

Commonwealth Transportation Fund (CTF) Revenue Bonds

Commonwealth of Massachusetts

Issuer: The Commonwealth of Massachusetts		
Assigned	Rating(s)	Outlook
Commonwealth Transportation Fund Revenue Bonds (Rail Enhancement & Accelerated Bridge Programs) 2019 Series A	AAA	Stable
Affirmed	Rating(s)	Outlook
Commonwealth Transportation Fund Revenue Bonds	AAA	Stable

Methodology:

U.S. Special Tax Revenue Bond Rating Methodology

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Rating Summary: The Bonds are special limited obligations of the Commonwealth and payable solely from the Pledged Funds, which primarily consist of Motor Fuels Tax revenues and various License and Registration Fees collected state-wide.

The Commonwealth enacted comprehensive transportation reform legislation in 2009 which was partly designed to segregate certain revenues towards capital investment in critical transportation infrastructure projects. The legislation also enabled the Commonwealth to pledge some or all of these revenues to payment of CTF special obligation revenue bonds. The segregated revenues, which consist primarily of a broad base of motor fuels taxes, driver’s license fees, and vehicle registration fees, have a long history of observable efficient and effective collection characterized by diversity in timing that smooths seasonality. The Commonwealth has demonstrated willingness and ability to adjust pledged revenues as needed to finance expanded capital needs, and also to make adjustments to offset other factors that influence the underlying base of vehicle and fuel related transactions such as lengthier registration periods

The pledged revenues currently generate approximately \$1.4 billion in revenue against maximum annual debt service of \$193 million. The Commonwealth’s comprehensive transportation capital planning will lead to issuance of an additional \$1.6 billion of CTF debt (estimated proceeds) over the next five years (through fiscal year 2024). But even after the new debt, pledged revenues are expected to cover maximum annual debt service requirements at least 5x, even while assuming very little growth in the pledged revenue base. For FY 2019,

pledged revenues year-over-year were up 0.7%. For the 3-months ended September 30, 2019, the pledged revenues are up approximately 0.3% when compared to the same period in FY 2018. Registry fee receipts, which since 2010 have historically made up over 40% of pledged revenues, are up over 2% in the same period.

The CTF Bonds enjoy numerous legal protections that KBRA believes insulate the pledged revenues from budget operations of the Commonwealth. Among these protections, described more fully in the Legal Framework section of this report, are Constitutional restrictions on the use of the revenues; covenants not to impair the rights or remedies of the Trustee; laws that prohibit the use of the pledged revenues for any purpose before appropriation to pay debt service; and restrictions on additional debt or changes to the pledged revenues unless maximum annual debt service coverage remains at least 4x.

The Stable Outlook reflects KBRA’s expectation that pledged revenues are resilient and unlikely to decline significantly enough to impair coverage of debt service, even in very adverse economic conditions. Further, KBRA believes the Commonwealth has no legal ability or political incentive to divert or dilute the pledged revenues in ways that would be detrimental to bondholders.

Key Rating Strengths

- Very broad and resilient nature of the pledged revenues that currently generate over 7x coverage of current maximum annual debt service requirements;
- Extensive legal protections that are collectively and effectively designed to insulate pledged revenues from Commonwealth budget operations;
- The Commonwealth’s diverse, wealthy, and growing economy;

Key Rating Concerns

- The pledged revenues are economically sensitive and likely to decrease in a recession, although the annual rate of decrease has been moderate in past downturns.

Drivers for Rating Change

- | | |
|---|---|
| • N/A | + |
| • An unlikely scenario where there was a substantial and sustained decline in pledged revenues. | - |

Pledged Revenues Details:
Motor Fuels Tax

Chapter 64A Receipts: 24 cents/gallon Gasoline Tax levied statewide.

Chapter 64E and Chapter 64F Receipts: 24 cents/gallon tax on special fuels and tax of 19.1% of average price/gallon of liquefied gas sold or used in the Commonwealth (Special Fuels Tax); 24 cents/gallon tax on each gallon of gasoline and special fuels acquired outside and used within the Commonwealth (Motor Carrier Tax).

Registry Fees

Chapter 90 Registry Fees: motor vehicle registration fees, motor vehicle license fees, miscellaneous fees relating to the operation and use of motor vehicles.

Key Ratios

Pledged Revenues ('000s)	FY 2019 ⁽¹⁾	% chg	3-mnths ended		% chg
			9/30/2018	9/30/2019	
Motor Fuel Taxes					
Ch. 64A Gas Tax	\$ 672,866	0.7%	\$ 176,990	\$ 175,619	-0.8%
Ch. 64E Sp. Fuels Tax & Ch. 64F Motor Carrier Tax	100,923	1.3%	26,191	26,062	-0.5%
Registry Fees					
Ch. 90 Registry Fees	616,830	0.7%	116,912	119,378	2.1%
Total Pledged Revenues	\$ 1,390,619	0.7%	\$ 320,093	\$ 321,059	0.3%
Registry of Motor Vehicles Transactions (count) ⁽²⁾	5,892	7.1%			
Pledged Revenues 2009-2019 CAGR		2.8%			
MADS Debt Service (FY 2023 in thousands) ⁽³⁾	196,493				
DSCR MADS from FY 2019 Pledged Revenues		7.1x			

Economic Data

Population (2018)	6,902,149
State Per Capita Personal Income	\$ 71,683
Real GSP per Capita	\$ 72,635
% Change from 2010 in Real GSP per Capita	12.3%

⁽¹⁾ Fiscal year 2019 revenues are preliminary and subject to change.

⁽²⁾ Transaction count for FY 2018; latest available figure.

⁽³⁾ MADS from prior CTF Bonds and 2019 Bonds.

Source: Commonwealth of Massachusetts; US Census; and Bureau of Economic Analysis

Rating Determinants (RD)

1. Legal Framework	AAA
2. Nature of Special Tax Revenues	AAA
3. Economic Base and Demographics	AAA
4. Revenue Analysis	AAA
5. Coverage and Bond Structure	AAA

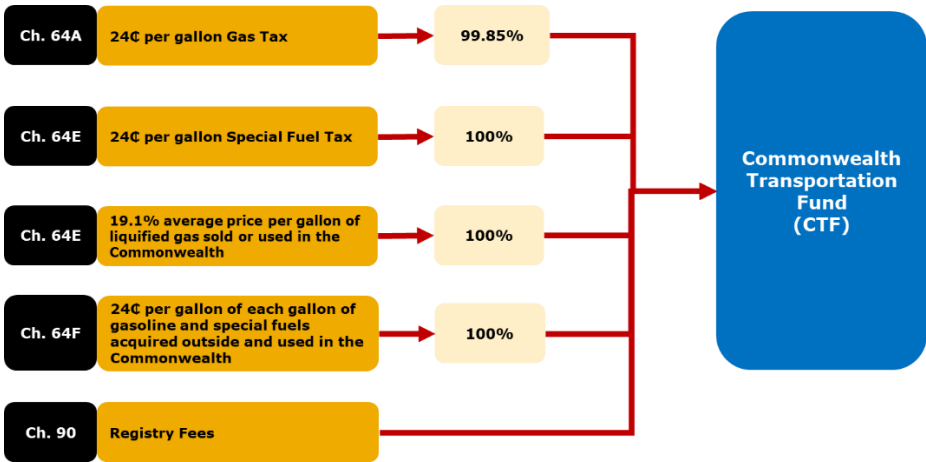
RD 1: Legal Framework

The legal and statutory framework, pursuant to which the bonds are issued, imposes strong protections that significantly limit bondholder risk. A principal benefit, in KBRA’s view, are the covenants imposed on the Commonwealth restricting it from diverting pledged revenues away from the Commonwealth Transportation Fund (“the CTF”) and/or applying pledged revenues as a transportation funding source prior to servicing CTF bonds. KBRA notes the strong revenue collection and deposit procedures with monthly deposit to the bond trustee as well as the Commonwealth’s covenant that it will not impair the rights of bondholders or lower registry fees or motor fuel tax rates unless it can demonstrate that pledged revenues will provide coverage of maximum annual debt service by at least 4x. KBRA also notes the strong protections against overleveraging pledged revenues imposed by the additional bonds test requiring gross revenues to equal at least 4x maximum annual debt service on existing and proposed additional debt. There is no requirement for a debt service reserve fund. The Massachusetts Constitution requires legislative appropriation of CTF funds, along with nearly all other state spending, for CTF bond debt service and all other transportation related purposes. In KBRA’s view, the importance of pledged revenues as a source of statewide transportation funding and the inability of the State to access these funds unless debt service on the CTF bonds is appropriated, mitigates any risks related to non-appropriation. In KBRA’s view, these provisions obviate the need for a debt service reserve fund requirement.

Nature and Strength of Pledged Revenues

The bonds are secured by a gross lien pledge of revenues from several taxes and fees that are constitutionally dedicated for transportation related purposes. Figure 1 provides an outline of the taxes and fees that constitute pledged revenues. Information on pledged revenues is provided in greater detail within the following sections of this report. The taxes and fees are applied across the entirety of the Commonwealth capturing the economic activity of a substantial statewide economic base. While the taxes and fees extend only to transportation related services, KBRA views the breadth of the tax base as very broad given the essentiality of automobile use to the underlying statewide economy.

Figure 1



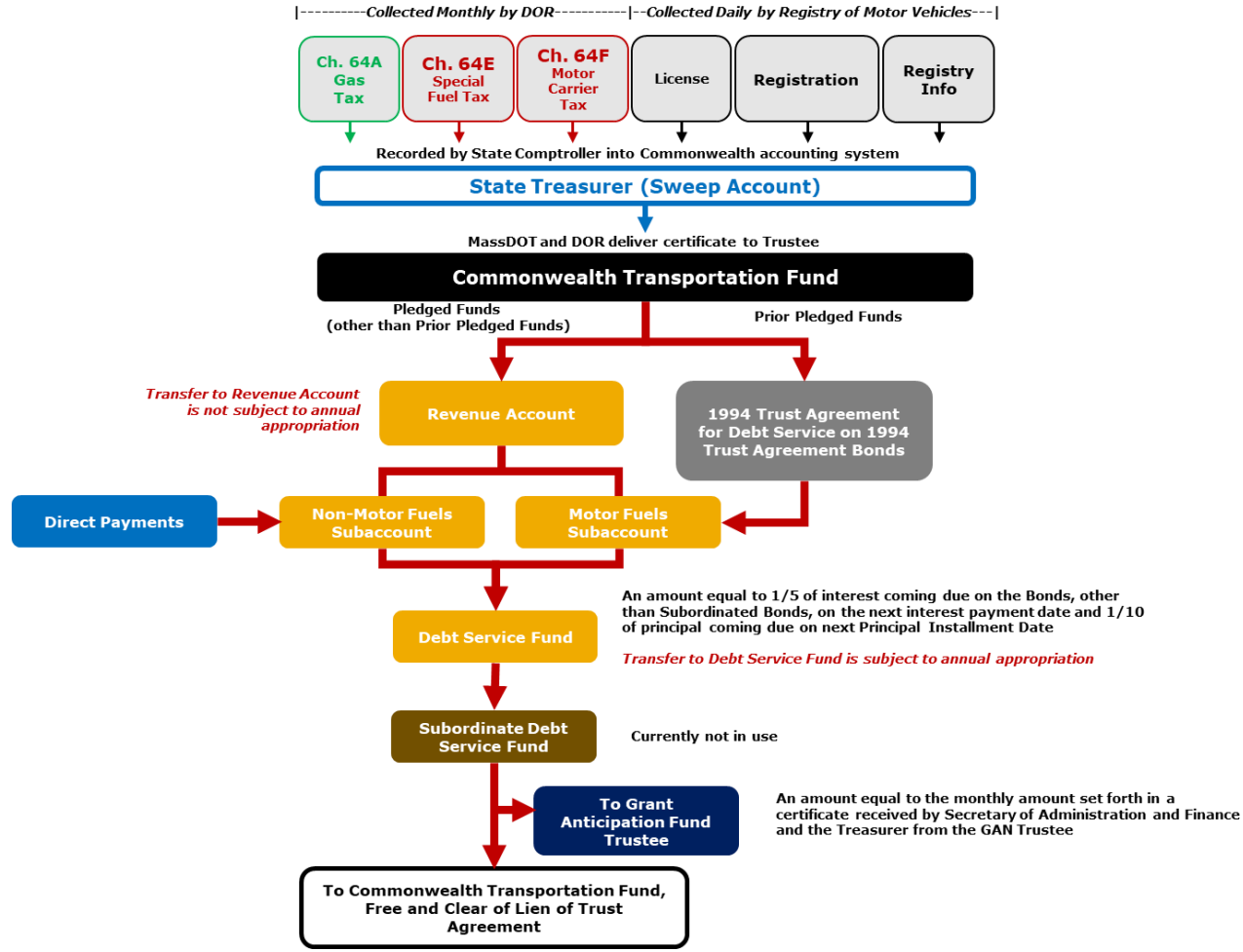
The pledged revenues are an essential source of funding for transportation related programs throughout the Commonwealth. Pursuant to the Massachusetts Constitution and state covenant, pledged revenues do not become available for state spending unless the appropriation for debt service for the current fiscal year has been made and the required monthly deposits to the CTF funds and accounts have also been made or provided for. It is KBRA’s understanding that if the Commonwealth failed to appropriate CTF funds there would be an approximate shortfall in transportation funding of approximately \$1.2 billion in fiscal year 2019.

KBRA also notes that the Commonwealth has granted a lien on pledged funds that is perfected by the filing of the trust agreement in the records of the Commonwealth Treasurer.

Flow of Funds & Timing of Deposits

Pledged revenues are collected by the Massachusetts Department of Revenue (“DOR”) and the Registry of Motor Vehicles (“MassDOT”). The strong collection procedures for pledged revenues are outlined in Figure 2. The DOR and MassDOT are required to deliver a certificate to the bond trustee within eight business days of the end of the month confirming the amount of pledged funds deposited within the past month. The state treasurer transfers pledged funds from the Commonwealth Transportation Fund into the revenue account, which is held by the trustee, within two business days of receiving the certificate from DOR and MassDOT.

Figure 2



KBRA views the revenue collection procedure as very strong and notes that the Commonwealth has made technological investments that simplify the payment of fees and taxes and enhance the Commonwealth’s ability to track and collect pledged revenues. KBRA understands that 99% of the dollar amount of motor fuels tax collections are remitted electronically. As shown in Figure 21, the Commonwealth has a small amount of bonds outstanding that are payable senior to CTF bonds (“1994 Trust Agreement Bonds”). The lien on the 1994 Trust Agreement Bonds is closed and any additional issuance will be limited to bond refundings. KBRA also notes that all 1994 Trust Agreement Bonds will be fully retired by FY 2022 and that annual debt service on these bonds is level and accounts for less than 3% of total projected pledged revenues in FY 2020.

The Commonwealth appropriates debt service as part of its annual budgeting process and, as noted, no funds may be transferred from the revenue account for any purpose, including debt service, until the appropriation has been made. The trustee is required to deposit monthly an amount equal to 1/5 interest due and 1/10 of the principal due on the next interest and or principal payment dates. For the Bonds, these dates are June 1 for principal and interest and

December 1 for interest only. KBRA notes that the Commonwealth's fiscal year begins on July 1 which, in KBRA's view, provides a sufficient amount of time between the required budget appropriation date and principal and interest payments dates that further mitigates the risk of non-appropriation. And in any event, budget delays are generally addressed by continuing resolutions carrying over prior years' appropriations.

Bondholder Protections & Statutory Limitations

In addition to the legal provisions set forth in the trust indenture, KBRA notes the statutory provisions that help create the strong legal framework supporting the Bonds, several of which are specifically outlined as follows:

- Article 78 of the Articles of Amendment to the Massachusetts Constitution, as amended, requires that any fees, duties, excises or license taxes relating to the registration, operation or use of vehicles on public highways, or to fuels used for propelling such vehicles be expended only for the following purposes: (1) the cost of administration of laws providing for such revenue, (2) the making of refunds and adjustments relating to such revenue; (3) the payment of highway obligations; (4) the cost of construction, reconstruction, maintenance and repair of public highways, bridges and mass transportation lines; (5) the cost of enforcing state traffic laws; and (6) the cost of other mass transportation purposes. Article 78 revenues may be expended by the Commonwealth and its counties, cities and towns for these purposes only in such manner as the Legislature may direct.
- The motor fuels tax imposed under Chapters 64A, 64E and 64F and the registry fees are classified as Article 78 revenues. The Pledged motor fuels tax receipts thus are available to be used only for such transportation-related purposes, including debt service on CTF bonds.
- The Commonwealth has agreed that any future amendments of the authorizing legislation, and other statutes that govern pledged funds, are subject to the covenant of the Commonwealth that it shall not take any action that would impair the rights and remedies of the owners of the Bonds. Specifically, the Commonwealth's right to make such changes is restricted by the trust agreement in which the Commonwealth has covenanted not to impair, in any way, the rights and remedies of the owners of the bonds under the trust agreement.
- The Commonwealth has covenanted in the trust agreement that, so long as any bonds are outstanding and unless an appropriation has been made by the legislature which is sufficient to pay debt service on the bonds, the pledged funds shall not be applied to any other use.
- The trust agreement does permit the Commonwealth to lower the rates of the motor fuels tax or any registry fees or both, provided that the state treasurer delivers to the bond trustee a certificate demonstrating the amount of pledged funds received by the state treasurer during any 12 consecutive months of the 18-month period ending with the last full month immediately preceding the effective date of any such change, as adjusted, as set forth in such certificate, to reflect the proposed change in rates, to be at least equal to 400% of the maximum annual debt service requirement due in any fiscal year of the then outstanding bonds.

Additional Bonds Test

Additional bonds may be issued if the Commonwealth can demonstrate that gross pledged revenues for any 12 consecutive months during the most recent 18-month period was not less than 4x maximum annual debt service due in the current or any future fiscal year on the outstanding bonds and the bonds to be issued. As noted, KBRA views the additional bonds test as restrictive and as providing sufficient protection against overleveraging pledged revenues.

Bankruptcy Assessment

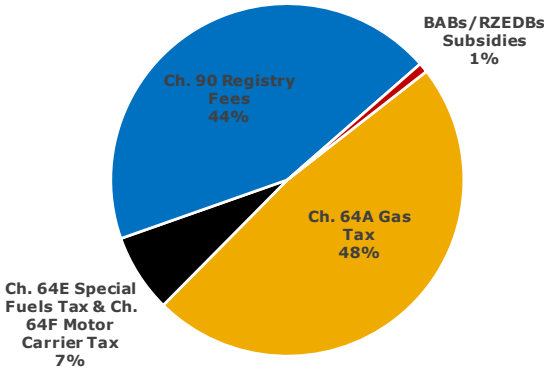
The United States Bankruptcy Code is not applicable to states. Because the Commonwealth is a state, it is thus not eligible for relief under the U.S. Bankruptcy Code.

RD 2: Nature of Special Tax Revenues

In KBRA’s view, the pledged funds, derived from a broad and essential base provide a strong source for repayment of the bonds. The pledged revenues consist of six motor fuels taxes and registry fees and are levied across the entire Commonwealth, which includes 6.9 million people and approximately 5.9 million registered vehicles. Gas taxes and vehicle registry fees account for 48% and 44% of the pledged revenues respectively; and 7% of the pledged revenues come from special fuels and motor carrier taxes (see Figure 3). An additional 1% of pledged revenues comes from federal Build America Bonds subsidies. Historically, gas taxes and vehicle registry fees have accounted for over 90% of pledged revenues.

The pledged taxes and fees, which generated nearly \$1.4 billion in FY 2019, up 0.7% or \$10 million from FY 2018, have a long history of efficient collection and are diverse in timing. The pledged revenues have grown at a compound annual rate of 2.8% over the last ten years. Registry fees consist of motor vehicle registrations and driver license fees. The steady trend in registry transaction count by type is shown in Figure 4. The Commonwealth implemented fee increases in 2009, and fee adjustments in 2014, which have led to increased pledged revenues despite the implementation of longer registration periods and longer license renewal periods over the past decade.

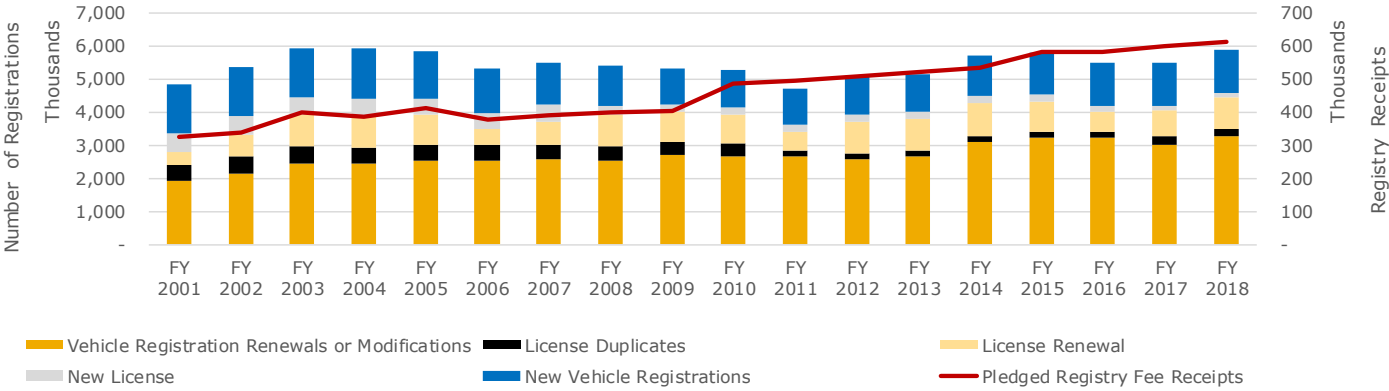
Figure 3
FY19 Diversity of Pledged Funds



Source: Commonwealth of Massachusetts

Figure 4

Registrations and Registry Receipts



Source: Commonwealth of Massachusetts Commonwealth of Massachusetts Annual Financial Information Commonwealth Transportation Fund Revenue Bonds.

Meanwhile, the motor fuels taxes, which the Commonwealth has imposed since 1928, are levied across numerous fuel types capturing virtually all consumption or importation of motor fuels in the Commonwealth.

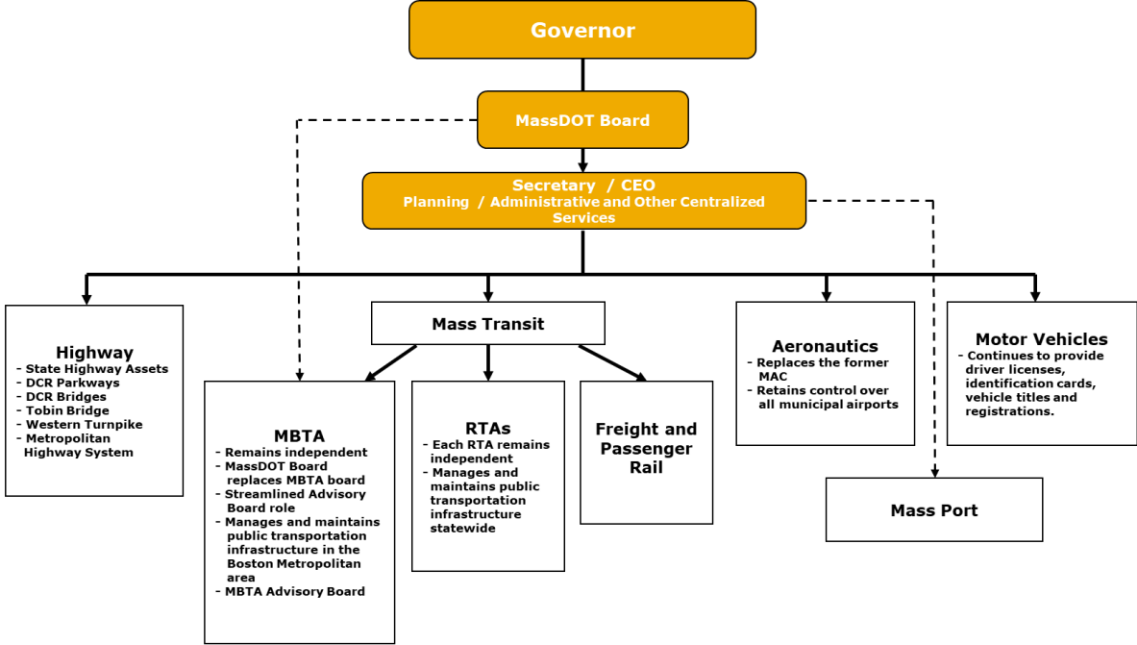
MassDOT

In June of 2009 the Commonwealth restructured its transportation system and created the Massachusetts Department of Transportation (“MassDOT”). MassDOT represents a merger of several state governmental entities including the Massachusetts Turnpike Authority, the Massachusetts Highway Department, the Registry of Motor Vehicles and the Executive Office of Transportation and Public Works. The Massachusetts Bay Transportation Authority (“MBTA”) and the Regional Transit Authorities (“RTAs”) located across the state remain independent but are subject to oversight by MassDOT.

MassDOT owns, operates and maintains the state highway system, including the Metropolitan Highway System and the I-90 Turnpike. It is responsible for planning and completing capital improvement projects on the state highway system

while coordinating with the MBTA and RTAs on bus and rail operations. MassDOT is also responsible for funding the Registry of Motor Vehicles as well as the Aeronautics Division, which retains control over all Commonwealth municipal airports. MassDOT develops its annual operating and capital budget in consultation with the Governor and the Executive Office for Administration and Finance, the Secretary of Transportation.

Figure 5



Source: Commonwealth of Massachusetts

Statewide Transportation Funding Sources

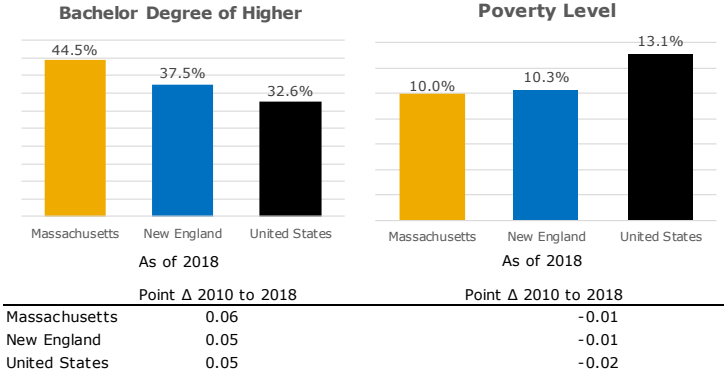
The annual operating and capital budgets for transportation are developed by the Governor, the Legislator, MassDOT, the MassDOT Board of Directors, and the Metropolitan Planning Organizations and RTAs that are located across the state.

The Commonwealth’s transportation system is funded from five primary sources including state taxes, motor vehicle fees, federal funds, toll revenues and bond proceeds. These funding sources are administered through the Commonwealth Transportation Fund and the Massachusetts Transportation Trust Fund (“MTTF”). The two funds segregate and account for all transportation related revenues and expenses made by the Commonwealth.

RD 3: Economic Base and Demographics

KBRA views the economic base of the Commonwealth as broad, wealthy, demonstrably resilient, and diverse. Many economic indicators are among the strongest in the U.S. and the New England Region¹ (see Figure 6). For example, Massachusetts’ population of roughly 6.9 million, representing approximately 47% of New England, has grown at nearly double the region’s rate of growth since 2010 (5.1% increase or a 0.6% compound annual growth rate (CAGR) since 2010). The Commonwealth also has a lower than average age dependency ratio, above average education attainment, and much higher than average wealth levels. Many of these positive indicators can be attributed to the

Figure 6



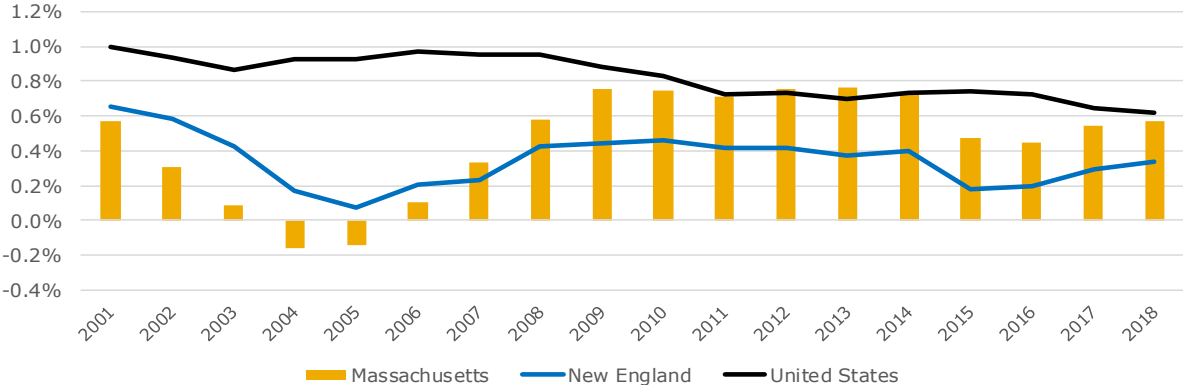
Source: U.S Census
 Bachelor degree or higher defined as "% of population over 25 with Bachelor's degree or higher".
 Poverty level defined as "portion of population living below the poverty line".

¹ New England Region is defined as Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

presence of several renowned higher-education institutions as well as high-paying healthcare and professional services jobs, as discussed further below.

Figure 7

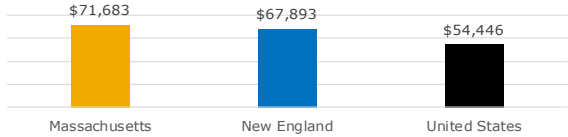
% Change in Population



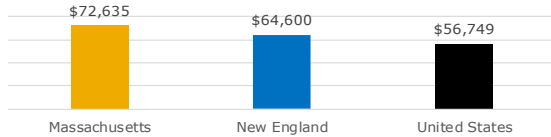
	2000	2010	2018	% Δ 2010 to 2018
Massachusetts	6,361,104	6,566,431	6,902,149	5.1%
New England	13,949,721	14,469,783	14,853,290	2.7%
United States	282,162,411	309,326,085	327,167,434	5.8%

Source: U.S. Bureau of Economic Analysis

Per Capita Personal Income



Real GSP Per Capita



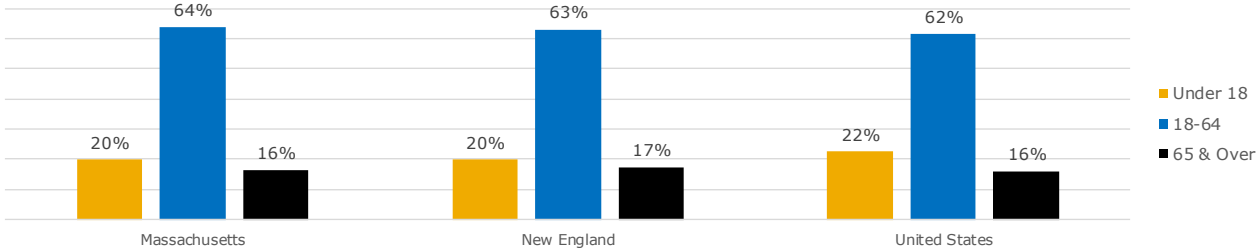
	% Δ 2010 to 2018	Comparison		% Δ 2010 to 2018	Comparison
Massachusetts	35.1%	-	Massachusetts	12.3%	-
New England	30.3%	106% of Region	New England	7.2%	112.4% of Region
United States	34.3%	132% of U.S.	United States	12.5%	128.0% of U.S.

Source: U.S. Bureau of Economic Analysis

The cohort of the population that is under 18 years of age between 2010 to 2018 is declining in Massachusetts at a more rapid rate than the U.S. average, but at a slower pace than New England as a whole. The age group of 18-64 is growing more rapidly in Massachusetts than in the U.S. and New England.

Figure 8

Age Groups



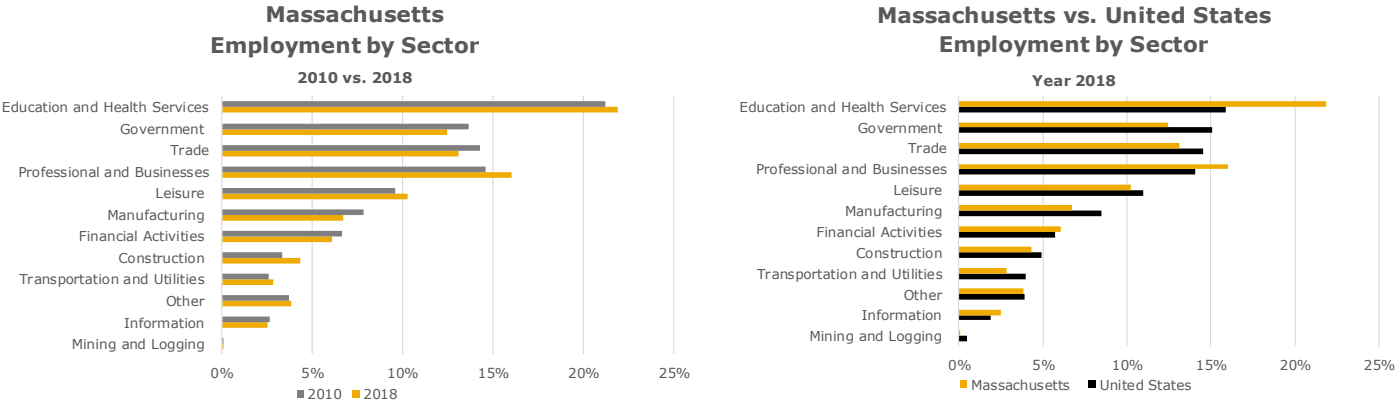
	% Δ 2010 to 2018	% Δ 2010 to 2018	% Δ 2010 to 2018
Under 18	-3.6%	-6.9%	-1.1%
18-64	3.9%	0.9%	3.4%
65 & Over	25.5%	25.9%	29.7%

Source: U.S. Census

Labor Market

The Commonwealth’s employment opportunities are diverse. The education and health services sector, which makes up the Commonwealth’s largest employment sector, provides a pool of relatively stable, high-skill, and high-paying jobs. The professional and business services, trade, and government sectors make up the remaining majority of the Commonwealth’s employment sectors (see Figure 9). The top private sector employers include eight hospitals, four universities, and three supermarkets, most of which are located in the Greater Boston area. The Commonwealth is also home to 12 Fortune 500 company headquarters.

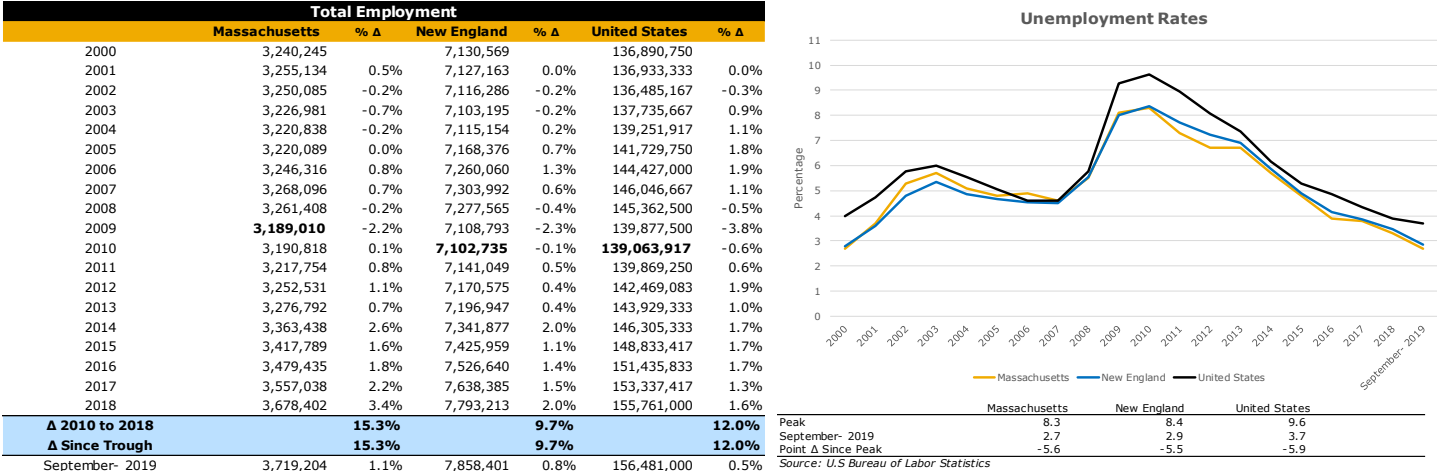
Figure 9



Source: U.S. Bureau of Economic Analysis

Before the Great Recession, growth in employment often lagged that of the U.S. However, this growth pattern changed post-recession (see Figure 10). Employment growth has been rapid and has outpaced the U.S. in many of the last 10 years owing to the robust development in technology, biotech, and healthcare. Massachusetts employment has grown at an average annual rate of 1.2% over the last ten years, compared to 0.7% for both New England and the U.S. across the same period. Post-recession unemployment rates in the Commonwealth have been consistently lower than the region and the nation.

Figure 10



Fueling the growth in employment, Massachusetts is home to a number of internationally recognized institutions, such as Harvard University and the Massachusetts Institute of Technology. Given its diversity of industry, a strong healthcare system, and top schools, as just mentioned, many graduates stay in the area to pursue careers.

Economic Output Performance

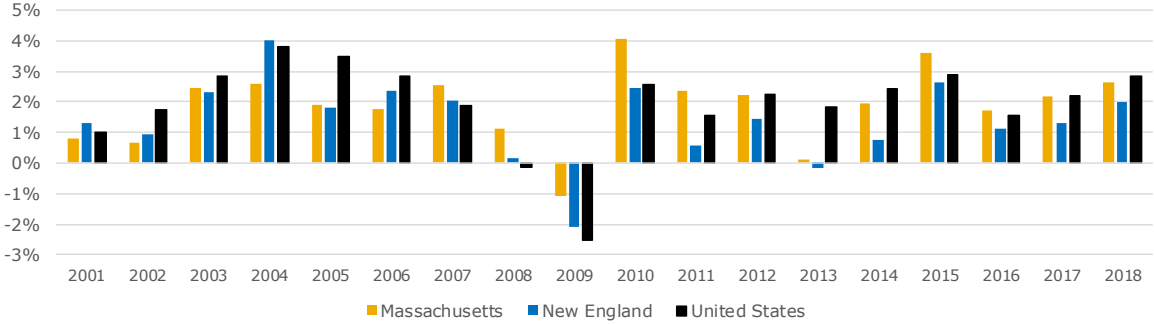
Massachusetts ranked 11th among states in economic output at over \$501 billion (GSP in chained 2012 dollars) in 2018, punching above its population rank of 15. Annual GSP growth has been strong and resilient and has outpaced the U.S. in six of the last ten years from 2008 through 2018. Across the same period, the Commonwealth’s total annual average GSP growth was 2.0% which exceeds the U.S. and New England (at 1.8% and 1.0%, respectively).

Massachusetts ranked 19th in exports in the U.S. in 2018 and the largest in New England. Total exports in 2018 equaled \$27.2 billion, decreasing nearly 4% from 2017, while national exports saw an increase of 5.2%. Overall, Massachusetts had a trade deficit of \$8.5 billion in 2018. The top trade partners of the Commonwealth are Canada, China, Mexico, Germany, and Japan. The top commodities traded are high-tech and medical related machineries.

It is KBRA’s view that the Commonwealth’s robust economic output is related to its innovation-focused economy with large venture capital investments in biotechnology, software, and technology infrastructure.

Figure 11

Real GSP Annual Change (chained 2012 dollars)



(\$ in Millions)	2000	2010	2018	% Δ 2010 to 2018
Massachusetts	359,521	424,581	501,337	18.1%
New England	749,473	871,810	959,518	10.1%
United States	13,130,987	15,598,753	18,566,442	19.0%

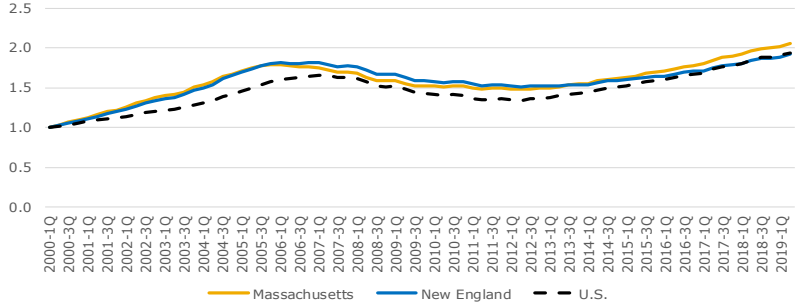
Source: U.S. Bureau of Economic Analysis

Housing Market

Despite declining by approximately 17.5% from its pre-recession peak, the impact of the Great Recession was milder on Massachusetts’ housing market than on the New England region. Recovery since its recessionary trough in 2012 has been gradual and healthy as currently home values are approximately 114% of the pre-recession peak, compared to approximately 106% for the region.

Figure 12

Home Values Indexed to 2000-Q1 (2000-Q1 to 2019-Q2)



Source: Federal Housing Finance Authority (FHFA), All-Transactions Indexes, Not Seasonally Adjusted

RD 4: Revenue Analysis

Overall trends in pledged revenues have shown modest but steady growth (see Figure 14). A combination of modest timely tax or fee increases, and transaction growth has offset long term stasis in fuel consumption and general movement toward lengthier license and registration cycles. Pledged revenues have grown at an average annual rate of 2.8% over the last ten years. For the 3-month period ended FY 2019 (through September), overall pledged revenues are up 0.3% when compared with the same period for FY 2018 (see Figure 13).

Figure 13

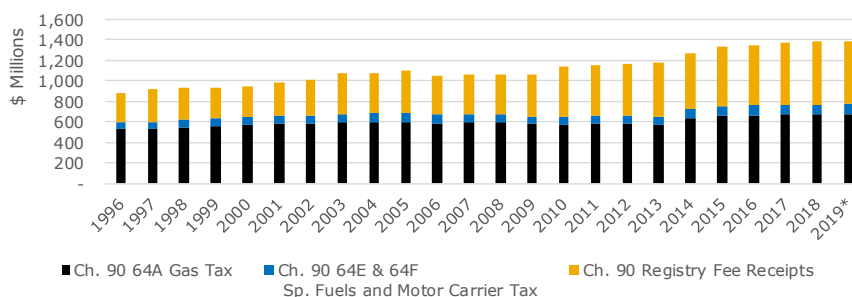
Pledged Revenues (000s)	3-mnths ended 9/30/2018	3-mnths ended 9/30/2019	% chg.
Ch. 90 64A Gas Tax	\$ 176,990	\$ 175,619	-0.8%
Ch. 90 64E & 64F Sp. Fuels and Motor Carrier Tax	26,191	26,062	-0.5%
Ch. 90 Registry Fee Receipts	116,912	119,378	2.1%
Total	\$ 320,093	\$ 321,059	0.3%

Source: Commonwealth of Massachusetts

Figure 14

Trend in Pledged Revenues (\$000s)								
Fiscal Year	Ch. 90 64A Gas Tax	% chg.	Ch. 90 64E & 64F Sp. Fuels and Motor Carrier Tax	% chg.	Ch. 90 Registry Fee Receipts	% chg.	Pledged Funds	% chg.
1996	532,324		65,259		280,923		878,506	
1997	535,040	0.5%	66,528	1.9%	313,215	11.5%	914,783	4.1%
1998	546,213	2.1%	73,822	11.0%	312,180	-0.3%	932,215	1.9%
1999	561,714	2.8%	73,549	-0.4%	297,658	-4.7%	932,921	0.1%
2000	572,209	1.9%	79,041	7.5%	300,040	0.8%	951,290	2.0%
2001	576,974	0.8%	81,547	3.2%	322,808	7.6%	981,329	3.2%
2002	585,519	1.5%	79,904	-2.0%	338,440	4.8%	1,003,863	2.3%
2003	593,691	1.4%	81,255	1.7%	397,683	17.5%	1,072,629	6.9%
2004	600,255	1.1%	82,659	1.7%	386,284	-2.9%	1,069,198	-0.3%
2005	599,736	-0.1%	84,382	2.1%	413,481	7.0%	1,097,599	2.7%
2006	589,591	-1.7%	80,785	-4.3%	375,670	-9.1%	1,046,046	-4.7%
2007	594,892	0.9%	79,545	-1.5%	388,496	3.4%	1,062,933	1.6%
2008	595,380	0.1%	75,560	-5.0%	396,904	2.2%	1,067,844	0.5%
2009	578,691	-2.8%	73,462	-2.8%	403,780	1.7%	1,055,933	-1.1%
2010	576,676	-0.3%	76,369	4.0%	485,789	20.3%	1,138,834	7.9%
2011	580,031	0.6%	79,152	3.6%	496,034	2.1%	1,155,217	1.4%
2012	581,148	0.2%	79,028	-0.2%	508,608	2.5%	1,168,784	1.2%
2013	570,477	-1.8%	79,302	0.3%	522,199	2.7%	1,171,978	0.3%
2014	640,702	12.3%	89,938	13.4%	533,194	2.1%	1,263,834	7.8%
2015	656,445	2.5%	97,947	8.9%	581,686	9.1%	1,336,078	5.7%
2016	666,539	1.5%	98,309	0.4%	580,426	-0.2%	1,345,274	0.7%
2017	670,093	0.5%	97,762	-0.6%	598,683	3.1%	1,366,538	1.6%
2018	667,866	-0.3%	99,654	1.9%	612,780	2.4%	1,380,300	1.0%
2019*	672,866	0.7%	100,923	1.3%	616,830	0.7%	1,390,619	0.7%

Trend in Pledged Revenue



*Fiscal year 2019 figures are preliminary and subject to change.

Source: Commonwealth of Massachusetts Annual Financial Information CTF Revenue Bonds

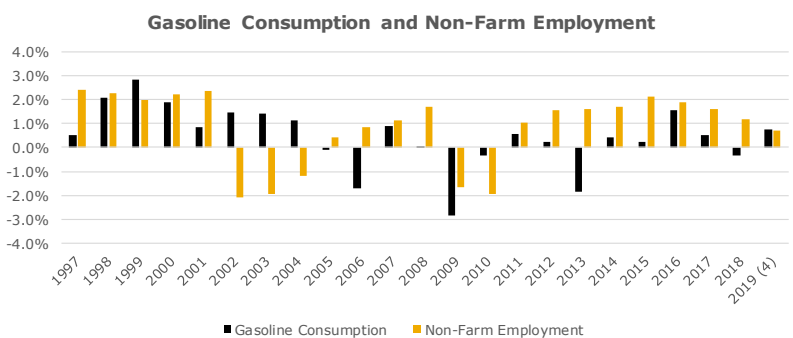
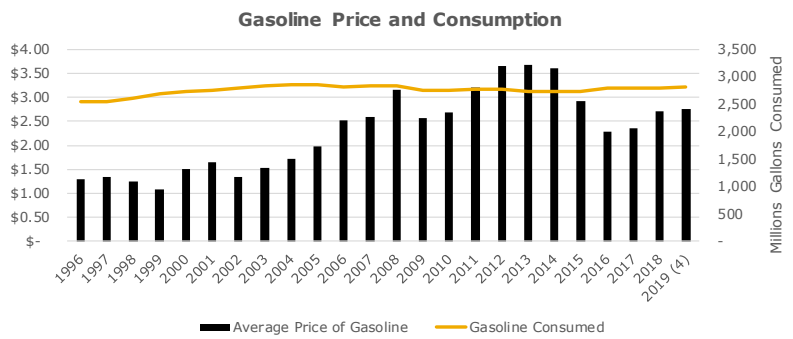
Motor Fuels Tax

The Commonwealth has imposed a tax on fuel since 1928. In general, motor fuels consumption and therefore motor fuel tax revenues are sensitive to oil price cycles, especially in places where public transportation provides a good alternative to driving. In Massachusetts, however, motor fuel consumption displays less sensitivity to oil prices than it does to overall employment activity and to general trends in fuel efficiency, as shown in Figure 15. In fact, total motor fuel consumption peaked in 2004. Nevertheless, a tax increase from 21 to 24 cents per gallon in 2013 led to a roughly \$80 million increase in fuel tax revenues that year despite relatively flat consumption (see Figure 15). KBRA believes

the Commonwealth's revenue raising action in 2013 demonstrates commitment to pledged revenues to support the CTF debt and also to support its long-term transportation infrastructure investment program.

Figure 15

HISTORICAL GASOLINE SALES						
Fiscal Year	Average Price of Gasoline (1)	% chg	Gasoline Consumed (millions of gallons) (2)	% chg	Non-Farm Employment (thousand) (3)	% chg
1996	1.29		2,539		3,008	
1997	1.35	4.3%	2,552	0.5%	3,080	2.4%
1998	1.25	-7.4%	2,605	2.1%	3,149	2.2%
1999	1.09	-12.5%	2,679	2.8%	3,212	2.0%
2000	1.51	38.3%	2,729	1.9%	3,283	2.2%
2001	1.64	8.8%	2,752	0.8%	3,360	2.3%
2002	1.34	-18.2%	2,792	1.5%	3,291	-2.1%
2003	1.54	14.6%	2,831	1.4%	3,227	-1.9%
2004	1.71	11.1%	2,863	1.1%	3,189	-1.2%
2005	1.98	15.8%	2,860	-0.1%	3,202	0.4%
2006	2.53	27.9%	2,812	-1.7%	3,229	0.8%
2007	2.59	2.5%	2,837	0.9%	3,265	1.1%
2008	3.15	21.5%	2,839	0.1%	3,321	1.7%
2009	2.58	-18.1%	2,759	-2.8%	3,267	-1.6%
2010	2.69	4.5%	2,750	-0.3%	3,204	-1.9%
2011	3.20	18.9%	2,766	0.6%	3,237	1.0%
2012	3.65	14.0%	2,772	0.2%	3,287	1.5%
2013	3.68	0.9%	2,721	-1.8%	3,339	1.6%
2014	3.61	-1.9%	2,733	0.4%	3,396	1.7%
2015	2.93	-19.0%	2,739	0.2%	3,468	2.1%
2016	2.28	-22.0%	2,781	1.5%	3,533	1.9%
2017	2.35	2.8%	2,796	0.5%	3,590	1.6%
2018	2.71	15.4%	2,787	-0.3%	3,632	1.2%
2019 (4)	2.75	1.6%	2,808	0.8%	3,658	0.7%
5 yr CAGR	-5.3%		0.5%		1.5%	
10 yr CAGR	0.7%		0.2%		1.1%	
10 yr total growth	2.1%		2.1%		14.2%	

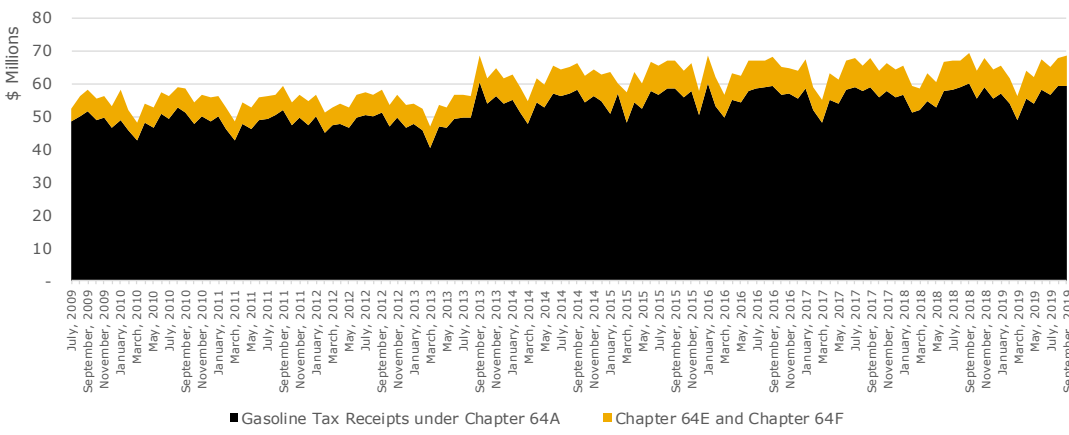


Source: Commonwealth of Massachusetts Annual Financial Information Commonwealth Transportation Fund Revenue Bonds.
 (1) Reflects the Average Price of Gasoline in all of Massachusetts.
 (2) Based on Historical Gasoline Tax Collections pursuant to Chapter 64A, except Aviation Fuel. See the Official Statements under Commonwealth Motor Fuels Tax - Refunds and Abatements from Gasoline Tax.
 (3) Seasonally adjusted. Calculated as fiscal year average of monthly employment. Historical employment figures have recently been revised by the U.S. Bureau of Labor Statistics by a re-benchmarking process which the Bureau goes through periodically.
 (4) Fiscal year 2019 figures are preliminary and subject to change.

While there is some seasonality in fuels tax receipts (See Figure 16), this risk factor is more than offset by the excess cash flowing through the CTF debt service fund on a monthly basis as described previously in the discussion of the Flow of Funds.

Figure 16

Historic Monthly Collection of Motor Fuel Taxes



Source: Commonwealth of Massachusetts Department of Revenue Monthly Revenue Blue Books

Registry Fees

Meanwhile, vehicle registration and license fees are less susceptible to seasonality and economic cycles but are affected by changes in regulations in policy. The overall number of registry transactions is little changed over the past decade (see Figure 18), but the cycle of transactions has changed because of lengthier license renewal and vehicle registration periods. Transactions (by count) have increased by an average annual rate of 0.9% over the last ten years. Corresponding adjustments to fee structure in 2010 and some fee increases in 2015 have offset the more modest growth trends in transactions (see Figure 17).

Figure 17

Historic Rates of Various Pledged Fees/Taxes										
Fiscal Year	Gasoline and Special Fuels Tax Rates per gallon	Pledged Motor Fuels Receipts (\$000)	% chg.	Registry Fees						
				Passenger Vehicles New Registrations and Renewal	Commercial Vehicles New Registrations and Renewal per 1,000lbs GVW	Certificate of Title	Class D License Renewal	Pledged Registry Fees Receipts (\$000)	% chg.	
2007	0.21	674,437	0.6%	36	15	50	40	388,496	3.4%	
2008	0.21	670,940	-0.5%	36	15	50	40	396,904	2.2%	
2009	0.21	652,153	-2.8%	50	20	75	50	403,780	1.7%	
2010 ⁽³⁾	0.21	653,045	0.1%	50	20	75	50	485,789	20.3%	
2011	0.21	659,183	0.9%	50	20	75	50	496,034	2.1%	
2012	0.21	660,177	0.2%	50	20	75	50	508,608	2.5%	
2013	0.21	649,779	-1.6%	50	20	75	50	522,199	2.7%	
2014 ⁽²⁾	0.24	730,640	12.4%	50	20	75	50	533,194	2.1%	
2015 ⁽¹⁾	0.24	754,392	3.3%	60	20	75	50	581,686	9.1%	
2016	0.24	764,848	1.4%	60	20	75	50	580,426	-0.2%	
2017	0.24	767,855	0.4%	60	20	75	50	598,683	3.1%	
2018	0.24	767,519	0.0%	60	20	75	50	612,780	2.4%	
2019 ⁽⁴⁾	0.24	773,790	0.8%	60	20	75	50	616,780	0.7%	

Source: Commonwealth of Massachusetts

- (1) 2015 increase in revenues due to increases in certain Registry Fees
(2) Effective July 31, 2013 Motor fuel tax increased to 24cents/gallon from 21 cents/gallon
(3) 2010 increase in revenues due to change in fee structure
(4) Fiscal yearh 2019 figures are preliminary and subject to change.

Figure 18

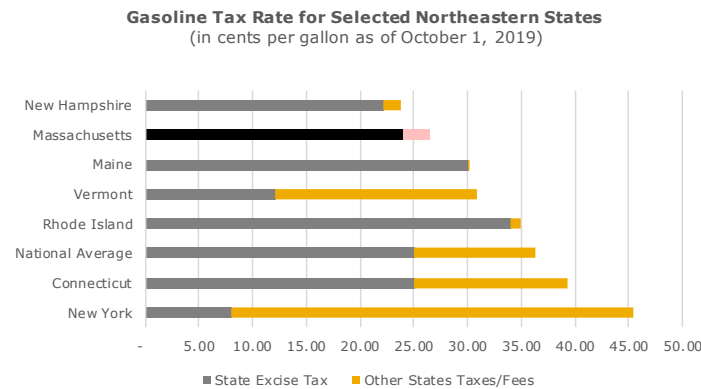
RMV Transactions since FY 2008										
Transaction	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Vehicle Registration										
Renewals or Modifications	2,685,700	2,640,476	2,643,757	2,552,172	2,644,174	3,091,268	3,208,001	3,206,242	3,021,320	3,267,124
License Duplicates	421,102	391,682	201,258	206,378	184,318	186,499	194,490	210,267	233,338	216,538
License Renewal	911,523	902,692	556,539	951,498	946,787	989,767	918,640	602,081	790,989	948,738
New License	227,098	213,416	222,157	224,365	230,148	231,807	207,191	158,807	152,968	160,191
New Vehicle Registrations	<u>1,083,422</u>	<u>1,119,292</u>	<u>1,079,229</u>	<u>1,175,158</u>	<u>1,123,537</u>	<u>1,204,382</u>	<u>1,250,330</u>	<u>1,315,321</u>	<u>1,302,777</u>	<u>1,299,835</u>
Total Transactions	5,328,845	5,267,558	4,702,940	5,109,571	5,128,964	5,703,723	5,778,652	5,492,718	5,501,392	5,892,426
Avg. Fees per Trans.	\$ 114.99	\$ 113.65	\$ 123.42	\$ 113.84	\$ 103.96	\$ 91.49	\$ 88.01	\$ 90.30	\$ 88.30	\$ 103.99

Source: MassDOT; Commonwealth of Massachusetts Annual Financial Information Commonwealth Transportation Fund Revenue Bonds.

(1) New License transactions totals for FY 2008-2013 have been restated due to a calculation error when recording new license transactions. Revenue attributable to the transactions has not changed.

KBRA notes that despite motor fuels tax increases in 2014, Massachusetts fuel tax levels remain competitive in the region; well below the national average (see Figure 19).

Figure 19



Source: Commonwealth of Massachusetts | American Petroleum Institute

RD 5: Coverage and Bond Structure

Historically, pledged revenues have provided extraordinarily high coverage of debt service (see Figure 20). This high coverage reflects the quality of the pledged revenues as well as the purposeful design and timing of the Commonwealth’s transportation debt and capital programs. As of October, 2019, there were approximately \$2.8 billion of Transportation Fund Revenue Bonds outstanding.

KBRA notes that the Commonwealth plans to issue an additional \$1.6 billion of bonds in FYs 2020 to 2024, but doing so in a way that maintains debt service coverage at 5x – assuming only modest growth in pledged revenues (see Figure 21). The Commonwealth’s debt plans are designed to achieve level debt service climbing to roughly \$275 million annually, and to continue allowing the CTF to spin off roughly \$1.1 billion of excess cash flow each year for other transportation needs.

Figure 20

Historic Annual DSCR (\$ thousands)		
FY	ADS	DSCR
2011	14,318	15.8x
2012	32,623	12.8x
2013	58,108	10.0x
2014	86,093	9.1x
2015	101,922	8.6x
2016	106,707	8.5x
2017	124,825	7.8x
2018	149,968	7.7x
2019 ⁽¹⁾	176,189	7.7x
MADS Year	MADS	MADS Coverage
2023	183,005	7.5x

Note: MADS and MADS Coverage is based on FYE 2019 Pledged Funds and 2019 Series POS debt service including prior debt only.

⁽¹⁾ Fiscal year 2019 figures are preliminary and subject to change.

Source: Commonwealth of Massachusetts

Figure 21

CTF Bond Debt Service Coverage Projection ⁽¹⁾ ('000)										
SFY Ending June 30	1994 Trust Agreement Bonds Total Debt Service	Projected CTF Pledged Funds	Prior CTF Bonds Debt Service ⁽²⁾	Debt Service on 2019 Bonds	Prior CTF Bonds and 2018 Bonds Debt Service	Prior CTF Bonds & 2018 Bonds Debt Service Coverage ⁽¹⁾	Excess Pledged Funds	Total Debt Service on Future Bonds ⁽³⁾	Total CTF Bonds Debt Service ⁽³⁾	Total Debt Service Coverage ⁽¹⁾
2020	29,822	1,372,385	179,083	5,444	184,527	7.4x	1,187,858	-	184,527	7.4
2021	29,821	1,372,386	179,083	10,000	189,083	7.3x	1,183,303	10,208	199,291	6.9
2022	29,821	1,372,386	179,084	10,000	189,084	7.3x	1,183,302	40,064	229,148	6.0
2023		1,402,207	183,005	10,000	193,005	7.3x	1,209,202	62,950	255,955	5.5
2024		1,402,207	183,003	10,000	193,003	7.3x	1,209,204	82,893	275,896	5.1
2029		1,400,083	182,727	10,000	192,727	7.3x	1,207,356	82,750	275,477	5.1
2034		1,397,177	182,348	10,000	192,348	7.3x	1,204,829	82,557	274,905	5.1
2039		1,393,015	181,804	10,000	191,804	7.3x	1,201,211	82,285	274,089	5.1
2044		1,390,619	181,493	15,000	196,493	7.1x	1,194,126	77,122	273,615	5.1
2049		1,390,619	-	112,140	112,140	12.4x	1,278,479	161,474	273,614	5.1

Source: Commonwealth of Massachusetts Commonwealth Transportation Fund Revenue Bonds (Rail Enhancement & Accelerated Bridge Programs) 2019 Series A Preliminary Official Statement.

⁽¹⁾ Estimated debt service coverage for fiscal year 2020 and thereafter is based on the Commonwealth’s projected revenues for fiscal year 2019, which are preliminary, unaudited and subject to change, and assuming no growth in such receipts in future years. Debt service projections for Bonds to be issued in fiscal year 2020-2024 are estimates based on current program needs and are subject to change.

⁽²⁾ Reflects gross debt service on Prior CTF Bonds.

⁽³⁾ Assumes aggregate issuance in fiscal years 2020-2024 (including the 2019 Bonds) of \$1.49 billion in aggregate bond principal amount for the Accelerated Bridge Program and Rail Enhancement Program combined, raising \$1.85 billion in net bond proceeds (including original issue premium). The final maturity for all issues is limited to June 30, 2049 pursuant to current law. Projected Debt Service on future issuance assumes current market rates. Figures are preliminary and subject to change.

Downside Protection

KBRA assessed the resiliency of the pledged revenues to cover annual debt service over the next 10 years on the total outstanding and planned debt issuances. MADS of total current and future debt of \$276 million occurs in FY 2024. Current projected collections of pledged revenues (FY 2020) provide 5.0X coverage of this amount. For coverage from pledged revenues to fall to 4.0X, pledged revenues would have to decline by nearly 20%. Historically, the largest year over year decline was 5%, which occurred in FY 2006.

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