

Appendix A: for “What Gets Measured Gets Managed: The Economic Burden of Business Property Taxes”

By Adam Found

This technical appendix provides details for the computation of tax system assumptions and other parameters used in Found, Dachis and Tomlinson (2013) and Found (2013a). For details of the formulas I use to calculate the results, see Found (2013a).

Empirical Assumptions

I need to make some simplifying empirical assumptions to conduct an inter-provincial marginal effective tax rate (METR) analysis. Also, because the amount of property tax a business pays equals a tax rate multiplied by the assessed value of the business's properties and may be subject to systems that cause effective tax rates to deviate from statutory tax rates, business property taxes (BPTs) typically require a measure of preparation greater than other capital taxes prior to being incorporated into a METR model. I have compiled the following material on provincial and municipal tax regimes from government websites and correspondence with civil service and assessment agency staff.

Capital tax systems are not static and are generally rife with special, and often non-transparent, provisions geared toward altering the tax burdens that would otherwise be realized by businesses if statutory tax rates were the whole story. For instance, certain industries, such as oil and gas, mining, forestry and manufacturing, receive industry-specific tax treatment such as royalties, excise taxes and investment tax credits (ITCs). In other cases, corporate income tax (CIT) rates levied on small firms are lower than the general rate levied on other firms, while research and development (R&D) investments are often given favourable CIT treatment to address knowledge externalities. Also, a jurisdiction's economic development programs may offer tax incentives, such as CIT “holidays”, ITCs or property tax abatements, to businesses making new investments within its boundaries or within a particular area thereof (e.g. the federal Atlantic Investment Tax Credit).

There is also no guarantee that jurisdictions will keep general statutory tax rates and other policy parameters constant over time, but at the same time there is no readily apparent manner for investors, investing businesses and, for that matter, economists to project these values. Like special tax regime provisions, dynamic tax systems can significantly diminish the tractability of METR analyses. Additionally, in order to facilitate comparability among jurisdictions, it is ideal to standardize non-tax parameters, such as investment shares across capital categories and across jurisdictions, leaving inter-jurisdictional variation to be driven by tax regime parameters only (Chen, 2000). For inter-provincial METR analysis, I accomplish this by standardizing all provincial non-tax parameters to the corresponding national averages, weighted by investment shares where applicable. This standardization implies that the individual provincial METRs reflect the impact of a jurisdiction's tax regime on the average investment made in the nation. For inter-municipal METR analysis, I apply the home province's modelling parameters along with local tax regime parameters.

I make the following simplifying assumptions to standardize the tax regimes:

1. I exclude from the analysis tax treatment in respect of:
 - (a) The natural resource sector (including exploration and development), except for data required to estimate effective ITC rates for the Atlantic Investment Tax Credit (AITC).
 - (b) The banking sector.
 - (c) Intangible investment, such as R&D and goodwill.

- (d) Extremely specialized business tax regime features, such as Ontario's Brownfields Financial Tax Incentive Program.
 - (e) Corporate investment in the residential structure sector in respect of BPT.
2. Where possible and appropriate, I apply the following principles:
 - (a) If a jurisdiction has not announced a sequence of future tax rates, I assume that the current tax rate applies from the current year onward.
 - (b) If a jurisdiction has announced a sequence of future tax rates, I assume that investors take into account the future sequence, and I assume that the final value in the sequence applies to investment from its corresponding year onward.
 - (c) I ignore announced temporary changes to non-tax rate parameter values, such as temporary accelerated Capital Cost Allowance (CCA) rates.
 - (d) I assume that announced permanent changes to non-tax rate parameter values that are currently being phased in have been fully implemented.
3. I assume that retail sales taxes (RSTs) and ITCs do not apply to land or inventories.
4. Finance Canada advised it will not share its RST data due to an agreement with Statistics Canada over the data, but suggested using its past RST METR contributions to back out the effective RST rates likely used. Following this method to standardize the varying complexities and tax bases of provincial RSTs, I therefore use the contributions in the 2008 Federal Budget (the most recent of Finance Canada's METR publications that stratifies provincial METRs by individual tax contribution) which reflect tax policies announced as of January 1, 2007. As a result, I multiply the 2013 statutory RST rates of British Columbia, Saskatchewan and Manitoba by 69.5 percent, 57.5 percent and 68.5 percent, respectively, to arrive at corresponding effective RST rates. Since the provinces have made some changes to their RSTs since 2007, the 2013 RST contributions I estimate in the METR may not necessarily match those estimated in the 2008 Federal Budget.
5. I apply the following parameters to all provinces, the values of which are based on 2012 Statistics Canada data unless otherwise indicated:
 - (a) Nominal interest rate on debt, obtained from Finance Canada in August 2013.
 - (b) Proportion of investment financed/issued as debt.
 - (c) Proportion of equity held as retained earnings.
 - (d) Corporate investment shares across capital categories, to some extent based on McKenzie et al. (1998).
 - (e) Real economic depreciation rates across capital categories.
6. I assume that the national inflation rate is 2 percent per year, as that is the Bank of Canada's target, and apply it to all provinces.
7. The combined provincial-federal PIT rates I use to represent what the average domestic investor faces in Canada is the weighted average of the corresponding 2013 statutory rates using provincial shares of national investment as weights sourced from 2012 Statistics Canada data.
8. I divide the capital stock into the following categories:
 - (a) Land
 - (b) Buildings
 - (c) Machinery
 - (d) Inventories

9. I assign CCA rates across capital categories as follows:
 - (a) Land: 0 percent since it is outside of CCA classification.
 - (b) Buildings: a weighted average of the two general rates for Class 1, the class most representative of structures. These rates are 10 percent for manufacturing and 6 percent for all other structures. I use Statistics Canada's 2012 manufacturing share of national building investment to calculate the weighted average CCA rate.
 - (c) Machinery: 30 percent since this is the general rate for Class 43, the class most representative of machinery and equipment.
 - (d) Inventories: 0 percent since they are outside of CCA classification.
10. With respect to the BPT:
 - (a) I assume that the assessed value of a class of property subject to property taxes is the market value only if reassessment takes place with a frequency such that the valuation date (i.e., the date on which the reassessment is based) is no more than one year before the implementation date (i.e., the date on which the reassessment takes effect for taxation).
 - (b) To the extent possible using available current and historical data, in calculating the effective tax rates, I account for:
 - i. Differential tax treatment across property classes.
 - ii. Assessment discounts and property tax credits.
 - iii. Reassessment lags (rounded to the nearest year) when assessed values are not deemed market values as per (a).
 - (c) Where possible, I calculate effective BPT rates by property class and then weight them by corresponding assessment shares to arrive at a province-wide effective BPT rate.
 - (d) A Business Occupancy Tax (BOT) is a type of BPT and I convert it into a conventional BPT equivalent where required.
11. Once an investment is made, I assume that the depreciation it experiences reflects physical wear only; that is, the investment's real capital gain in present value is zero over its useful life.
12. I assume that, in places they exist, provincial ITCs apply to all manufacturing buildings and machinery and that the federal AITC applies to all buildings and machinery engaged in manufacturing, agriculture, forestry, fishing or hunting in the four Atlantic provinces.¹ Using 2012 Statistics Canada data, I estimate the share of buildings and machinery investment that is eligible for provincial ITCs and the AITC. I apply these shares to statutory ITC rates to obtain effective ITC rates.
13. Since the CIT impacts the METR non-linearly and since ITCs are part of the CIT regime, I apportion the METR contribution of the CIT between federal and provincial levels on a pro-rata basis for each province according to the following procedure:
 - (a) Step 1: Including only federal ITCs and CIT, I calculate the notional METR due to only federal CIT.
 - (b) Step 2: Including only provincial ITCs and CIT, I calculate the notional METR due to only provincial CIT.

¹ As of 2013, the AITC no longer applies to the oil and gas industry (Canada, 2012).

- (c) Step 3: Sum (a) and (b).
- (d) Step 4: Including only federal and provincial ITCs and CIT, I calculate the total METR. This is the combined federal-provincial CIT contribution to the METR.
- (e) Step 5: The federal CIT contribution to the METR is (d) multiplied by (a) divided by (c).
- (f) Step 6: The provincial CIT contribution to the METR is (d) minus (e).
14. For each province, once I calculate the CIT contribution to the METR, I calculate the contributions of the RST and BPT by incorporating them into the METR in that order, respectively.²
15. With respect to local BPTs:
- (a) I apply the foregoing empirical assumptions to municipalities when possible and appropriate. Otherwise, I assume that parameters and data for a province apply to its municipalities.
- (b) When possible, when a local authority (e.g., a school board) other than a municipality levies differential effective property tax rates across residential and business classes, I treat the taxes as though the municipality itself levies them.
16. I calculate the total Canadian national METR as a weighted average of the provincial or municipal METRs, as the case may be, using 2012 provincial shares of national corporate investment as weights.

British Columbia and Vancouver

In British Columbia, the provincial assessment agency, B.C. Assessment, performs reassessments annually using July 1 as a valuation date with implementation on the following January 1 for four business classes as shown in Table 1.

Table 1: British Columbia BPT Rates – 2013

Property Class	Share of Assessment Base	Statutory BPT Rate	BPT Credit Rate	Effective BPT Rate
	<i>Percent</i>			
Utilities	1.44	1.400	0.0	1.400
Major Industry	3.33	0.620	60.0	0.248
Light Industry	10.10	1.080	0.0	1.080
Commercial	85.13	0.620	0.0	0.620
All Business	100.00	0.678	N/A	0.665

Source: Authors' calculations.

² As it turns out, the results are not appreciably sensitive to the order of incorporation of the various taxes. In fact, the impact of the BPT is independent of all other tax regime parameters.

Table 1A: Vancouver RPT and BPT Rates – 2013

Property Class	Share of Business Assessment Base	Effective Tax Rate	Net Effective Tax Rate
	<i>Percent</i>		
Residential	0.00	0.234	0.000
Utilities	0.54	3.982	3.748
Major Industry	0.56	3.597	3.363
Light Industry	2.11	1.041	0.807
Commercial	96.79	1.003	0.769
All Business	100.00	1.034	0.800

Source: Authors' calculations.

In 2013, British Columbia increased BPT rates for the Utilities Class and Light Industry Class, and announced the elimination of the 60 percent BPT credit for the latter.³ I have obtained 2013 property tax data for the province and the City of Vancouver and from the website of the Ministry of Community, Sport and Cultural Development. The 2013 assessment-weighted statutory provincial BPT rate is 0.678 percent, which translates into an effective rate of 0.665 percent once I take into account the 60 percent BPT credit for the Major Industry Class. This BPT credit applies to provincial BPT only, not municipal BPT.

I calculate the City of Vancouver's net effective BPT rate as 0.800 percent (Table 1A) following a method similar to that for the province (Table 1). I do not need to adjust the municipal RPT rate because of the British Columbia Homeowner Grant as it applies to provincial RPT only.

Alberta and Calgary

Municipalities in Alberta, as well as the Ministry of Municipal Affairs, must reassess properties on an annual basis using July 1 as a valuation date with implementation on the following January 1. Only properties of the farmland, linear (such as pipelines), machinery and railway type are assessed by the Ministry of Municipal Affairs; otherwise, property is assessed locally by municipalities. The only property class subject to the provincial BPT is the Non-Residential Class; the other classes are the Residential Class, Farmland Class and Machinery and Equipment Class, the latter of which may be subject to a municipal capital tax levy at the option of the local municipality, but is exempt from the provincial BPT.

The province assigns annual BPT requisitions to each municipality. According to the Ministry of Municipal Affairs website, in the interest of equity, the province uses municipality-specific market-to-assessed value equalization ratios to

³ The credit for the Light Industry Class has been reduced to 30 percent for 2013 and it will be 0 percent in 2014. The credit is however to remain intact for the Major Industry Class.

mitigate local assessment biases (i.e., systemic deviations from market value) when assigning provincial BPT requisitions to municipalities. As the Ministry requires time to audit reported municipal assessments and calculate appropriate equalization ratios, equalized assessment lags market value by approximately one year. With municipal assessment largely a service provided at the municipal level, currently available provincial data alone is insufficient to estimate province-wide appreciation for the commercial (or any) property class.

Since the Ministry was unable to provide all of the data required to account for the lag built into equalized assessment, I use the Alberta Ministry's 1999-2013 Equalized Assessment Reports and assessment data for Ontario as a proxy for the assessment-specific missing Alberta data (Ontario data discussed further below). The Alberta data indicates that total business assessment increased by 9.11 percent per year on average during 1998-2012, where this figure combines both new construction and appreciation of existing stock. The Ontario data indicates that business assessment increased by a total of 6.89 percent per year on average between 2008 and 2012, 3.99 percentage points of which is attributable to appreciation, implying that the residual 1.90 percentage points reflect new construction. Taking the 3.99 percent as a proportion of the total assessment increase of 6.89 percent and applying the result to the 9.11 percent total assessment growth rate for Alberta, I arrive at an estimated average annual business property appreciation rate of 5.28 percent for Alberta.

Using this appreciation rate to account for equalized assessment lagging market value by about one year and noting that the Ministry of Education's website indicates that the 2013 province-wide BPT rate on equalized assessment is 0.390 percent, I calculate that Alberta's effective provincial BPT rate is 0.370 percent.

According to the City of Calgary's website, the 2013 statutory RPT and BPT rates are 0.380 percent and 1.099 percent, respectively. Comparing Calgary's 2012 assessments to the province's corresponding equalized assessments indicates that those of Calgary exactly match market value as determined by the province. Hence, Calgary's statutory RPT and BPT rates are effective rates.

Calgary has also elected to levy a business occupancy tax (BOT) on lessees of business premises, which is clearly akin to a BPT. The BOT base is annual rental value of business premises, and the BOT assessment system operates as part of the overall market value-based assessment system for property taxation. According to the City's website, the 2013 statutory BOT rate is 7.58 percent. However, the City of Calgary will be rolling this tax into the BPT on a phased basis between 2014 and 2019. According to the City's website, this transition will raise current BPT revenue by 28 percent once completed. Applying this factor to the existing effective BPT rate gives a total equivalent effective BPT rate of 1.407 percent. Subtracting from this the effective RPT rate, Calgary's total net effective municipal BPT rate is 1.027 percent.

Saskatchewan and Saskatoon

With the exception of a number of municipalities that are responsible for their own local assessment, the Saskatchewan Assessment Management Agency (SAMA) is responsible for assessment in the province. Reassessment province-wide takes place every four years with the most recent having taken effect January 1, 2013 and remaining in effect until the end of 2016. Since the valuation date for the 2013-2016 assessment cycle is January 1, 2011, the current reassessment lag is two years and I take that into account when calculating effective BPT rates. Starting with the current assessment cycle, the base date has been shifted forward from June 30, which is 2.5 years behind the implementation date, to January 1 which is 2 years behind the implementation date. Since the base date of the last assessment cycle is June 30, 2006, then 2013 assessments reflect 4.5 years' worth of appreciation.

As of January 1, 2013, the province has reduced the number of business classes for provincial BPT to two, but the province levies different BPT rates between these classes (see Table 2, which is based on province-wide assessment data

Table 2: Saskatchewan BPT Rates – 2013

Property Class	Share of Assessment Base	Statutory BPT Rate	2006-2011 Average Annual Appreciation	Effective BPT Rate
<i>Percent</i>				
Commercial/Industrial	58.50	0.828	13.28	0.645
Resource	41.50	1.104	4.29	1.015
All Business	100.00	0.943	9.04	0.793

Source: Authors' calculations.

provided by SAMA).⁴ I use the statutory provincial BPT rates as posted on the website of the Ministry of Government Relations. The assessment-weighted statutory provincial BPT rate is 0.943 percent and I calculate the corresponding effective rate as 0.793 percent due to the two-year reassessment lag for 2013, assuming the 2006-2011 appreciation trend has continued into 2013.

The City of Saskatoon's statutory property tax rate for 2013 is 0.751 percent on all taxable property. However the City applies differential tax rate multipliers to residential and business property so as to overtax businesses relative to residents.⁵ I use 2012 year-end and 2013 year-beginning assessment data provided by the City to calculate 2006-2011 average annual appreciation rates for the residential and business property classes and use these figures to account for the two-year assessment lag.

I calculate Saskatoon's net effective BPT rate as 0.284 percent (Table 2A). For both provincial and municipal property taxation, Saskatchewan requires residential assessment to be discounted by a factor of 30 percent prior to property taxation, while business property receives no such discount. Despite this favourable treatment of residential property, due to a combination of a low business-to-residential tax ratio (currently at 1.75 on an effective basis as per Saskatoon's tax ratio

4 Special thanks to SAMA, particularly to Steve Suchin, Managing Director, Technical Standards and Policy Division for invaluable assistance.

5 I ignore Saskatoon's special tax treatment of private recreational aircraft hangers. I also do not attempt to account for Saskatoon's phase-in of reassessment-related tax bill changes on the basis that phased increases and decreases offset one another in terms of the overall impact on the business sector. Separate school boards in Saskatchewan maintain a constitutional authority to levy a property tax. According to the Ministry of Municipal Relations, most separate school boards have however elected to align their property tax regimes with that instituted by the province for public school boards. This is not surprising given the structure of Saskatchewan's funding/taxation system, which reduces provincial grants to a separate school board should it elect to levy property tax rates higher than those set by the province for public school boards:

"Minority faith boards of education have the constitutional right to levy different mill rates from members of the minority faith. The rates must be in the same proportion by property class as government mill rates. If a board levies mill rates that are higher than those set by government, their funding allocation will be adjusted to ensure that their total budget remains as approved by the minister. If a board levies mill rates that are lower than those set by government, their funding allocation will be adjusted to the level that would have been determined if the board had adopted the provincial mill rates." (Saskatchewan 2013).

The provincial funding/taxation system incents separate school boards to hold local property tax rates at the provincial levels set for public school boards. At any rate, the separate school boards within the City of Saskatoon have adopted the provincial property tax rates, so I treat them as though they are indistinguishable from the public school boards for taxation purposes.

Table 2A: Saskatoon RPT and BPT Rates – 2013

Property Class	Assessment Discount Rate	Statutory Tax Rate	Tax Rate Multiplier	2006-2011 Average Annual Appreciation	Effective Tax Rate	Net Effective Tax Rate
	<i>Percent (except Tax Rate Multiplier)</i>					
Residential	30.00	0.751	0.9411	14.48	0.377	0.000
Commercial/ Industrial	0.00	0.751	1.1765	15.58	0.661	0.284

Source: Authors' calculations.

policy) and low levels of taxation generally, Saskatoon has the most competitive net effective municipal BPT rate among the municipalities herein studied.

Manitoba and Winnipeg

While the City of Winnipeg maintains its own assessment system, the remainder of the province is assessed by the Ministry of Local Government. Both Winnipeg and the residual Province of Manitoba are on an identical two-year assessment cycle, with a valuation date of April 1 of even years and an implementation date of January 1 of the following even year. For 2013, the induced lag between market and assessed values is about three years and I take this into account when calculating effective BPT rates.

Table 3 illustrates Manitoba's classification and differential treatment of business property based on data I have obtained from the Ministry of Local Government and the City of Winnipeg. Although the province levies a uniform statutory BPT rate across all business property classes, effective rates differ by class due to corresponding differences in assessment discount rates and appreciation over the assessment lag. According to various Manitoba municipal websites, the 2013 statutory provincial BPT rate is 1.183 percent. The corresponding effective rate is 0.605 percent once I take into account assessment discounting and the current three-year assessment lag for 2013.

As for the City of Winnipeg, it is arguably the most complicated of the municipalities herein studied because it has a BOT and a supplementary property tax levied by eight local school boards on top of a conventional municipal BPT. The City's website indicates that it levies a uniform statutory tax rate of 1.460 percent on all property, however effective rates differ across property classes for the same reasons they do province-wide. Using the assessment data provided by the City of Winnipeg, I calculate the net effective BPT rate as 0.275 percent (Table 3A).⁶

Like Calgary, Winnipeg levies a BOT on the annual rental value of business premises. According to Winnipeg's website and 2013 Budget, the 2013 BOT rate of 5.90 percent will raise \$58.4 million in revenue but will be offset by a \$4.7 million tax expenditure dedicated to funding the Small Business Tax Credit, leaving net revenue at \$53.7 million. Dividing this revenue into total (undiscounted) business assessment yields an equivalent statutory BPT rate of 0.315 percent. Since this rate applies to all business premises, I account for the assessment lag by deflating it by the overall business appreciation

⁶ Table 3A excludes the impact of Winnipeg's BOT.

Table 3: Manitoba BPT Rates – 2013

Property Class	Share of Assessment Base	Assessment Discount Rate	Statutory BPT Rate	2010-2012 Average Annual Appreciation	Effective BPT Rate
	<i>Percent</i>				
Pipeline	18.87	50.00	1.183	0.01	0.591
Railway	19.46	75.00	1.183	0.32	0.293
Other Business	61.67	35.00	1.183	2.81	0.708
All Business	100.00	N/A	1.183	1.80	0.605

Source: Authors' calculations.

Table 3A: Winnipeg RPT and BPT Rates – 2013

Property Class	Share of Business Assessment Base	Assessment Discount Rate	2010-2012 Average Annual Appreciation	Statutory Tax Rate	Effective Tax Rate	Net Effective Tax Rate
	<i>Percent</i>					
Residential	0.00	55.00	5.78	1.460	0.555	0.000
Pipeline	0.20	50.00	3.44	1.460	0.660	0.105
Railway	1.55	75.00	10.79	1.460	0.268	-0.287
Other Business	98.25	35.00	4.18	1.460	0.839	0.284
All Business	100.00	N/A	4.28	1.460	0.930	0.275

Source: Authors' calculations.

rate of 4.28 percent calculated in Table 3A to arrive at an equivalent effective BPT rate of 0.278 percent. Rolling the BOT rate into Winnipeg's conventional net effective BPT rate as calculated in Table 3A yields a total net effective municipal BPT rate of 0.553 percent.

Unlike other cities in my analysis, Winnipeg's school boards levy a local property tax on top of the provincial property tax. Although the school boards are required to levy a uniform tax rate across property classes, effective rates differ accordingly for the same reasons they do for the province and the City of Winnipeg. An additional wrinkle related to this local tax is the provincial Education Property Tax Credit (EPTC) which is only available to residential taxpayers. The basic EPTC is \$700 per household for 2013.

I have obtained the 2013 statutory education tax rates for Winnipeg's school boards from the City's website. Table 3B uses these rates along with school board level assessment data I obtained from the 2012-2013 Financial Reporting and

Table 3B: Winnipeg Local Statutory Education RPT and BPT Rates – 2013

City School Board	Share of City Residential Assessment Base	Share of City Business Assessment Base	Statutory RPT Rate	Statutory BPT Rate
	<i>Percent</i>			
Winnipeg	21.63	44.25	1.672	1.672
St. James-Assiniboia	9.43	15.23	1.335	1.335
Pembina Trails	18.54	12.04	1.311	1.311
Seven Oaks	8.68	3.60	1.672	1.672
Seine River	3.78	1.75	1.537	1.537
Interlake	2.28	2.29	1.516	1.516
Louis Riel	19.16	11.67	1.330	1.330
River East Trascona	16.51	9.17	1.459	1.459
All School Boards	100.00	100.00	1.464	1.512

Source: Authors' calculations.

Table 3C: Winnipeg Local Effective Education RPT and BPT Rates – 2013

Property Class	Assessment Discount Rate	Education Property Tax Credit Rate	2010-2012 Average Annual Appreciation	Statutory Tax Rate	Effective Tax Rate	Net Effective Tax Rate
	<i>Percent</i>					
Residential	55.00	33.52	5.78	1.464	0.370	0.000
Business	35.00	0.00	4.28	1.512	0.867	0.497

Source: Authors' calculations.

Accounting in Manitoba Education (FRAME) Report to estimate the 2013 assessment-weighted statutory RPT and BPT rates for local education as 1.464 percent and 1.512 percent, respectively.

Using these assessment-weighted local statutory education RPT and BPT rates, Table 3C is the local school board analogue to Table 3A for the purpose of estimating the local net effective BPT rate for education on an assessment-weighted basis. I divide EPTC revenue – as reported in the FRAME Report – into Winnipeg's 2012 residential assessment base to estimate the implicit EPTC rate for residential property as 33.52 percent. This rate is likely accurate for 2013 since the 2013 basic EPTC amount of \$700 also applied in 2012.

Since the FRAME Report does not disaggregate the business assessment base, I treat the entire base as if it were classified as Other Business since that class represents over 98 percent of the total business assessment base in Winnipeg. The appreciation rates I use to account for the three-year assessment lag as well as the assessment discount rates are the same as those I used in Table 3A. I estimate that the local net effective education BPT rate is 0.497 percent. Adding this to the total net effective municipal BPT rate (which includes the BOT) of 0.553 percent previously calculated yields a total net effective BPT rate of 1.050 percent for the City of Winnipeg.

Ontario and Toronto

Responsibility for maintaining Ontario's assessment system is vested in the Municipal Property Assessment Corporation (MPAC). MPAC reassesses the province every four years with January 1 of years divisible by four as the valuation date. Reassessments are implemented one year after the valuation date with increases in property value being phased in with equal installments over the four-year period for which the reassessment applies.

The province sets provincial BPT rates individually for each business class (commercial, industrial and pipeline) in each single-tier and upper-tier municipality, but a uniform rate, known as the "new construction" rate, applies to all new business investment in most municipalities. For historical reasons, the province levies BPT rates lower than the new construction rate in a number of municipalities and these rates vary by municipality and even business class within a single municipality. I combine these lower rates with the new construction rate across municipalities and business classes to arrive at an assessment-weighted average statutory provincial BPT rate of 1.211 percent for Ontario.

Table 4 summarizes how I calculate Ontario's effective BPT rate for 2013 as shown in Found (2013a). I arrive at effective BPT rates by class for Ontario by developing a formula to account for a multi-year equalized phase-in of property value increases. As shown in Table 4, Ontario's effective provincial BPT rate is 1.039 percent for 2013.

Using 2013 tax rate information from the City of Toronto's website, in Found (2013a) I calculate a net effective municipal BPT rate of 0.896 percent for Toronto. This calculation accounts for Toronto's banding of part of the commercial assessment and is summarized in Table 4A, in which I employ the same formula as in the overall Ontario calculation to account for the four-year assessment cycle.

Table 4: Ontario BPT Rates – 2013

Property Class	Share of Assessment Base	Assessment-Weighted Statutory BPT Rate	2008-2012 Average Annual Appreciation	Assessment-Weighted Effective BPT Rate
	<i>Percent</i>			
Commercial	83.68	1.206	4.12	1.029
Industrial	14.14	1.259	3.53	1.098
Pipeline	2.18	1.119	1.90	1.038
All Business	100.00	1.212	3.99	1.039

Source: Authors' calculations.

Table 4A: Toronto RPT and BPT Rates – 2013

Property Class	Share of Business Assessment Base	Statutory Tax Rate	2008-2012 Average Annual Appreciation	Effective Tax Rate	Net Effective Tax Rate
	<i>Percent</i>				
Residential	0.00	0.534	5.08	0.440	0.000
General Commercial	47.75	1.672	5.17	1.372	0.932
Residual Commercial – Tax Band 1	24.46	1.478	5.17	1.213	0.773
Residual Commercial – Tax Band 2	19.29	1.672	5.17	1.372	0.932
Industrial	8.21	1.666	4.19	1.417	0.977
Pipeline	0.29	1.027	1.81	0.956	0.516
All Business	100.00	1.622	5.08	1.336	0.896

Source: Authors' calculations.

Quebec and Montreal

The Government of Quebec has indicated via correspondence that its assessment-weighted statutory BPT rate for 2013 is 0.221 percent. Each year, assessors revalue properties in one third of the municipalities in Quebec. Similar to Ontario, Quebec requires assessment increases to be phased in by equal annual instalments over a three-year period, which I take into account with a formula similar to that for Ontario, as noted above.

Quebec divides business property assessment into commercial and industrial classes and treats each class identically. I use province-wide assessment data obtained from the provincial government to calculate a business assessment growth rate of 3.06 percent for 2012. Since this figure includes both new construction and appreciation, it should be reduced by a factor approximating the contribution of new construction to the total assessment base. The data obtained indicates that the change in the number of business properties was 0.66 percent in 2012. Assuming that new business properties are of average value relative to the existing business property stock, I reduce the overall growth rate of 3.06 percent by 0.66 percentage points to arrive at an estimated business appreciation rate of 2.40 percent. Found (2013a) estimates the 2013 average effective BPT rate for Quebec as 0.206 percent after accounting for Quebec's three-year assessment cycle.

Turning now to the City of Montreal, to simplify matters I focus on the Borough of Ville Marie, the location of Montreal's central business district, as the borough representative of the city. The rationale is that borough-level assessment data required to weight all borough taxes within Montreal is not available. At any rate, borough taxes represent a very small part of the overall property tax levied in Montreal. The Montreal website indicates that for 2013 the statutory RPT rate within the Borough of Ville Marie is 0.919 percent along with a total statutory BPT rate of 3.839 percent. Using the Montreal portion of the assessment data I have obtained and applying the method used in Found (2013a) to estimate business property appreciation for Quebec, I calculate a residential appreciation rate of 5.27 percent and a business appreciation rate of 4.22 percent for Montreal. Using the same formula as above to account for the three-year assessment cycle, I calculate the effective 2013 RPT and BPT rates for Montreal as 0.790 percent and 3.397 percent, respectively. Taking the difference yields a net effective municipal BPT rate of 2.607 percent.

Table 5: New Brunswick BPT Rates – 2013

Year	Statutory BPT Rate	Effective BPT Rate – Land	Effective BPT Rate – Buildings
	<i>Percent</i>		
2013	2.104	1.866	1.885
2014	2.021	N/A	N/A
2015	1.939		
2016 Onward	1.856		

Source: Authors' calculations.

New Brunswick and Saint John

Service New Brunswick, a provincial agency, performs reassessments annually using January 1 as the valuation date and, retroactively, the implementation date. The property tax system is divided into residential and non-residential classes, however the province has legislated a business-residential ratio of 1.5 for all municipal property tax rates.

New Brunswick is the only province aside from Prince Edward Island that refers to the tax as the “Provincial Property Tax”, rather than the “School Tax” or “Education Tax”. New Brunswick and Prince Edward Island are also the only provinces to establish provincial property tax rates for future years. The *Real Property Tax Act* establishes New Brunswick’s statutory provincial BPT rates for 2013 onward as per Table 5, where successive tax rates represent an approximately four percent reduction from the previous year’s. It is worth noting that, with a 2012 BPT rate of 2.186 percent, New Brunswick’s legislated BPT reduction plan will have shaved 5.5 percentage points off the provincial METR by 2016.

Based on the announced statutory BPT rates, Found (2013a) develops a formula to calculate New Brunswick’s 2013 equivalent level effective tax rates (ELETRs) for land and buildings, which are 1.866 percent and 1.885 percent, respectively, as shown in Table 5.

The City of Saint John levies an RPT rate of 1.785 percent. With New Brunswick’s required tax ratio of 1.5, Saint John’s BPT rate is therefore 2.678 percent. These are effective rates given the structure of New Brunswick’s assessment system, thus the net effective municipal BPT rate for Saint John is 0.893 percent.

Nova Scotia and Halifax

In Nova Scotia, the Property Valuation Services Corporation (PVSC) maintains the assessment rolls of the province’s municipalities. Although reassessment takes place annually, the valuation date is always two years behind the implementation date. Specifically, the implementation date of January 1, 2013 corresponds to a valuation date of January 1, 2011. Therefore, assessed values lag market values by two years. The province classifies property by residential, resource (farming, fishing etc.) and commercial (which includes industrial property).

Several attempts to acquire appropriate assessment data from PVSC were unsuccessful, so I assume all property province-wide appreciates annually at the residential rate of appreciation (2.80 percent) noted in the Halifax Regional

Table 6: Nova Scotia BPT Rates – 2013

Property Class	Statutory BPT Rates					Deemed Annual Appreciation	Effective BPT Rate
	Education	PVSC	Correctional Services	Housing Authorities	Total		
	<i>Percent</i>						
Commercial	0.305	0.010	0.009	0.007	0.331	2.80	0.313

Source: Authors' calculations.

Table 6A: Halifax Regional Municipality RPT and BPT Rates – 2013

Property Class	Statutory BPT Rates					Deemed Annual Appreciation	Effective Tax Rates	
	Urban General	Fire	Transit	Supplementary Education	Total		Total	Total Net
	<i>Percent</i>							
Residential	0.651	0.025	0.156	0.035	0.867	2.80	0.820	0.000
Commercial	3.037	0.075	0.000	0.104	3.216	2.80	3.043	2.223

Source: Authors' calculations.

Municipality's 2013/2014 Budget since this municipality represents well over 50 percent of the provincial property tax base. If anything, this approach should make estimated effective BPT rates conservative since property in Halifax likely appreciates faster compared to the rest of Nova Scotia.

I aggregate all of Nova Scotia's 2013/2014 provincial BPT rates levied on the commercial class to arrive at an effective provincial BPT rate of 0.313 percent, as calculated in Table 6. The education BPT rate is that prescribed by current regulation under the Education Act with the remaining BPT rates as indicated in the Halifax Regional Municipality's 2013/2014 Budget.

The Halifax Regional Municipality levies general property tax rates, numerous area rates (for services such as fire and transit) mostly based on geographic variation in deemed service levels and a supplemental education tax rate for the local school board. Since data is not available to weight area rates by geographic area of Halifax Regional Municipality, and since local rates are largely insignificant relative to general rates and are largely equal for residential and business classes where one exists for business, I mostly ignore them. The exceptions are fire and transit area rates as they differ substantially by class and are relatively non-negligible in magnitude. Applying the aforementioned 2.80 percent appreciation rate to both residential and commercial classes, I calculate Halifax Regional Municipality's 2013 total net effective BPT rate as 2.223 percent (Table 6A).

Prince Edward Island and Charlottetown

Like New Brunswick, Prince Edward Island has a “Real Provincial Property Tax” and has established future provincial BPT rates. In fact, the provincial BPT rate is fixed by legislation at 1.5 percent for all business property. The *Real Property Assessment Act* requires the provincial government to reassess properties each year with a January 1 valuation date and implementation on the following January 1. The effective provincial BPT rate is thus simply 1.5 percent.

As for the City of Charlottetown, its 2013 Budget indicates that its 2013 statutory RPT and BPT rates are 0.670 percent and 2.360 percent, respectively. Given Prince Edward Island’s assessment system, these are effective rates, so taking the difference yields a net effective BPT rate of 1.690 percent.

Newfoundland and Labrador and St. John’s

The *Assessment Act* requires property reassessment to be carried out by the Municipal Assessment Agency (MAA) and the City of St. John’s every three years between January 1 and September 30 with implementation the following year for taxation. The City of St. John’s manages its own assessment system while MAA manages the rest of the province. The valuation date is defined as the more recent of January 1, 2005 or January 1 every third year after 2005. Thus, the current valuation date is January 1, 2011, implying that 2013 assessed values are two years behind market values, a lag for which I account. The Province of Newfoundland and Labrador does not levy a provincial property tax.

According to the website of the City of St. John’s, as of January 1, 2013 it has rolled its BOT into the BPT. The City’s 2013 statutory RPT and BPT rates for properties with water and sewer services are 0.810 percent and 2.620 percent, respectively. Using assessment and tax information provided by City staff, I estimate that residential and commercial property appreciated at average annual rates of 8.85 percent and 3.32 percent, respectively, during 2008-2011. Assuming this trend has continued into 2013, effective RPT and BPT rates are 0.684 percent and 2.454 percent, respectively. Taking the difference yields a net effective BPT rate of 1.770 percent.

Parameter Values

The parameter values required for the METR analysis are summarized in the tables below. For the complete METR analysis, including a treatment of the underlying theory, see Found (2013a).

Table 7: National Parameter Values Common to All Capital Categories

Parameter	Value	Source
	Percent	
Nominal Interest Rate on Debt	5.80	Finance Canada
Proportion of Investment Financed/Issued as Debt	34.77	Statistics Canada
Proportion of Equity Held as Retained Earnings	35.73	
Inflation Rate	2.00	Assumed by Author

Source: Authors’ calculations.

Table 8: National Parameter Values Varying by Capital Category

Parameter	Land	Buildings	Machinery	Inventories	Source
	<i>Percent</i>				
Share of Corporate Investment	10.56	35.19	23.22	31.03	Statistics Canada; McKenzie et al. (1998) ^a
Real Economic Depreciation Rate	0.00	4.04	10.77	0.00	
CCA Depreciation Rate	0.00	6.15	30.00	0.00	Canada Revenue Agency

Note:

a: Since the land data is not disaggregated by Statistics Canada along residential/corporate lines, in line with McKenzie et al. (1998) the investment share for land is deemed to be 30 percent of that for buildings, implying about 23 percent of corporate property value is attributable to land. Since inventory investment is not included in the corporate investment flow dataset, the share of inventory investment is deemed to be 45 percent of land, building and machinery investment combined, again in line with McKenzie et al. (1998).

Table 9: Corporate Investment Shares

Parameter	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Canada	Source
		<i>Percent</i>										
National Corporate Investment	12.62	34.42	6.60	3.13	23.28	14.08	1.38	1.68	0.23	2.58	100.00	Statistics Canada
Federal Atlantic ITC-Eligible – Buildings	N/A	N/A	N/A	N/A	N/A	N/A	16.33	13.34	22.81	9.25	N/A	
Federal Atlantic ITC-Eligible – Machinery	N/A	N/A	N/A	N/A	N/A	N/A	32.44	27.68	33.60	21.37	N/A	
Provincial Manufacturing ITC-Eligible – Buildings	N/A	N/A	6.51	3.55	N/A	7.02	N/A	N/A	7.89	N/A	N/A	
Provincial Manufacturing ITC-Eligible – Machinery	N/A	N/A	8.76	16.69	N/A	24.36	N/A	N/A	20.46	N/A	N/A	

Table 10: Combined Federal-Provincial PIT Rates

Parameter	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Canada	Source
	<i>Percent</i>											
PIT Rate on Interest	43.70	39.00	44.00	46.40	49.53	49.97	45.07	50.00	47.37	42.30	44.52	Canada Revenue Agency; Provincial Websites
PIT Rate on Capital Gains	21.85	19.50	22.00	23.20	24.77	24.99	22.54	25.00	23.69	21.15	22.26	
PIT Rate on Dividends	25.78	19.29	24.81	32.46	33.85	35.22	24.91	36.06	28.70	22.47	26.98	

Table 11: Statutory Business Tax and ITC Rates

Parameter	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Source
	<i>Percent</i>										
Federal General CIT Rate	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	Canada Revenue Agency; Provincial Websites
Provincial General CIT Rate	11.00	10.00	12.00	12.00	11.50	11.90	12.00	16.00	16.00	14.00	
Federal ITC Rate – Manufacturing	0.00	0.00	0.00	0.00	0.00	0.00	10.00	10.00	10.00	10.00	
Provincial ITC Rate – Manufacturing	0.00	0.00	5.00	10.00	0.00	5.00	0.00	0.00	10.00	0.00	
General Provincial RST Rate	7.00	0.00	5.00	8.00	0.00	0.00	0.00	0.00	0.00	0.00	
Assessment-Weighted Provincial BPT Rate	0.678	0.390	0.943	1.183	1.212	0.221	2.104	0.331	1.500	0.000	Authors' Calculations

Table 12: Effective RST, BPT and ITC Rates

Parameter	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Source
	<i>Percent</i>										
Provincial RST Rate – Buildings and Machinery	4.865	0.000	2.875	5.480	0.000	0.000	0.000	0.000	0.000	0.000	Authors' Calculations
Assessment-Weighted Provincial BPT Rate – Land	0.665	0.370	0.793	0.605	1.039	0.206	1.866	0.318	1.500	0.000	
Assessment-Weighted Provincial BPT Rate – Buildings	0.665	0.370	0.793	0.605	1.039	0.206	1.885	0.318	1.500	0.000	
Federal ITC Rate – Buildings	0.000	0.000	0.000	0.000	0.000	0.000	1.633	1.334	2.281	0.925	
Federal ITC Rate – Machinery	0.000	0.000	0.000	0.000	0.000	0.000	3.244	2.768	3.360	2.137	
Provincial ITC Rate – Buildings	0.000	0.000	0.326	0.355	0.000	0.351	0.000	0.000	0.789	0.000	
Provincial ITC Rate – Machinery	0.000	0.000	0.438	1.669	0.000	1.218	0.000	0.000	2.046	0.000	

Table 13: Assessment-Weighted Net Effective Local BPT Rate for Largest Municipality in a Province

Quantity/Attribute	Vancouver	Calgary	Saskatoon	Winnipeg	Toronto	Montreal	Saint John	Halifax	Charlottetown	St. John's	Source
Province	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Statistics Canada
2011 Population	603,502	1,096,833	222,189	663,617	2,615,060	1,649,519	68,043	390,096	32,174	100,646	
	<i>Percent</i>										
Statutory RPT Rate	0.234	0.380	0.751	2.924	0.534	0.919	1.785	0.867	0.670	0.810	Municipal and Provincial Websites; Authors' Calculations
Statutory BPT Rate	1.034	1.407	0.751	3.287	1.622	3.839	2.678	3.216	2.360	2.620	
Effective RPT Rate	0.234	0.380	0.377	0.925	0.440	0.790	1.785	0.820	0.670	0.684	
Effective BPT Rate	1.034	1.407	0.661	1.975	1.366	3.397	2.678	3.043	2.360	2.454	
Net Effective BPT Rate	0.800	1.027	0.284	1.050	0.896	2.607	0.893	2.223	1.690	1.770	