Elements of Revenue Forecasting III: From mechanical projection to forecast

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Revenue forecasting

- **Effective Tax Rate approach** (L2)
- **Elasticity approach** (L3)
  - Point elasticity
  - Regression

This lecture discusses

- How to select forecasting methods
- How to incorporate qualitative information and
- Deviations from the baseline projection

Outline

I. How to select forecasting methods
   a) Good properties for projections
   b) Revenue aggregates to GDP ratio
   c) ETR vs. Elasticity

II. How to incorporate qualitative information

III. Deviations from the baseline projection
   a) Policy actions
   b) Shocks

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Part I: How to select forecasting methods

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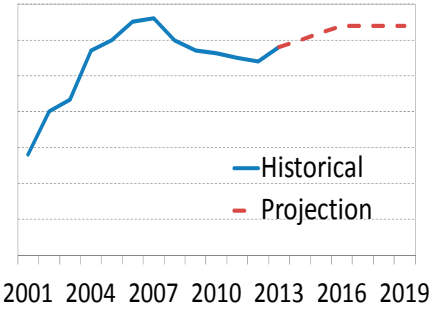
Good properties for projections

- Smooth
- Stories for visible patterns
  - Trends
  - Jumps



- Stories for deviations from the past projections
  - New information
  - Forecast errors

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What can we check?

Do they exhibit good properties?

Are they consistent with your stories?

Are they realistic?

Revenue to GDP ratio
- Each revenue item
- Revenue aggregates

Projected path of ETR/Elasticity

Implied ETR/Elasticity
- Implied elasticity in the ETR approach
- Implied ETR in the elasticity approach

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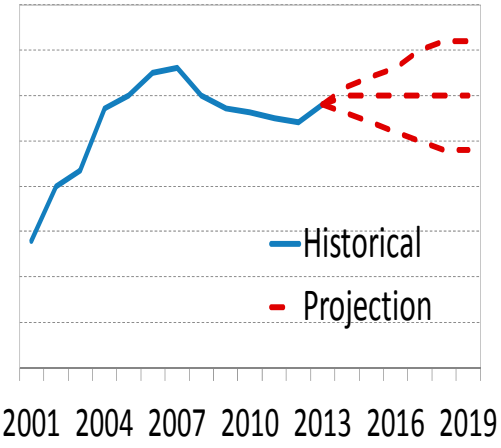
Trends

Example:

Total revenue to GDP ratio

- Key statistics

If it is not realistic or cannot be justified, go back to each revenue items



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Composition

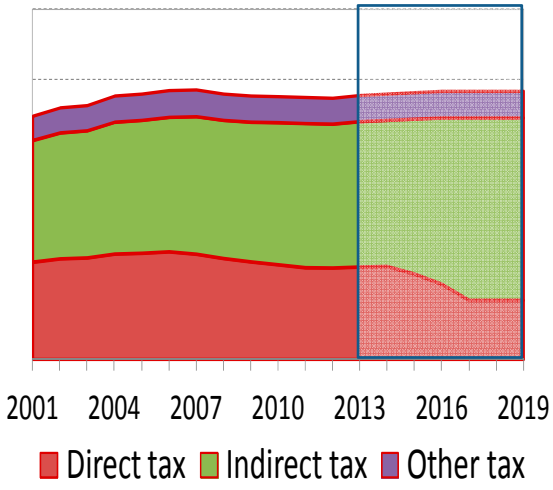
Example:

Direct tax

vs.

Indirect tax

Make sure that the trend is well justified



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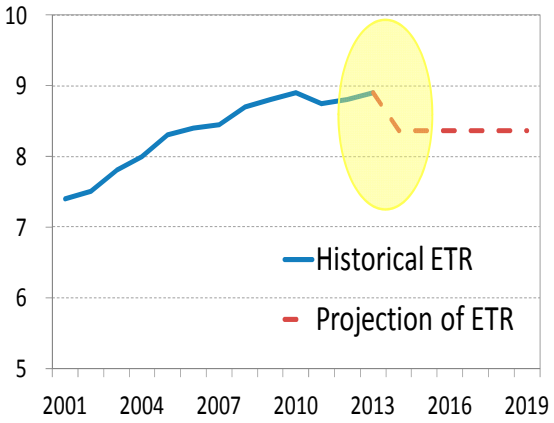
Unjustified jumps

Example:

Sudden deterioration in revenue collection in 2014

Make sure what explains the jump



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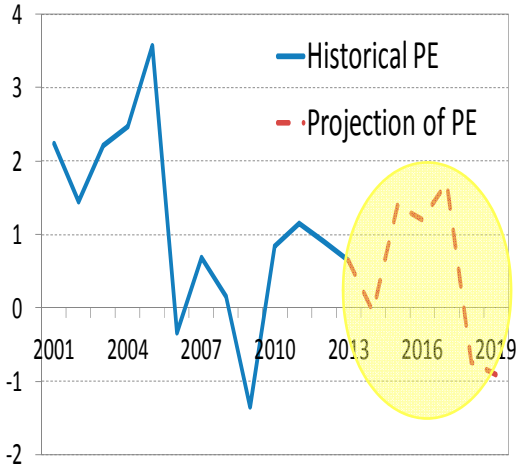
Unjustified fluctuations

Example:

Point elasticity

Are they justified?

Usually, make projections smooth in the long-run, where less info is available



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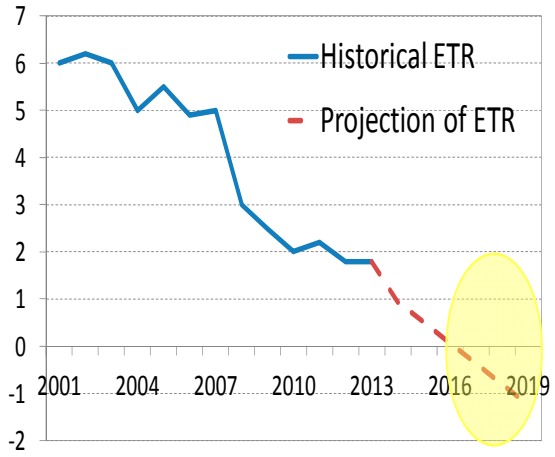
Negative ETR

Interpretation:

Tax eventually becomes subsidy

Usually, a negative ETR is not right

Think about why the ETR has been decreasing



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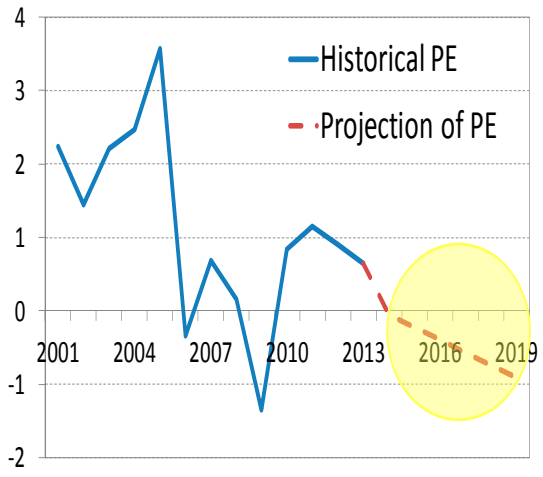
Negative Elasticity

Interpretation

Tax revenue drops when the tax base grows

Negative PE is possible but needs to be justified



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Implied Elasticity in the ETR approach

	2012	2013	2014p	2015p	2016p
Customs	1,680	2,030	**2,400**	**2,542**	**3,038**
Imports	30,000	35,000	**40,000**	**41,000**	**49,000**
ETR (%)	5.6	5.8	**6.0**	**6.2**	**6.2**
Implied E			1.3	2.4	1.0

Implied Elasticity:

$$\text{Implied E} = \frac{\%\text{ change in the projected revenue}}{\%\text{ change in the projected proxy tax base}}$$

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Implied ETR in the Elasticity approach

	2012	2013	2014p	2015p	2016p
Customs	1,680	2,030	**2,378**	**2,420**	**2,892**
Imports	30,000	35,000	**40,000**	**41,000**	**49,000**
Elasticity	1.9	1.3	**1.2**	**0.7**	**1.0**
Implied ETR (%)			5.95	5.90	5.90

Implied ETR:

$$\text{Implied ETR} = \frac{\text{Projected revenues}}{\text{Projected proxy tax base}}$$

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Elasticity and ETR

	2012	2013	2014p	2015p	2016p
Customs	1,680	2,030	**2,320**	**2,378**	**2,842**
Imports	30,000	35,000	**40,000**	**41,000**	**49,000**
Elasticity	1.9	1.3	**1.0**	**1.0**	**1.0**
ETR (%)	5.60	5.80	5.80	5.80	5.80

Elasticity of 1 ⟺ Constant ETR

- Tax revenue grows at the same rate as its proxy tax base

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Elasticity greater than one

	2012	2013	2014p	2015p	2016p
Customs	1,680	2,030	**2,465**	**2,557**	**3,306**
Imports	30,000	35,000	**40,000**	**41,000**	**49,000**
Elasticity	1.9	1.3	**1.5**	**1.5**	**1.5**
ETR (%)	5.60	5.80	6.16	6.24	6.75

Elasticity > 1 ⟺ Increasing ETR

- Tax revenue grows at a higher rate than its proxy tax base

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Elasticity less than one

	2012	2013	2014p	2015p	2016p
Customs	1,680	2,030	**2,175**	**2,202**	**2,417**
Imports	30,000	35,000	**40,000**	**41,000**	**49,000**
Elasticity	1.9	1.3	**0.5**	**0.5**	**0.5**
ETR (%)	5.60	5.80	5.44	5.37	4.93

Elasticity < 1 ⟺ **Decreasing ETR**

- Tax revenue grows at a lower rate than its proxy tax base

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Elasticity and ETR - summary -

Elasticity	ETR
Greater than 1	Increasing when the proxy tax base ↗
	Decreasing when the proxy tax base ↘
1	Constant
Less than 1	Decreasing when the proxy tax base ↗
	Increasing when the proxy tax base ↘

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When is the Elasticity approach useful?

- There is no absolute answer
- But, typically suitable for revenues based on tax rates

  Example:
  Income tax, VAT, customs

- … because it tends to produce a **stable relationship** between revenue and its proxy tax base

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Adjustments in the Elasticity

	2012	2013	2014p	2015p	2016p
Customs	1,680	2,030	**2,378**	**2,420**	**2,892**
Imports	30,000	35,000	**40,000**	**41,000**	**49,000**
Elasticity	1.9	1.3	**1.2**	**0.7**	**1.0**
Implied ETR (%)			5.95	5.90	5.90

- Changes in the elasticity tend to imply **minor** changes in the ETR
  - i.e. **Stable relationship** between revenue and its proxy tax base

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When is the ETR approach useful?

- Typically useful for revenues that faces **more policy discretion** and **uncertainty**
- i.e. **unstable relationship** to its proxy tax base

Example:
Non-tax revenues, excise tax, other taxes

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Adjustments in the ETR

	2012	2013	2014p	2015p	2016p
Customs	1,680	2,030	**2,400**	**2,542**	**3,038**
Imports	30,000	35,000	**40,000**	**41,000**	**49,000**
ETR (%)	5.6	5.8	**6.0**	**6.2**	**6.2**
Implied E			1.3	2.4	1.0

- **Small** change in the ETR can imply a **large** change in the elasticity, depending on the proxy tax base growth
- Easy to handle unstable relationships

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How to select projection methods - summary-

Typically …

- **Elasticity approach** is useful for revenues based on tax rates
- **ETR approach** is useful for revenues that faces more uncertainties

However, there is no “absolute” answer.

- Select methods case by case
- Look for good properties for projections

Part II: How to incorporate qualitative information

Improvements in tax administration

Reforms conducted in the recent years

- Improvements can take several years
- Make sure your expected improvements are realistic (size, duration, etc.)

Do not include **future reforms** in the baseline projections (unless firmly confirmed)

- Consider them as a possible factor to deviate from the baseline scenario

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Information from donors

Incorporate information from…

- **Bilateral** consultation with donors
- **OECD**
  - Aid information and outlook http://stats.oecd.org/Index.aspx?DataSetCode=FSS
  - Survey on Donors Forward Spending Plans http://www.oecd.org/dac/aid-architecture/
- **Other resources**

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Part III: Deviations from the baseline scenario

Recap: Baseline projections

Baseline (deemed most likely):

- Macroeconomic forecasts
- Current policy
- Firmly confirmed policy changes

Deviations from the baseline projections:

- Policy actions
- Shocks
- Upward and downward risks

Considering deviations clarifies the key assumptions

Policy actions

Stimulus policies

- Temporary tax cuts and exemptions
- Moratoriums

Structural reforms

- Introduction of new taxes
- Permanent change of tax rates
- Tax administration reforms

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Shocks

External environment

- Commodity price shocks
- World economy developments
- Natural disasters

Domestic economy

- Business cycles
- Change in the economic structure
  - e.g. Discovery of natural resources

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Alternative projections

Example: Introduction of VAT

- Baseline projections: without VAT
- Alternative projections: with VAT

ETR/Elasticity:

- Statutory tax rate
- Effectiveness of tax administration
- Compliance rate etc.

Proxy tax base (macro assumptions):

- Real GDP growth
- Inflation etc.

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Summary

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Summary

- Which approach to use?
  - Elasticity approach tend to be useful for revenues based on tax rates
  - ETR approach tend to be useful for revenues that face more uncertainty
  - But, there is no absolute answer
- Good properties for projections
  - Realistic
  - No unjustified trends and fluctuations
- Also use qualitative information
  - Baseline projections and deviations

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