

Impact of Changes to the Québec Government Funding Formula

Pier-André Bouchard St-Amant (ÉNAP)

MAUT Workshop on McGill University Finances

What Is This Workshop About?

- The set of rules through which (provincial) Higher Education appropriations are transferred to universities.
 - E.g.: about a **university funding formula**.
- This is not about the *level* of funding, nor about the *funding mix* (tuition vs state vs private).
- How does it work? What alternate policies exists?
- What incentives it generates?
- How should we design an *efficient* funding formula?
- Does it matter?

Funding by source

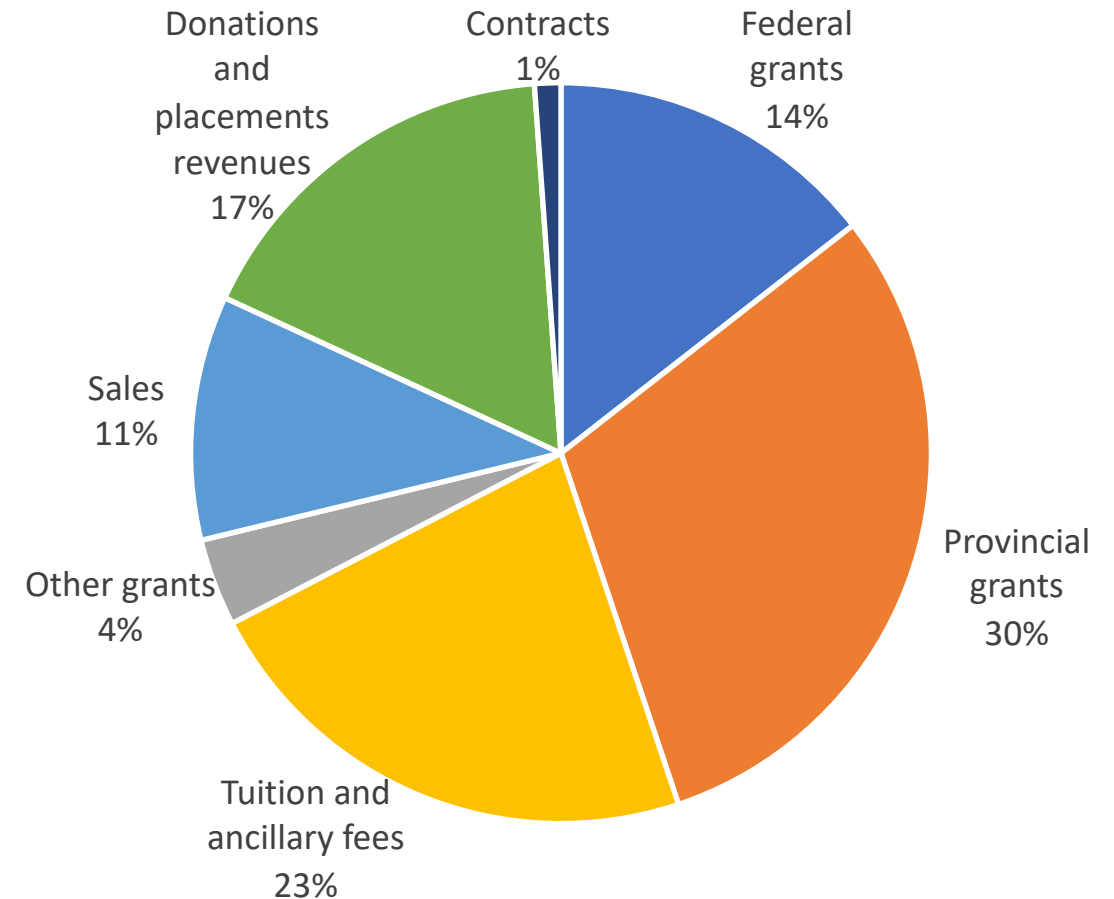
Sources:

- Provincial:
 - Standard appropriations (main source)
 - Infrastructure subsidies.
 - Specific programs.
 - Fiscal expenditures and indirect programs (international researcher tax credit, student aid, etc.)
- Federal:
 - Research councils (NSERC/SSHRC, etc)
 - Transfers to provinces
 - Specific departmental contracts/transfers
 - Fiscal expenditures and indirect programs.
- Students: tuition and ancillary fees.
- Other sources:
 - Donations and private subsidies.
 - Sales.
 - Other sources.

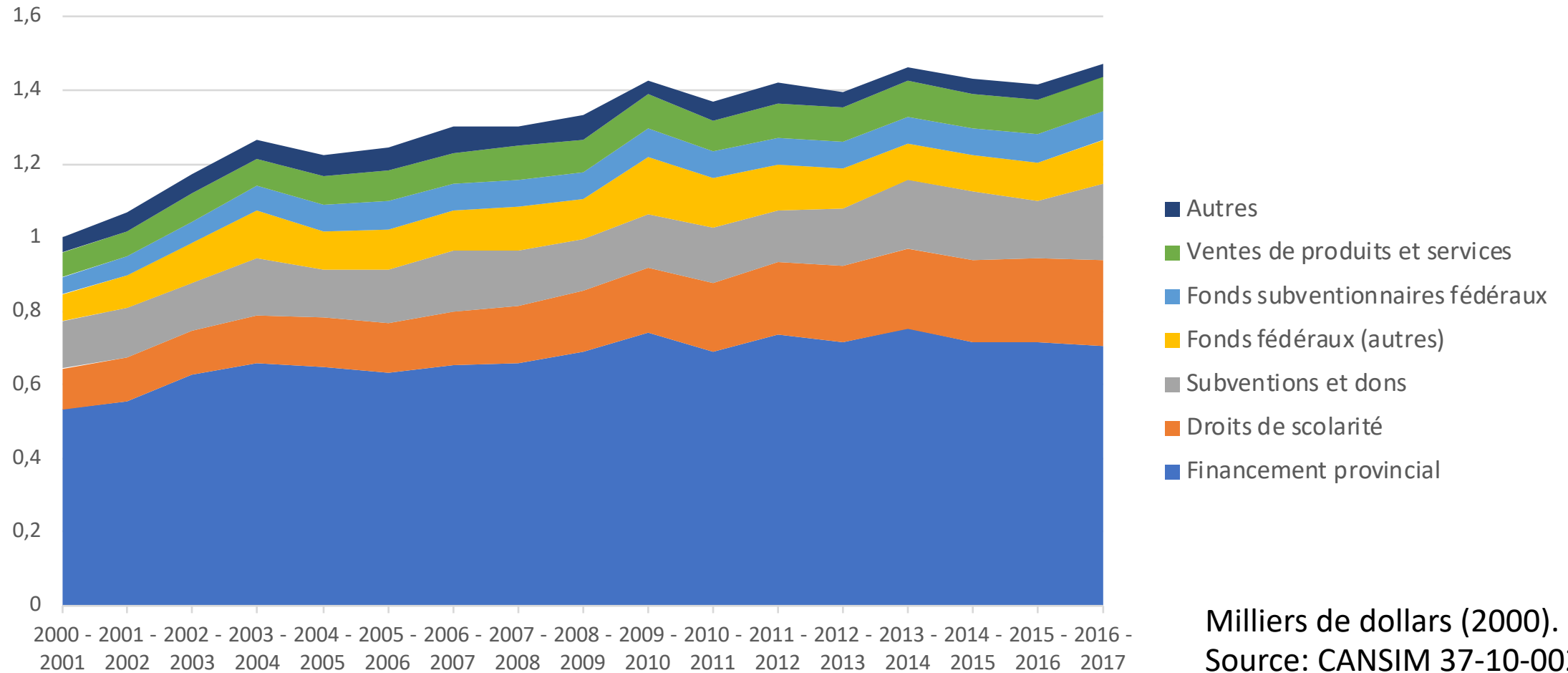
53% of Revenues Are Regulated by Québec

McGill revenues	2018 (k\$)	(%)
Federal grants	204 977	14
Provincial grants	431 238	30
Tuition and ancillary fees	319 673	23
Other grants	54 171	4
Sales	151 374	11
Donations and placements revenues	240 551	17
Contracts	16 264	1
Total	1 418 248	100

Source: Financial Statements (2018)

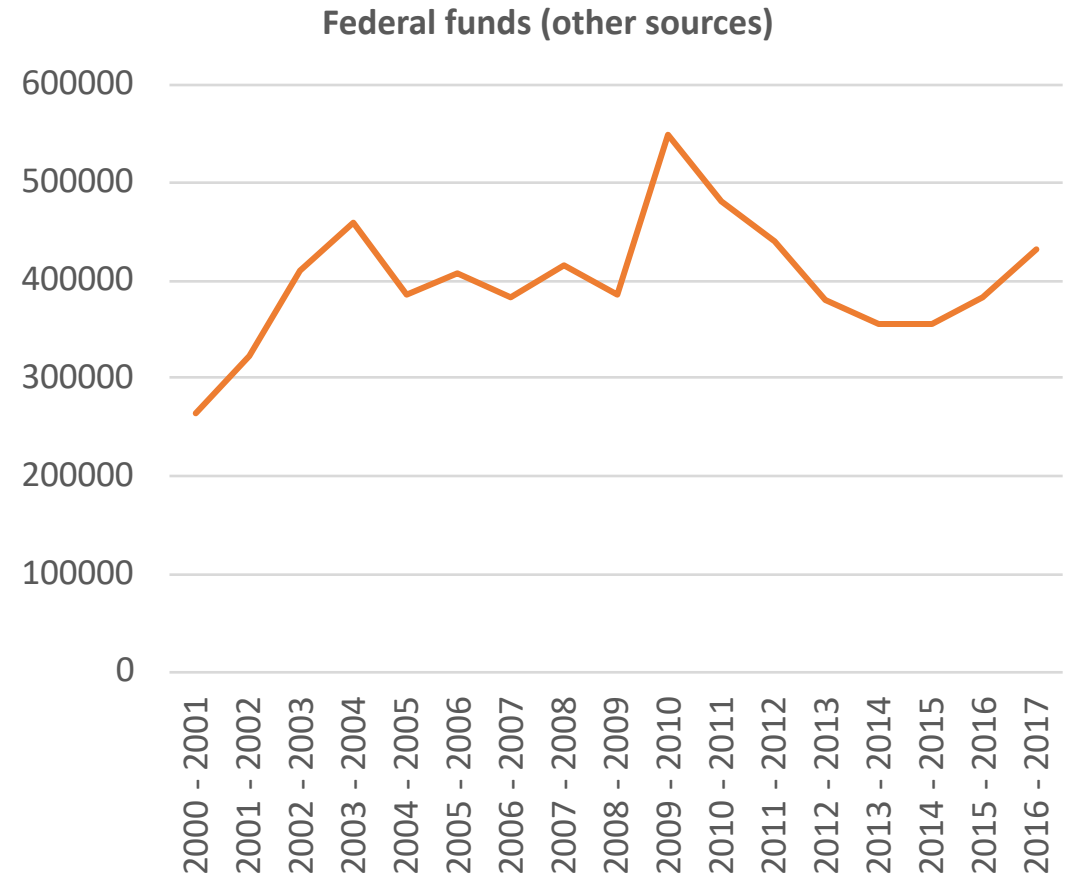
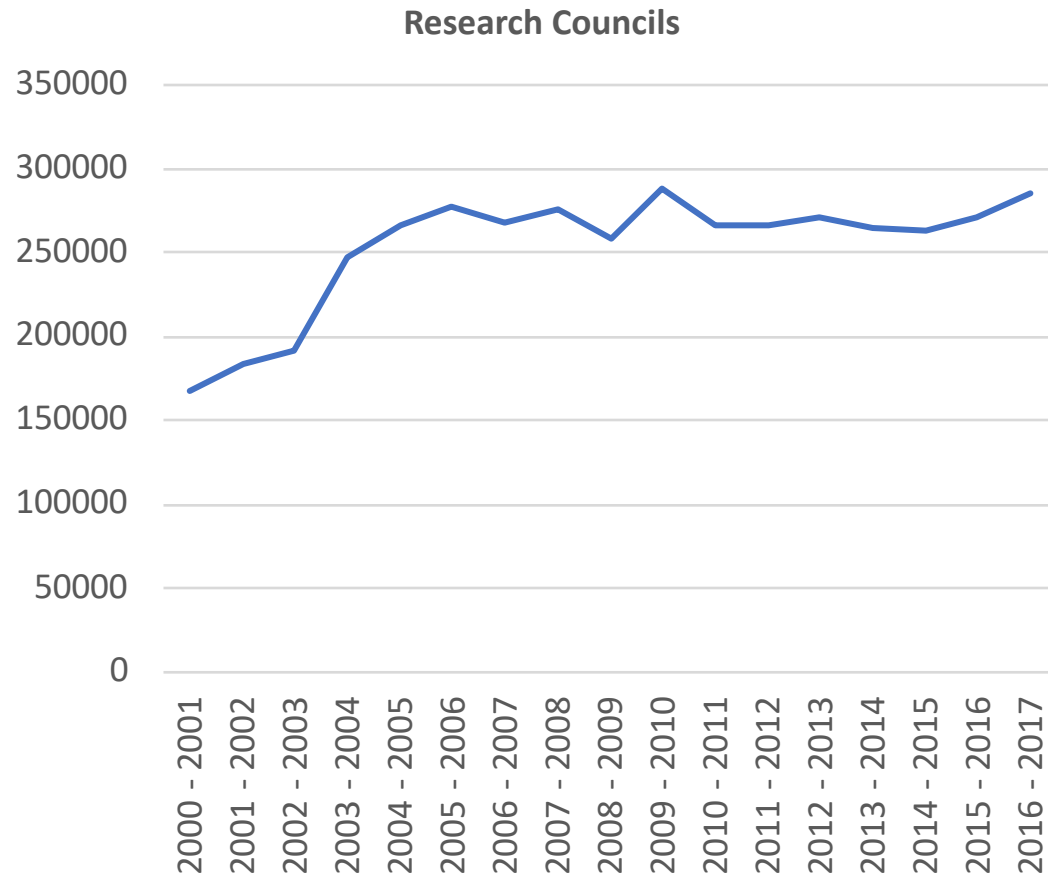


Total funding by source (Québec) 2000-2016



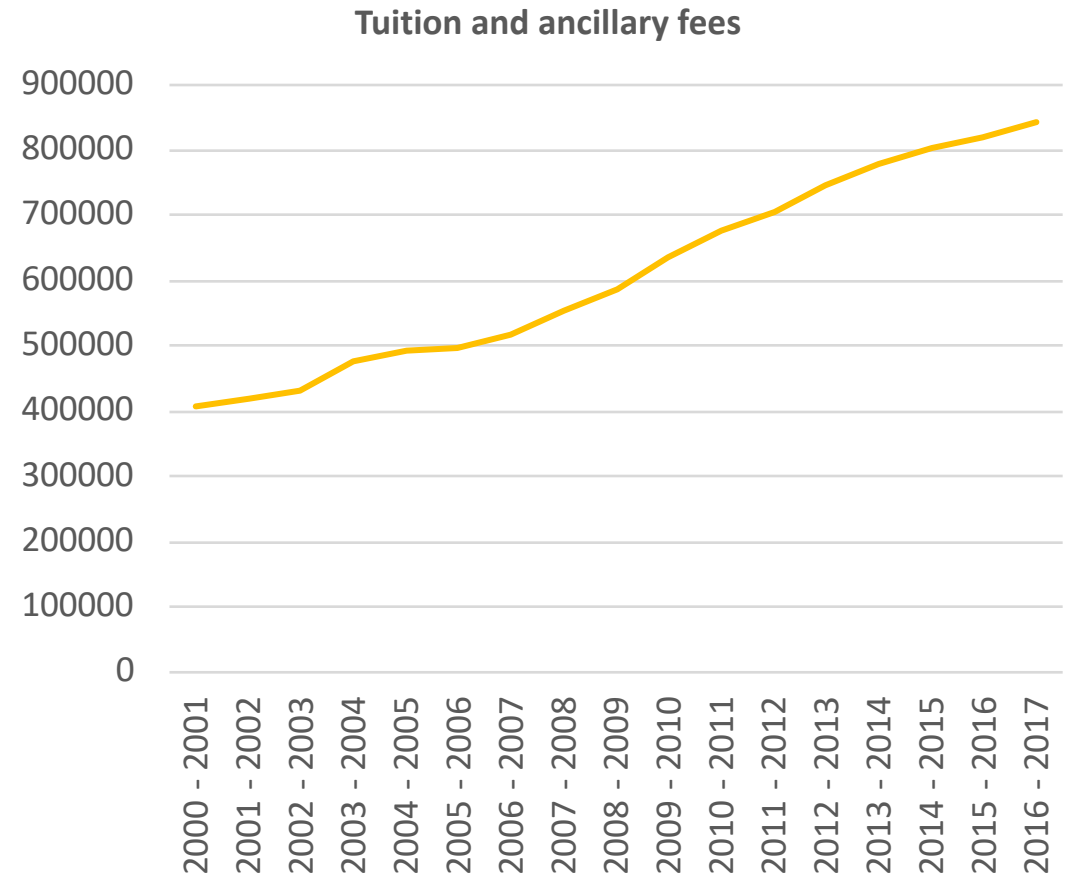
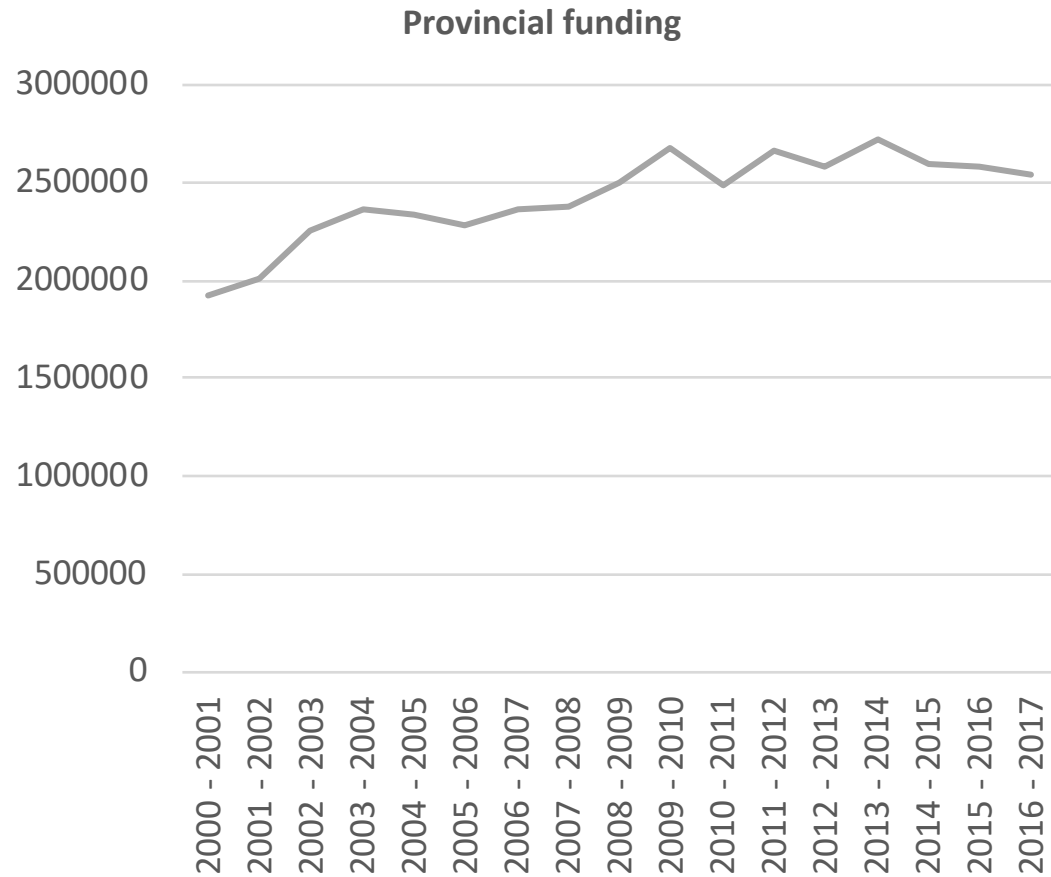
Milliers de dollars (2000).
Source: CANSIM 37-10-0026-01

Trends In Each Component (QC)



Milliers de dollars (2000).
Source: CANSIM 37-10-0026-01

Trends in Each Component (QC)



Milliers de dollars (2000).
Source: CANSIM 37-10-0026-01

Often Forgotten Funding Sources

- Some regressive programs with little impact:
 - Research tax credits
 - Tuition tax credits
 - The Canada Learning Bond
 - Registered Education Savings Plan (RESPs).
 - Roughly 2 billions (Qc) in these programs...
- Student aid:
 - The Canada Student Loan program is funnelled in the Québec Student Aid (since 1937!).

Should We Have A Funding Formula?

- Yes.
- It is a tool for procedural equity.
 - The rule is (roughly) known to everyone.
 - The rule is (roughly) the same to everyone.
 - It is stable.
- It is an implicit boundary who shapes academic freedom.
 - It provides a layer of protection from politics
 - (McGill is not exempt [from Québec politics](#))

What Type of Formula?

There are four archetypes:

- Unconditional funding (small jurisdictions).
 - Manitoba.
- Input based funding (large University systems)
 - Students, professors, building sizes, etc.
 - California, Texas (partial), France, Québec, Ontario (to name a few).
- Output based funding
 - Norway, Sweden.
- Performance based funding
 - Tennessee, Florida ... and [now Ontario](#) (to name a few).
- Most jurisdictions « mix » these archetypes.

Unconditional Funding

- Funding changes yearly, in an incremental fashion. In Québec, it is often dubbed “historical funding” because of its yearly incremental approach (e.g.: last year + x%).
- No strings attached. Institutional autonomy is complete.
- This approach prevailed in Québec prior to year 2000. Universities complained that it did not reflect the evolution of enrollment.
- There is little need for accountability.
- The formula provides no incentives.
- Yearly changes in funding may be unpredictable.

Input Based Funding

- The *share* of appropriations depends on (some) inputs:
 - Full-time equivalent students (FTEs). 30 units = 1 FTE (for undergrads).
 - (Used) square footage of buildings.
 - Energy Prices
 - Price of books and related materials.
 - Costs of human resources.
- This approach:
 - Follows the evolution of costs.
 - Provides incentives to increase costs.

Input Based Funding

- It is the most popular formula in large jurisdictions.
- A « private » university getting its revenues only from tuition is an extreme case of input based formula.
- In most jurisdictions, the prevalent input is the number of FTEs.
- The core idea remains the same, although there are minor changes across jurisdictions:
 - In Québec, the funding is a function of the last three years.
 - In Ontario, there is a « corridor model ». Funds follow enrollment only within the corridor.

Output Based Funding

- Funding depends on the university output, like the number of graduates, the research output, or completed credits. It is often called the « taximeter model ».
- Used in Norway, Sweden and should be implemented in Ontario.
- The approach:
 - Provides incentives for accrued production.
 - Pushes production costs down.
 - Pushes quality down.
 - Assumes outputs can be accurately measured

In Québec

- The core of the funding formula is based on:
 - FTEs.
 - Unconditional transfers.
 - The price of energy and used square footage.
- Unconditional transfers are university specific.
- The other components are the same for any university.
- New dimension since 2017 (that I have not yet analyzed): universities can now receive additional (provincial) funding through the [infrastructure plan](#).
- Several procedures for accountability are also in place.

In Québec

- Some small specific components of the formula are performance based:
 - « Bonuses » if there are no deficits.
 - Funding is tied to the lack of strikes (be it a student strike or a professor strike): a strike from professors does not pay for future wage increases
- The core of the formula depends on:
 - University specific transfers
 - A baseline price per student (+/- 3600\$)
 - A set of weights for each category of student « for funding purpose ».
 - A computer science student is weighted more than an arts student.
 - An undergraduate student is weighted less than a graduate student.
 - A component that depends on the price of energy and used superficity.
- There are two key exceptions (that we will discuss later on).

A (Simple) Example

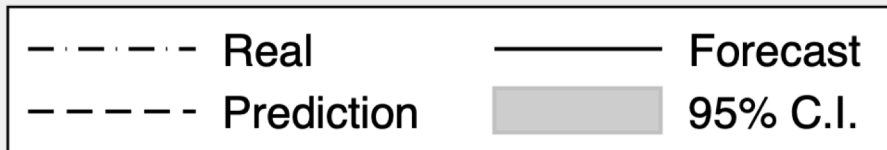
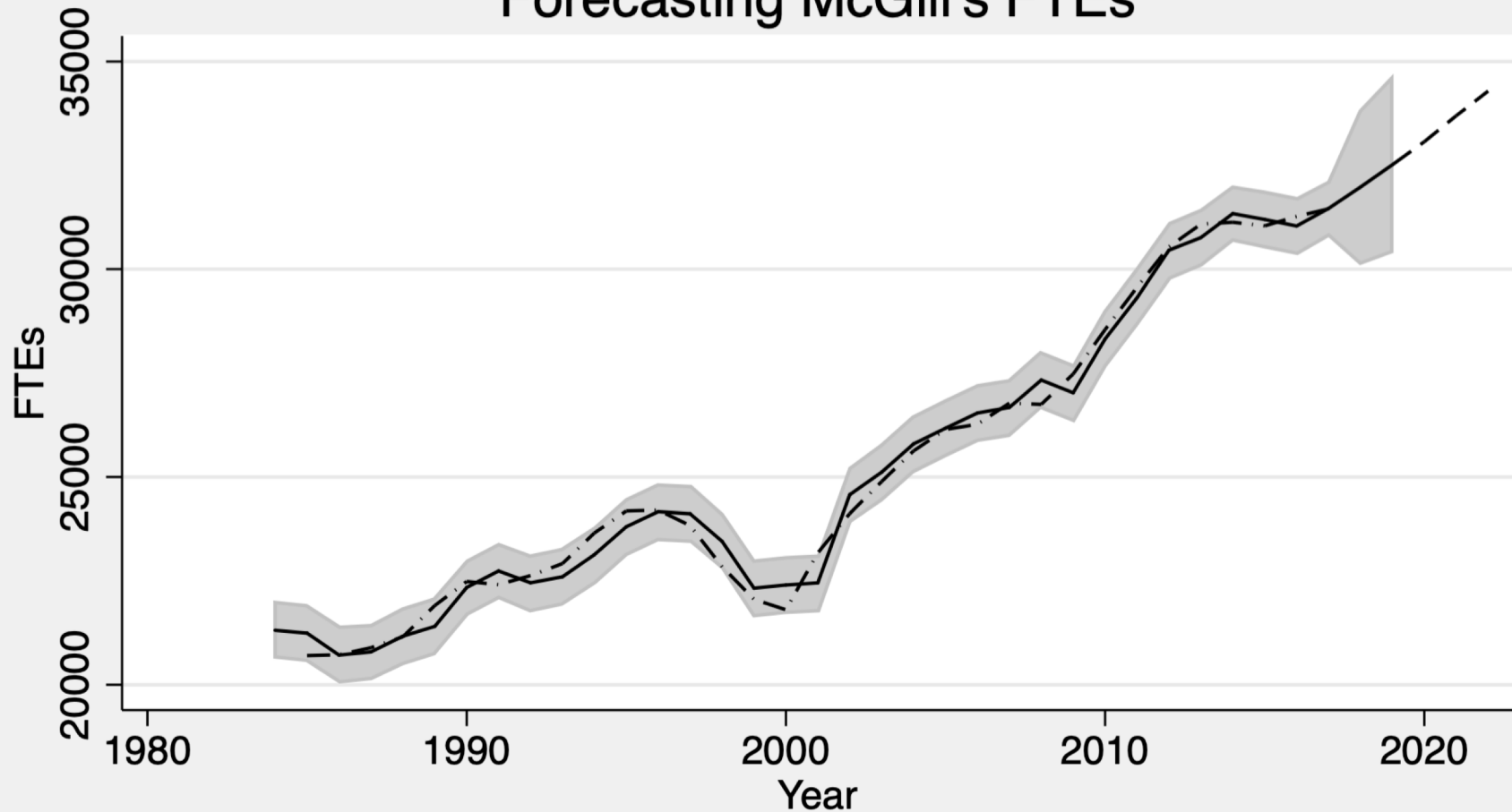
- Consider a (fictitious) university with only two programs:
 - A computer science program for undergrads, where there are 100 FTEs.
 - The weight of a student is 2.10.
 - A sociology program for masters students, where there are 20 FTEs.
 - The weight of a student is 5.25.
 - The baseline price is 4000\$ per student.
 - Unconditional transfers and other components of the formula add up to 1 M\$.
- Then, this university receives a grant of 2.26 M\$.
- Details:
 - Weighted FTEs are given by: $2.10 \times 100 + 5.25 \times 20 = 315$ FTEs.
 - Enrollment based component: $4000 \text{ \$} \times 315 \text{ FTEs} = 1.26 \text{ M\$}$
 - Plus other sources: 2.26 M\$.

Main components of the formula

	Per student	Superficy and price of energy	Unconditional, universal	Unconditional, specific
Funding (k \$)	2 111 189.1	343 515.0	52 702.0	454 379.5
Percentage	71,3	11,6	1,8	15,3

Source: MES (2017).

Forecasting McGill's FTEs



Source: Bouchard St-Amant and Tadjioque (2019).

McGill Is
Not About
to Go
Bankrupt

Forecasting Next Years' FTEs

- Five variables:
 - Nominal GDP (+).
 - Unemployment rate (+).
 - 18-25 population (+).
 - The last two years' forecasting errors (+, -).
- This is a simple narrative.
- Key factors that yet remain to be ascertained:
 - The deregulation of tuition fees for international students.
 - How the change in weighted enrollment affects trends.

FTEs Forecast (McGill)

	2018-2019	2019-2020	2020-2021
95% lower bound	30148	30431	n/a
Forecast	31976	32513	33067
95% upper bound	33804	34595	n/a
Budget relevance	2019-2020	2020-2021	2021-2022

Source: Bouchard St-Amant and Tadjioque (2019)

Some Additional Comments

- It is the prerogative of the Treasury Board to determine the final appropriations (before sending them to the National Assembly).
 - The minister in council usually votes in December (the budget is in March).
 - Funding can change with governments and the electoral cycle.
- Cuts/Investments?
 - Cuts are often made by changing unconditional transfers.
 - Investments are often made by changing the baseline price.
- Key idea: the baseline price varies with total appropriations.

An Analysis of Incentives

- The incentives of the funding formula reveal themselves when the interdependence of the system is analysed.
- Key concept: it is a *sharing* rule. It divides the pie.
- Universities face incentives to increase enrollment:
 - If a few universities adopt this practice, they will increase their funding.
 - Other universities that do not adopt the practice will see their funding decrease.
 - If all universities adopt a growth strategy (with equal forces), then funding should remain the same (despite having more students).
 - For as long as universities do not coordinate, this should be the observed outcome of the strategy.

A (Simple) Example

- Two identical universities
- Each have a single program with 100 FTEs.
- Total provincial funding is equal to 100%, with 10% in unconditional transfers. The total funding is fixed.
- The university can choose two strategies:
 - A growth strategy (leading to a 10% increase in enrollment)
 - Status quo.
- Growth strategy?
 - Wide admissions and « funnel » programs.
 - Conversion of non-credited activities to credited activities (internships, etc.).

A (Simple) Example

		University 2	
		Status quo	Growth
		$(\frac{G}{e_1+e_2})$	
University 1	Status quo	(50, 50)	(48, 52)
	Growth	(52, 48)	(50, 50)
		(0.5)	(0.476)
		(0.476)	(0.45)
	(F_1, F_2)		

An Analysis of Incentives (Continued)

- Universities have incentives to “over-report” in high weight categories:
 - If a small number of universities do this, they will increase their funding.
 - Universities who do not will see their funding decrease.
 - If all universities do this, their funding should remain the same and the effective impact of weights will erode.
 - As long as universities do not cooperate, the last point should be the observed outcome.

Source: funding rules, 2018.

Pondération des effectifs étudiants
Année universitaire 2018-2019

		Coûts moyens observés ¹ des années universitaires 2012-2013 à 2014-2015			Droits de scolarité ²	Coûts moyens subventionnés			Pondération par cycle		
		1 ^{er} cycle	2 ^e cycle	3 ^e cycle		1 ^{er} cycle	2 ^e cycle	3 ^e cycle	1 ^{er} cycle	2 ^e cycle	3 ^e cycle
30	Médecine vétérinaire	50 457	32 870	43 827	1 354	49 103	31 517	42 473	14,51	9,31	12,55
31	Agriculture, foresterie et médecine dentaire	30 662	32 870	43 827	1 354	29 308	31 517	42 473	8,66	9,31	12,55
32	Médecine, optométrie et santé des populations	18 630	32 870	43 827	1 354	17 276	31 517	42 473	5,11	9,31	12,55
33	Beaux-arts	17 340	19 128	43 827	1 354	15 986	17 774	42 473	4,72	5,25	12,55
34	Sciences pures	8 476	32 870	43 827	1 354	7 123	31 517	42 473	2,10	9,31	12,55
35	Réadaptation, sciences des aliments, sciences de l'aménagement et arts numériques	8 476	19 128	43 827	1 354	7 123	17 774	42 473	2,10	5,25	12,55
36	Éducation, sciences infirmières, pharmacie et relations humaines	8 476	9 632	43 827	1 354	7 123	8 278	42 473	2,10	2,45	12,55
37	Génie et informatique	8 476	9 632	43 827	1 354	7 123	8 278	42 473	2,10	2,45	12,55
38	Droit, mathématiques, sciences humaines et sociales et lettres	6 020	19 128	43 827	1 354	4 666	17 774	42 473	1,38	5,25	12,55
39	Administration	6 020	9 632	43 827	1 354	4 666	8 278	42 473	1,38	2,45	12,55
40	Psychologie	4 738	9 632	30 425	1 354	3 384	8 278	29 071	1,00	2,45	8,59
41	Activités non associées à une discipline	4 738	4 738	4 738	1 354	3 384	3 384	3 384	1,00	1,00	1,00
42	Médecins résidents		7 452		1 354		6 098			1,80	

Two Additional Exceptions

- The Québec formula has *two* components that depends on enrollment:
 - The weighted component that we already discussed. Its intent is to reflect the differences in teaching costs.
 - The *unweighted* component. Its intent is to reflect the volume costs of services (e.g.: library).
- The formula keeps the highest of the two following numbers:
 - The FTEs of last year.
 - The average FTEs over the last three years.
 - This approach smooths funding with respect to enrollment shocks.

A Complete Analysis of the Formula For McGill

- Please download the excel file at:
<https://sites.google.com/view/pabsta/funding-formulas>

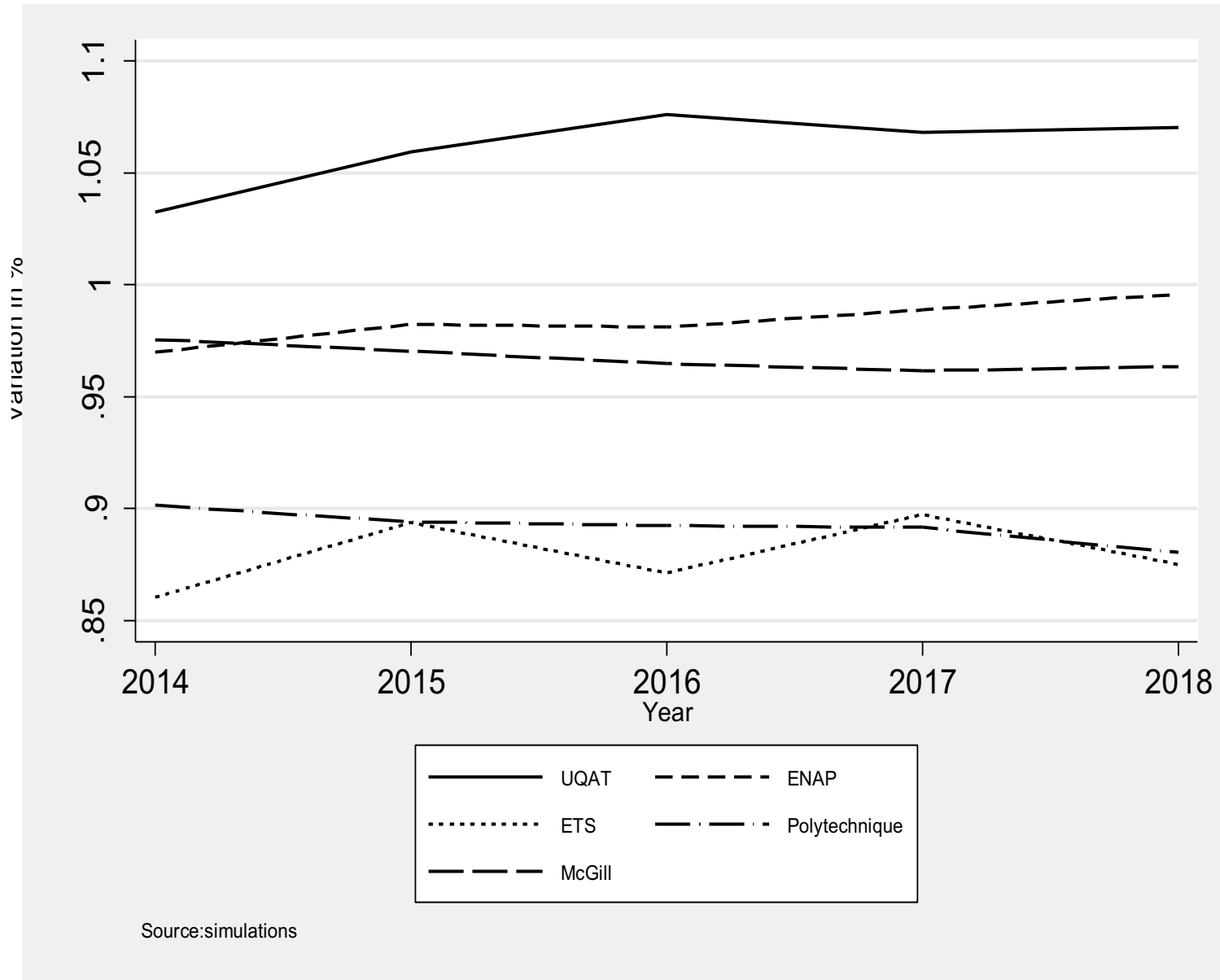
2017 Changes to the Funding Formula

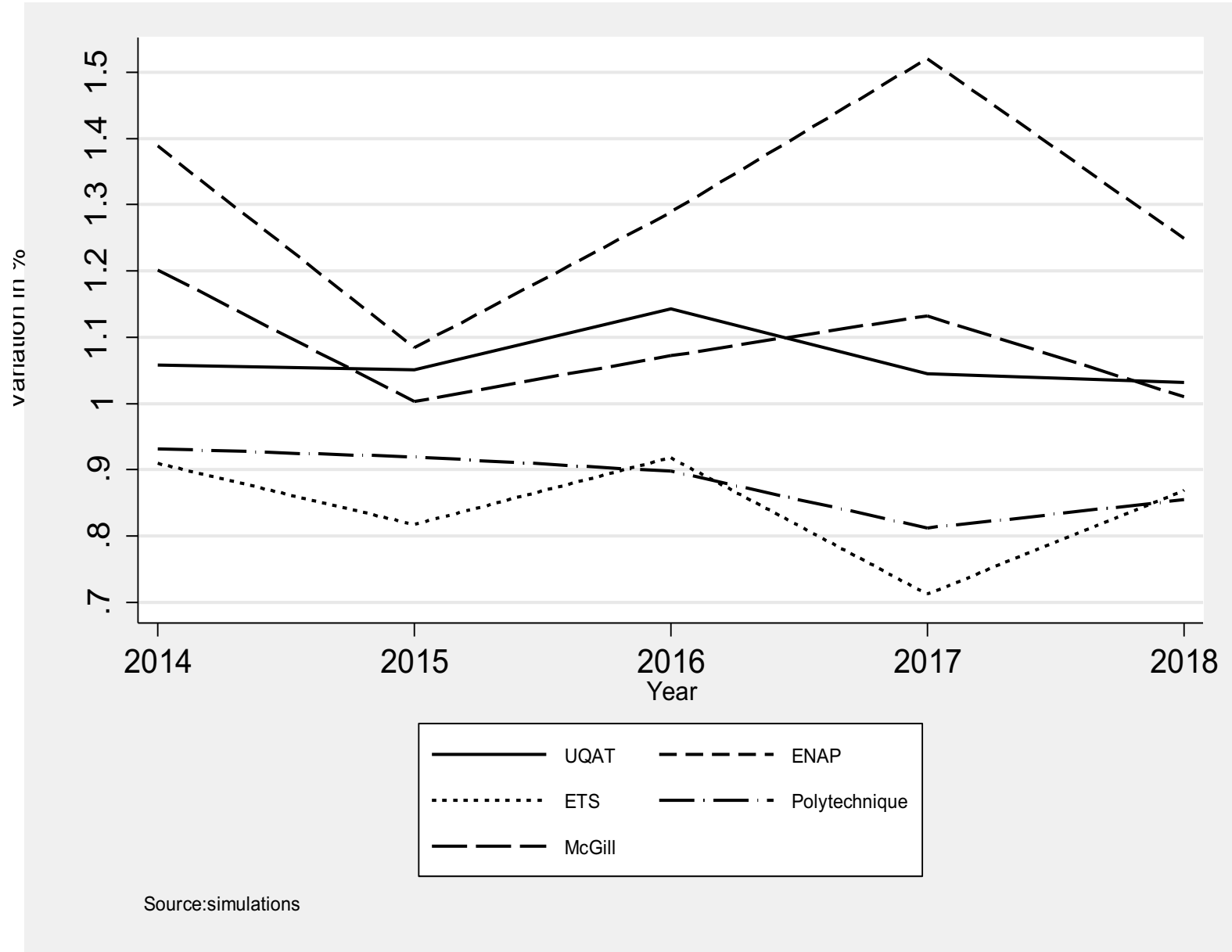
- Key changes
 - Funding families were reduced from 24 to 13 (x 3 tiers).
 - An increase of 105.2M\$ in 2018-2019.
 - Growth limiting mechanism for the first years (5% max).
 - Specific transfers were abolished (188.6M\$) and channeled in the main formula.
 - 6.3M\$ in unconditional transfers for regional universities.
 - 8 M\$ for engineering schools.

Recent Changes to the Funding Formula

- Engineering schools (Polytechnique, ETS) lost the most with the recent formula.
- (ÉNAP won the most)
- Three main changes:
 - (-) Medical interns were accounted twice before.
 - (-) Weights to the « Engineering » family were reduced.
 - (+) Weights to Masters and PhDs were increased significantly.
- Absent of an increase in funding, any change to the funding formula is purely redistributive.

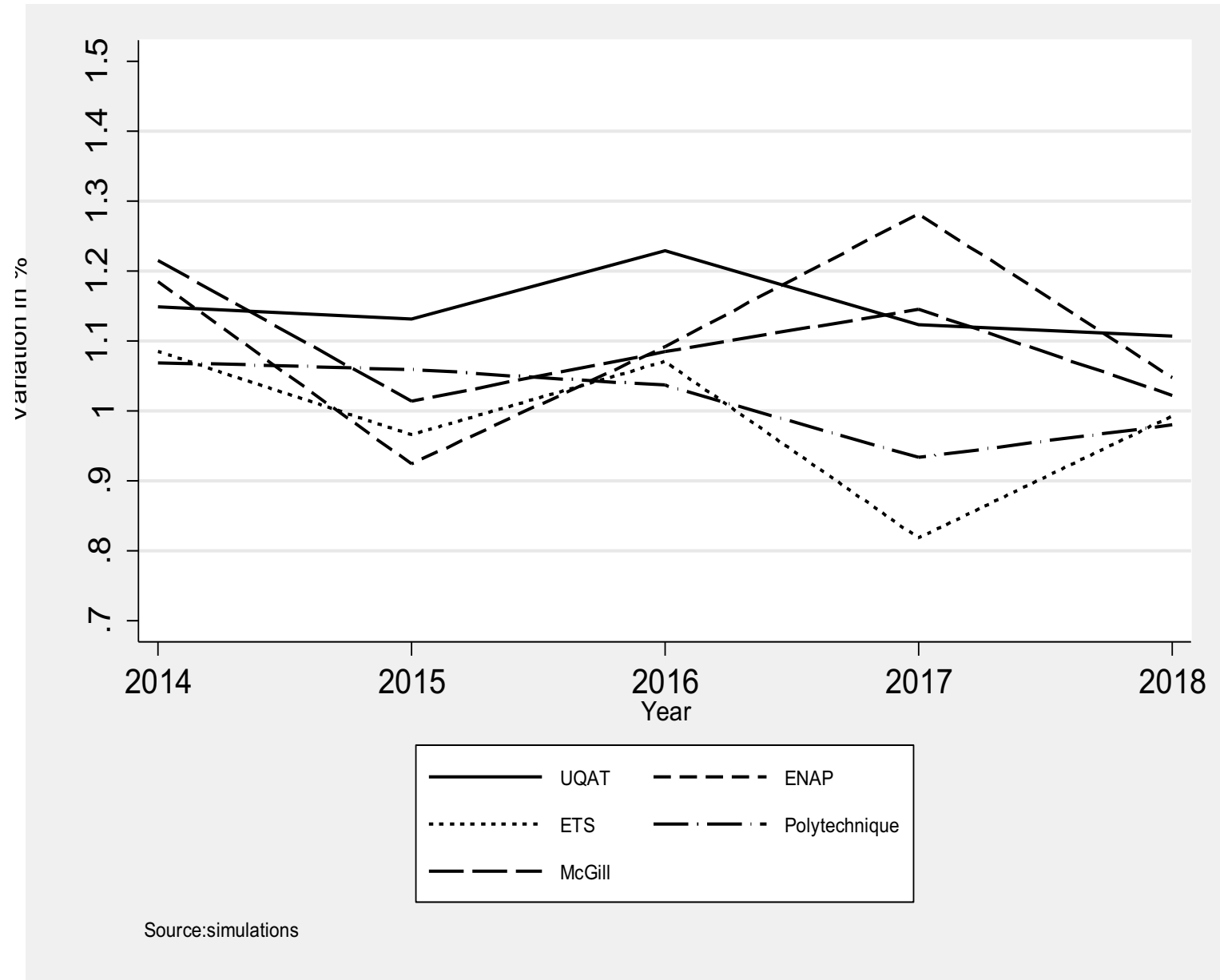
Impact of the Weight Changes (5 selected univs)





Weight
Changes +
Permanent
measures
(no growth, no
reinvestment)

Source:simulations



Weight
 Changes +
 Permanent +
 growth +
 reinvestment

Source:simulations

Some Relevant Work

Management/Policy Work:

- Frolich, Schmidt and Rosa (2010). *Funding Systems For Higher Education and Their Impacts On Institutional Strategies and Academia: A Comparative Perspective*. ([url](#))
- Cretan (2012). *Education Funding Methods in European States*. ([url](#))
- Jonbloed and Vossensteyn (2001). *Keeping Up Performances: An International Survey of Performance-Based Funding In Higher Education*. ([url](#))

Reports:

- Hawaii Department of Education (2017). *Funding Formula Use in Higher Education*. ([url](#))

Advanced Economic Theory:

- Di Fraja and Valbonesi (2012). *The Design of a University System*. ([url](#))
- Yours Truly, (working paper). *Efficient University Funding Formulas*. ([url](#))