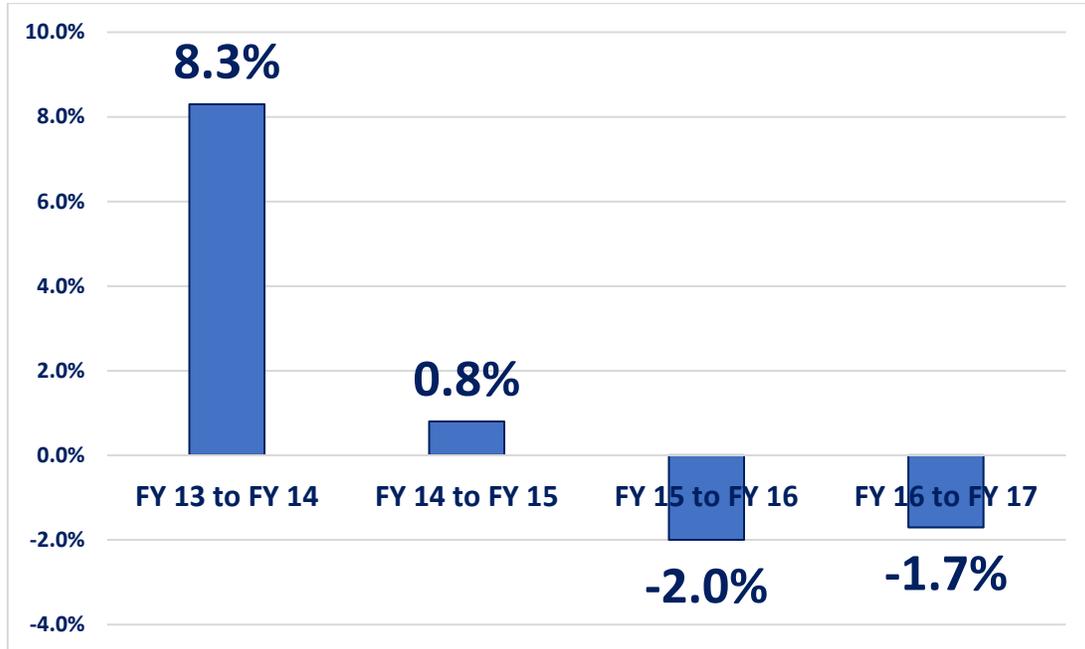
My interviews with Portsmouth merchants, some of whom shared with me summaries of their customer zip code information, confirm that downtown merchants were most affected by, and most vulnerable to, the negative effects of the tolls. Indeed, since 2014, several businesses that I visited as a part of my previous report have gone out of business. Correctly or not, tolls have been blamed for their demise.

While not definitive by itself, meal and beverage tax revenues in the Olde Towne area, zip code 23704, have tailed off since tolls were initiated. Graph 5 illustrates the downtrend that has occurred between fiscal years in the Olde Towne area even while meal and beverage tax revenues were increasing in the rest of the City.

⁷ Indirectly, the City also receives transportation funding from the 0.7 percent Hampton Roads regional tax for roads and transit, but this is unrelated to our analysis here.

Graph 5

**Percent Changes in Meal and Beverage Tax Revenues in the Olde Towne
(Zip Code 23704) Area, FY 2013 to FY 2017**



To provide broader evidence on this matter, I relied upon a statistical regression model very similar to the one I used to explain tunnel vehicle traffic. This time, however, let's assign the letters TS to quarterly taxable sales in the entire City of Portsmouth. This time, we want explain TS by means of factors such as the volume of tunnel traffic plus the number of jobs in Portsmouth, the number of jobs in Hampton Roads, defense spending, the month of the year, the day of the week, whether academic institutions such as ODU, NSU and TCC are in session, the level of Port activity, traffic disruptions due to construction and repair, and of course the tolls.

Symbolically, $TS = f(TT, JOBSP, JOBSHR, DOD, MONTH, DAY, UNIV, PORT, DISR, TOLLS)$. Once again, we want to determine the effect of each of these variables upon taxable sales and most specifically whether tolls have been an important factor in determining taxable sales.

Table 3

Factors Influencing Quarterly Taxable Sales in Portsmouth, 2017

Volume of Tunnel Traffic	Positively related to taxable sales; 1,000 additional vehicles coming through the tunnel monthly increase taxable sales by \$12,000 monthly
Jobs in Portsmouth	The number of jobs in the City is not as important as the number of jobs in the region
Jobs in Hampton Roads	More important than jobs in the City, but highly correlated with defense spending
DOD Spending	Very important determinant of taxable sales because 40% of the regional economy is related to defense spending
Month of Year	January is a negative, while June, July and August are the largest positives
Day of Week	Friday and Saturday are large positives; Monday is a major negative
Univ in Session	No visible impact of university schedules on taxable sales
Port TEUs	Very small positive impact
Traffic Disruptions	When they occur, they depress taxable sales, but there must be several in a quarter to see a difference
Tolls	Tolls depress taxable sales in Portsmouth by \$2.2 million per quarter, or \$8.8 million per year and diminish the City's tax collections by approximately \$300,000 annually

The statistical analysis for taxable sales yielded some very interesting results. The overall number of jobs in Hampton Roads is more closely related to taxable sales in Portsmouth than the number of jobs in Portsmouth itself. Presumably this reflects the reality that Portsmouth restaurants and businesses sell extensively to non-residents and also that the population and job base of the City gradually have eroded over time.

Defense spending is an important determinant of taxable sales in Portsmouth. This variable is highly correlated with the jobs variables; in a broad sense, each measures the same phenomenon---general economic prosperity. Yet, it also is a reminder that defense expenditures are responsible for about 40 percent of the value of economic activity in our region. Like it or not, defense spending continues to be the economic engine that propels Hampton Roads and Portsmouth.

Months of the year count. January is a distinct negative, perhaps due to a spending hangover from Christmas. The three really positive months are June, July and August, with September, October and December also being important.

Days of the week also are important to taxable sales, but differently from the way they influenced traffic flows. After taking account of all the factors, it is apparent that weekends are good for taxable sales in Portsmouth. Contrast this to tunnel traffic, which declines on weekends. This suggests that weekends stimulate Portsmouth residents in particular to patronize local restaurants and businesses.

Whether the major educational institutions in Norfolk are in session has no significant impact upon taxable sales in Portsmouth and Port activity has only a minimal effect.

Tunnel disruptions due to construction and repair were an important determinant of daily vehicle traffic through the tunnels. Taxable sales data, however, are provided on monthly and quarterly bases. It takes multiple disruptions in a single month or quarter to be able to observe traceable impact in the data. Fortunately, the number of disruptions has declined significantly in recent years and no longer are a very large negative influence on taxable sales.

Tolls count where taxable sales are concerned. **A good ball park estimate is that in 2017 Portsmouth lost about \$8.8 million in taxable sales and \$488,000 in sales, meal and beverage tax revenues because of the tolls. This latter number is roughly 2.3 percent of the City's current tax revenues from these sources and consists of a loss of approximately \$389,000 in revenue relating to lower taxable general sales, plus an estimated \$81,000 in reduced meal and beverage tax collections, plus an estimated \$18,000 reduction in Business and Professional Tax (BPOL) collections.**

My 2015 study reported larger estimates for Portsmouth's tax revenue losses relating to taxable sales. These smaller estimates in this report once again suggest

that customers gradually have adjusted to the tolls and the tolls no longer are quite the impediments to economic activity they once were. Even so, one downtown merchant whom I interviewed said, “That’s like you telling me that you’re not going to punch me in the face as much as in the past and then asking me to thank you for it.”

We should recognize that the major negative commercial impacts of the tolls have been concentrated in the downtown area. That is, the losses I have estimated have not been spread evenly over the city. What is hardly noticeable to home owner or renter in Churchland or Hodges Manor can be a huge problem to a business owner on High Street.

IMPACT OF THE TOLLS ON HOUSING MARKETS

Tolls may have had a variety of negative effects upon the City of Portsmouth, but there is no evidence that its overall residential housing markets have suffered as a consequence. A plausible hypothesis is that the imposition of tolls made Portsmouth residential properties less valuable. An easy way to test this proposition is to compare home sales numbers in 2013 1Q to those in 2018 1Q (tolls begin in 2014 1Q).

Table 3, utilizing Real Estate Information Network (REIN) data, shows the results of this analysis. During this five-year period, existing home sales rose substantially (48.13 percent) and the median (50th percentile) sales price on those homes rose 49.00%. These percentage increases were approximately double those in the remainder of Hampton Roads.

The data in Table 3 tell us that it would be difficult to make the case that the imposition of tolls has been a negative influence on housing markets in Portsmouth. The market for existing homes in Portsmouth has flourished since tolls were imposed. Why? An important reason appears to be that existing homes in Portsmouth simply are a good buy---they are priced below comparable homes in other areas of Hampton Roads and often located near major employers. It could also be the case, however, that the new tunnels have reduced commuting times and increased commuting reliability for some individuals and thereby made Portsmouth more attractive, at least for those headed east in the direction of Norfolk and Virginia Beach.

The data in Table 3 relate to existing homes. The market for new homes in Portsmouth is only about one-tenth the size of the existing home market and

therefore not as informative. However, over the 2013-2018 period, median sales prices of new homes rose 11.00 percent in Portsmouth, while sales rose 42.86 percent.

Table 3

**The Impact of Tolls on the Sales Prices of Existing Homes
in Portsmouth: 2013 1Q to 2018 1Q**

	<u>Percent Increase in Sales of Existing Homes</u>	<u>Percent Increase in Median Sales Price of Existing Homes</u>
Portsmouth	48.13%	49.00%
Hampton Roads	24.47%	22.16%

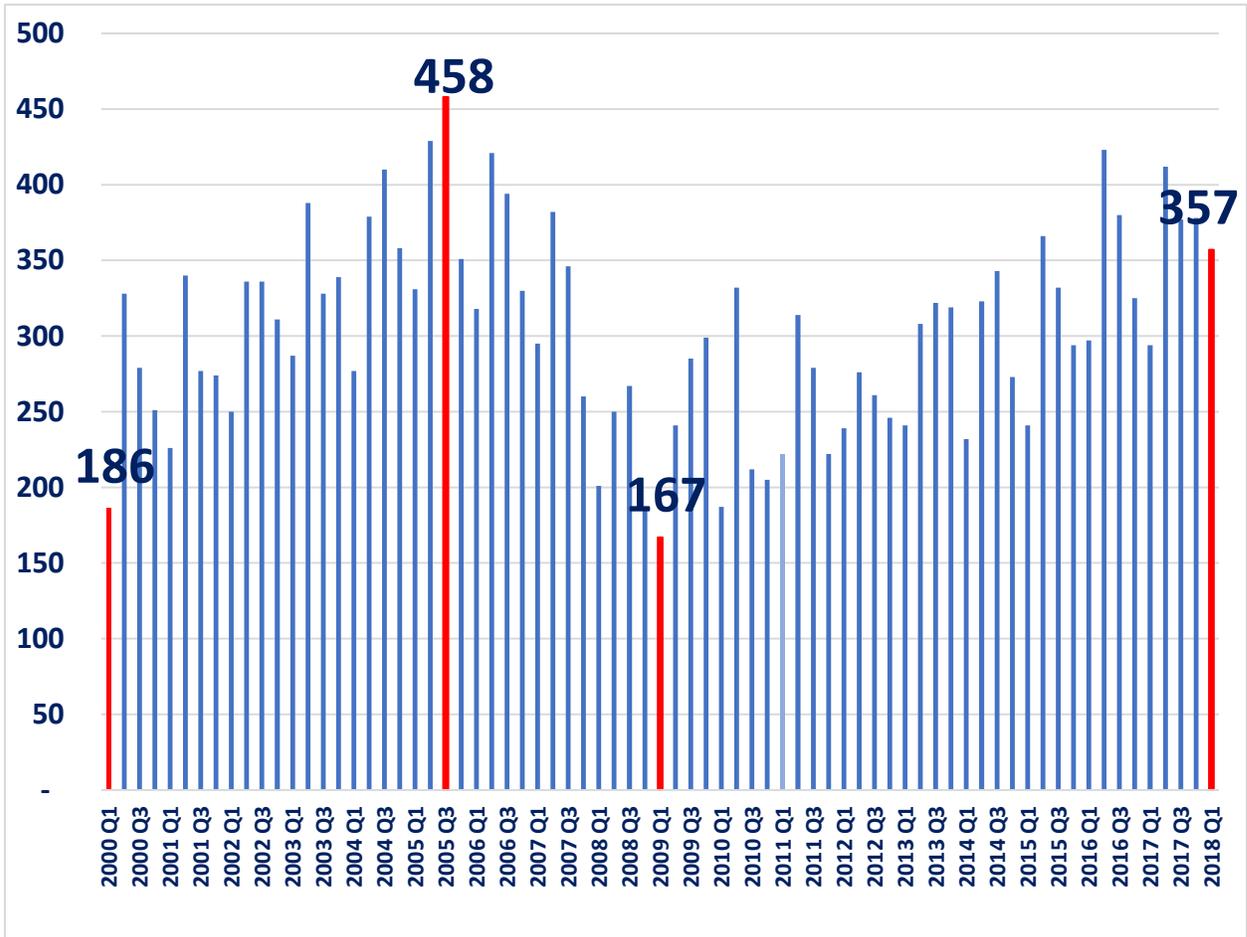
Source: Real Estate Information Network (REIN) and the Old Dominion University Forecasting Project.

Graphs 6 and 7 report Real Estate Information Network sales and median price data for Portsmouth since 2000. Even though the housing market is not as hot as it was in the boom times of the previous decade, both sales and prices have rebounded enthusiastically since their Great Recession low points.

Perhaps there was a hiccup in sales and price growth for existing homes in Portsmouth when tolls were imposed in 2014, but since then sales have more than doubled in number since their 2009 1Q low point. Further, the median sales price of existing homes was exactly \$79,100 higher in 2018 1Q than it was in 2000 1Q.

Graph 6

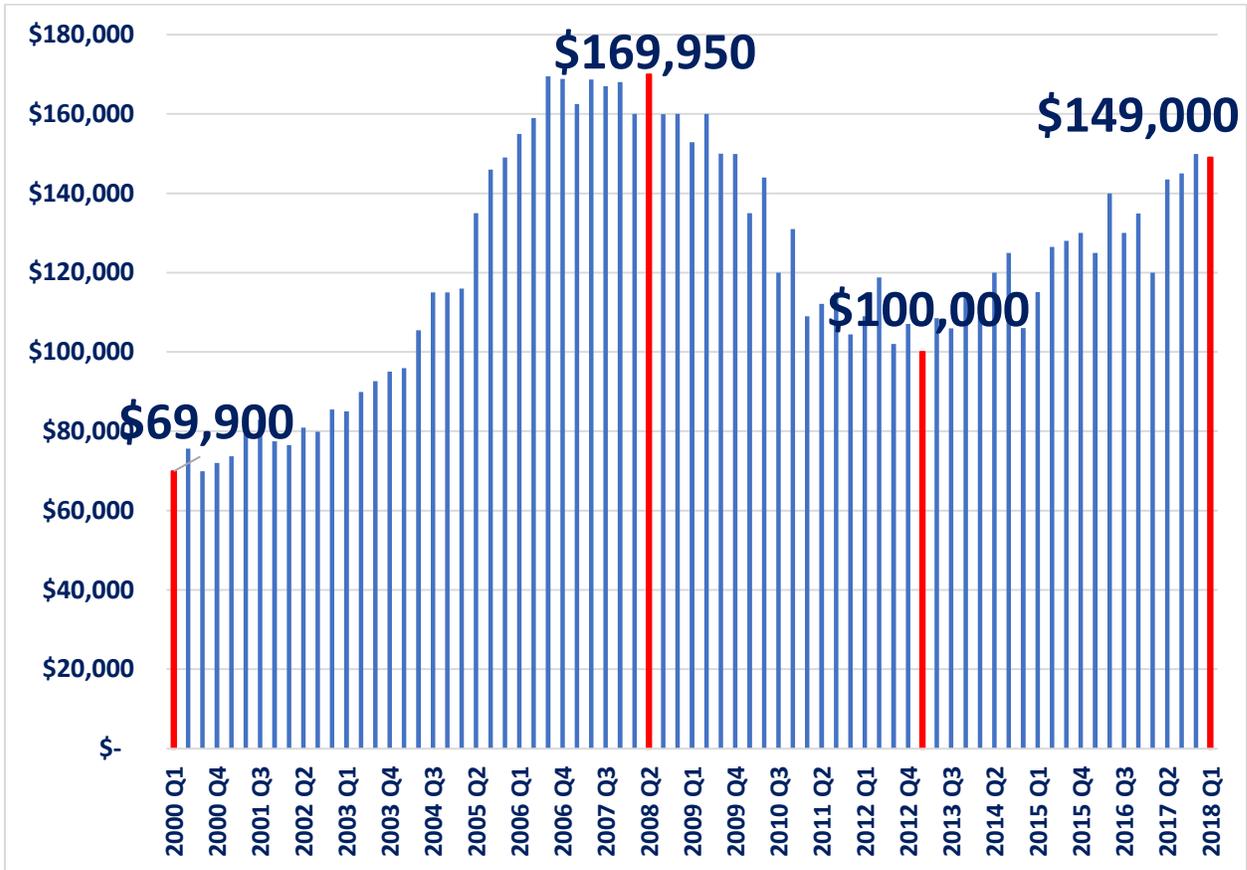
**Number of Existing Homes Sold:
Quarterly Averages, Portsmouth, 2000-2018**



Source: Real Estate Information Network (REIN) and the Old Dominion University Forecasting Project

Graph 7

**Median Sales Prices of Existing Homes Sold:
Quarterly Averages, Portsmouth, 2000-2018**

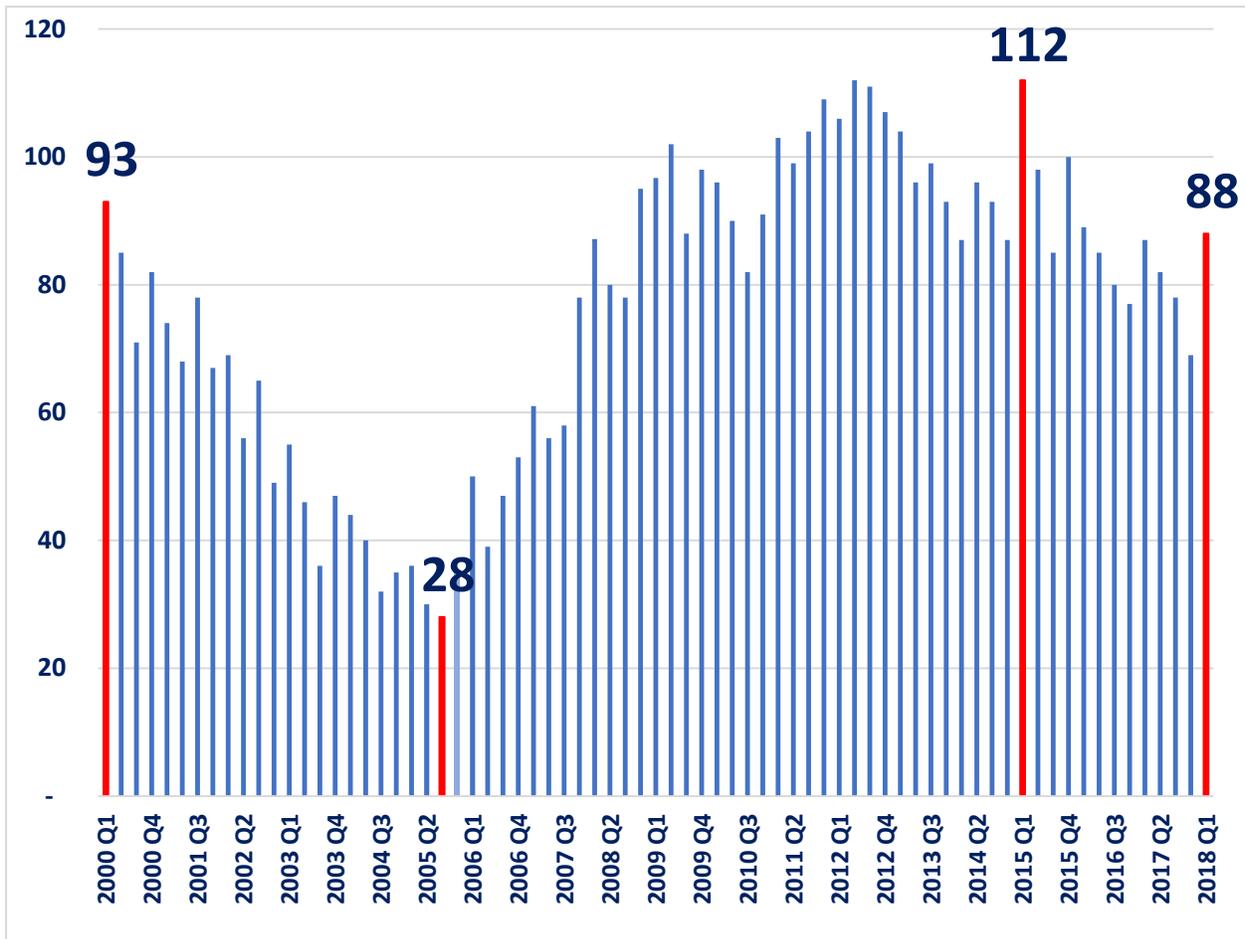


Source: Real Estate Information Network (REIN) and the Old Dominion University Forecasting Project

Improvements in the average number of days required to sell an existing home have not exhibited similarly robust improvement, but still are significantly below previous highs (see Graph 8). One could argue that the upward blip in the average number of days required for sale in 2015 reflected the imposition of tolls, but there has been substantial improvement in this datum since 2015 1Q.

Graph 8

Average Days on Market for *Existing Homes*:
Quarterly Averages, Portsmouth, 2000-2018



Source: Real Estate Information Network (REIN) and the Old Dominion University Forecasting Project.

In sum, what do the data in Table 3 and Graphs 5, 6 and 7 tell us? **There is no evidence that residential housing markets have been damaged by the imposition of tolls.** Indeed, one might make the opposite case.

TOLLS AND ASSESSED VALUATIONS

A plausible hypothesis is that the advent of tolls on the MTT and DTT tunnels has caused stagnation or even a decline in the value of residential and commercial

properties in Portsmouth. This is difficult to test for several reasons. First, assessed valuations change slowly, sometimes lag reality, and are sensitive to actual property sales, which reflect market values at a given point in time. Second, four years (2014-2017) probably is not a sufficiently lengthy period to render a judgment. Decisions to sell and/or move often are arrived at slowly and are influenced by debt obligations, school children, etc. The point is that we will be much better able to make a judgment about the impact of tolls on assessed valuations in Portsmouth in 2024 than in 2018.

Another challenge is that growing cities (for example, Chesapeake and Suffolk) present very different assessed valuation environments than built-out cities such as Portsmouth, Norfolk, and Hampton. Total assessed valuations will be growing rapidly in Chesapeake and Suffolk and cannot usefully be compared to Portsmouth. Hence, one must compare assessed valuations of comparable properties, a difficult task in any situation, but an impossible one for this report because it would require inspections, appraisals, etc.

It's also true that cities develop assessment habits that, over the long term, skew the assessments they assign to properties up or down compared to other cities. Correcting for such tendencies requires knowledge that very few individuals in Hampton Roads have.

Hence, candor requires an admission that there is a limited amount we can say on this issue in 2018. This said, it is worth noting that assessed valuations in Portsmouth in recent years have been growing more slowly than those in more or less comparable cities such as Norfolk and Hampton.

Between March 8, 2016 and February 13, 2017, the percent increase in the combined commercial/residential assessed valuation in Portsmouth was .42 percent. By comparison, assessed valuations rose 2.42 percent in Norfolk between FY 2016 and FY 2017 (not the same period, but close). Over the same period, assessed valuations rose 0.8 percent in Hampton.

In a section above, I documented the estimated \$8.8 million annual reduction in taxable sales that has occurred because of the tolls. The loss of \$8.8 million in taxable sales likely will lower commercial property values. This follows because many commercial properties are assessed on an income approach in which a

commercial property's net income is capitalized into real estate values. This commercial income could be earned by an individual who owns and operates a business, or is earned by this individual from rents paid by tenants.

With this in mind, let's construct an example showing how the loss of \$8.8 million in lost sales could translate into lower real estate values. Let's assume that net income represents 30 percent of sales for a typical business and that we capitalize this net income at 12 percent (a typical assumption on commercial properties). This enables us to compute:

$(\$8.8 \text{ million} * (1.0 - .7)) / .12 = \22.0 million in reduced real estate values---which in turn translates to an approximate \$286,000 annual loss in real estate tax collections for the City.

We will need to wait several years to see if these predictions hold true.

THE BURDEN OF THE TOLLS: PORTSMOUTH VERSUS OTHER CITIES

One can approximate the overall burden of the tolls on the four most affected cities (Norfolk, Portsmouth, Suffolk and Virginia Beach) by focusing on two types of commuters---those coming and those leaving specific cities. For example, Portsmouth hosts more than 44,200 jobs, but only about 8,300 of those jobs are occupied by residents of Portsmouth. The remaining 35,900 jobs are filled by individuals coming from other cities. Many of these job holders (an estimated 7,219) come from Norfolk and Virginia Beach via the MTT and DTT.

A larger number of Portsmouth residents (18,681 daily) leave Portsmouth via the MTT and DTT to work in Norfolk and Virginia Beach.

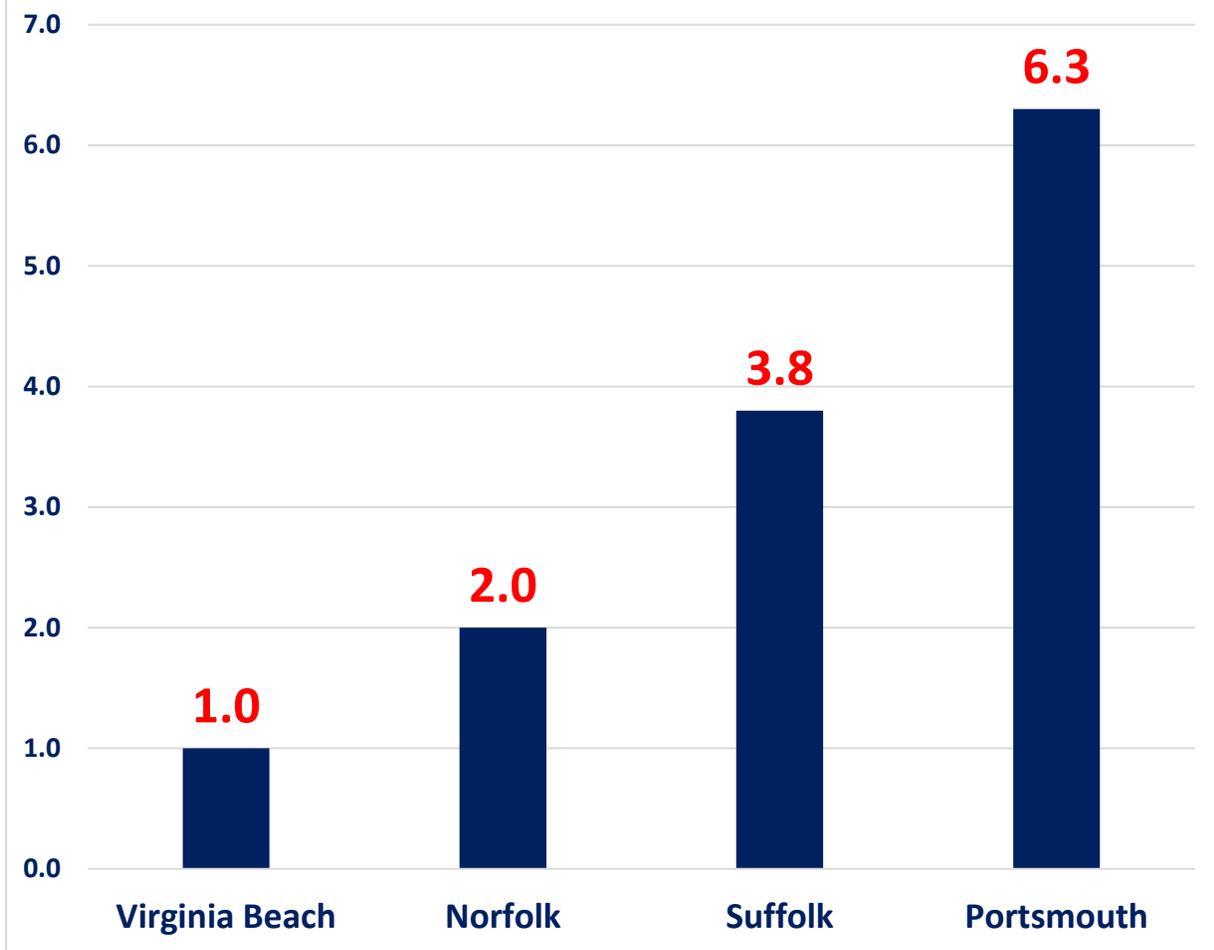
If we combine the number of individuals coming into the city via the MTT and DTT to work there with the number leaving the city via the MTT and DTT to work in Norfolk or Virginia Beach, then the resulting number is a good measure of the total number of workers who (coming or going) use the MTT and DTT daily to commute to their jobs.

The next step is to take this number (in Portsmouth's case, $7,219 + 18,681 = 26,000$) and see what proportion this is of each city's population. In Portsmouth's case, $26,000/96,201 = 19.4$ percent. For Suffolk, the percentage is 11.7 percent; for Norfolk, it is 6.1 percent; for Virginia Beach, is only 3.1 percent. These percentages reflect Portsmouth's greater economic connection to the MTT and DTT.

Proportionately, far more workers related to Portsmouth are affected by the tolls than is true for any of the other Southside cities (Chesapeake has not been included because it has so few individuals who use the MTT and DTT). Graph 9 below captures this reality. **Relatively speaking, Portsmouth is 6.3 times more affected by the tolls compared to Virginia Beach, and 3.8 times as much as Norfolk. This is evidence of economic vulnerability. Portsmouth's economic life is much more vulnerable to the tolls, and more affected by the tolls, than is true for any other city. This is because Portsmouth has a much greater proportion of workers who, coming or going, must pay the tolls.**

Graph 9

Relative Economic Impact of the Tolls on Four Cities, 2017



The ability of residents of Portsmouth to pay the tolls is not as high as it is for the residents of the other cities. Table 4 reports per capita income 2016 for the four cities and the percent of that income a commuter with an EZ Pass would pay if he/she makes 400 trips and pays peak hour toll rates. One can see that Portsmouth residents typically end up paying larger proportions of their incomes to satisfy the tolls than the residents of the other cities. **Simply put, the tolls are regressive taxes that extract higher proportions of the income of Portsmouth residents than it true for a typical resident of the other cities. This is another aspect of Portsmouth’s economic vulnerability to the tolls.**

Table 4

**Annual Peak Hour EZ Pass Tolls as a Percent of Per Capita Income:
Hampton Roads Cities, 2017**

	<u>Per Capita Income</u>	<u>Paid as Percent of Per Capita Income</u>
Virginia Beach	\$33,250	2.50%
Suffolk	\$30,331	2.74%
Norfolk	\$25,450	3.27%
Portsmouth	\$23,878	3.48%

Source: U.S. Census, Quick Facts, www.census.gov/quickfacts.

SUMMING IT UP

The imposition of tolls on the MTT and DTT tunnels hurt the City of Portsmouth. Relatively speaking, Portsmouth’s job base and labor force are six times as vulnerable to the tolls as compared to Virginia Beach. This is true because larger proportions of those working in Portsmouth get there by using the tunnels and larger proportions of its citizens head east to jobs in Norfolk or Virginia Beach. These individuals have few ways to avoid using the tunnels.

Using statistical regression analysis to separate out the effects of tolls on tunnel travel, I found that the imposition of tolls reduced traffic by 12.4 percent at the MTT and 9.8 percent at the DTT in 2017 (and 10.5 percent overall). Toll diminished taxable sales in Portsmouth by an estimated \$8.8 million in 2017.

If there is any good news here, it is that the negative impact of the tolls upon Portsmouth has diminished recently. In particular, traffic through the DTT tunnel has been recovering---not yet to 2013 levels, but now is significantly higher than the low tide year of 2014 when tolls were introduced. This is good news for the city’s merchants, for those involved in real estate, and for city government, whose tax collections depend partially upon tunnel traffic.

Very few things of economic value can be gained without a price being paid. The point here is not that improving the tunnels was a bad idea, but rather that the costs of those improvements have not been equitably distributed across the citizens and cities of Hampton Roads. The City of Portsmouth, which has the least economic ability of any area city to bear such costs, has had to pay the highest price.

Nor is the long-term outlook much better. The Commonwealth's agreement with the Elizabeth River Company (ERC) will saddle tunnel users with significantly increased tolls through 2070. If the past history of the Consumer Price index is an accurate guide to what will happen to prices over the next 50 years, then in 2070 the peak time toll for a passenger car will exceed \$21.00. It will suffice for me to say that this is not a recipe for regional economic development and certainly is not good news for the City of Portsmouth.

What is needed is a more equitable way to pay for the tunnels, perhaps even a means to buy out the contract with the ERC. Almost surely such a solution this must involve a regional funding source (since the tunnels are vital regional infrastructure) and some additional financial participation by the Commonwealth because of the relationship of the tunnels to the Port of Virginia.