

ENERGY PRICES AND TAXES

Energy Data Centre



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Summary

1) The importance of price statistics

2) Which prices do we collect?

a) End-Use prices

b) Price indices

c) Crude Oil Import Costs

d) Other price data

e) Common Challenges



EPT Questionnaire

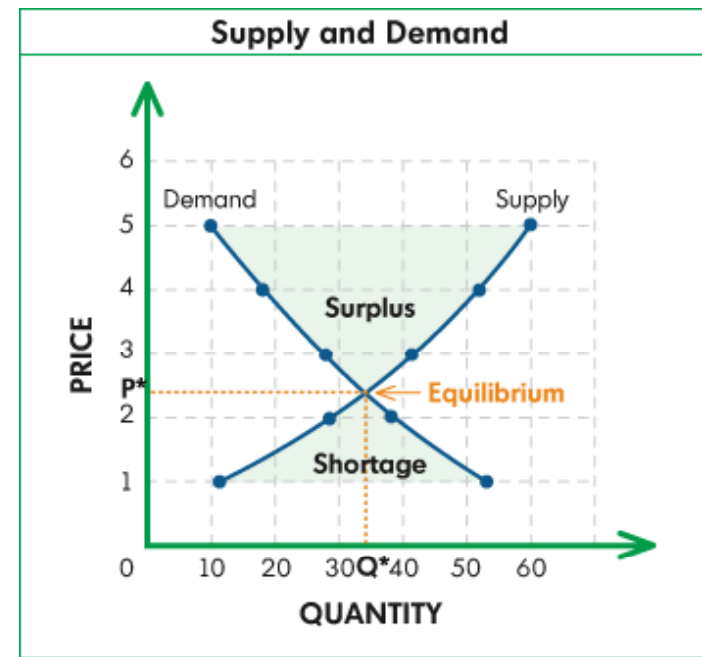
SOM Questionnaire

3) What information can be derived?

4) Where are prices published at the IEA?

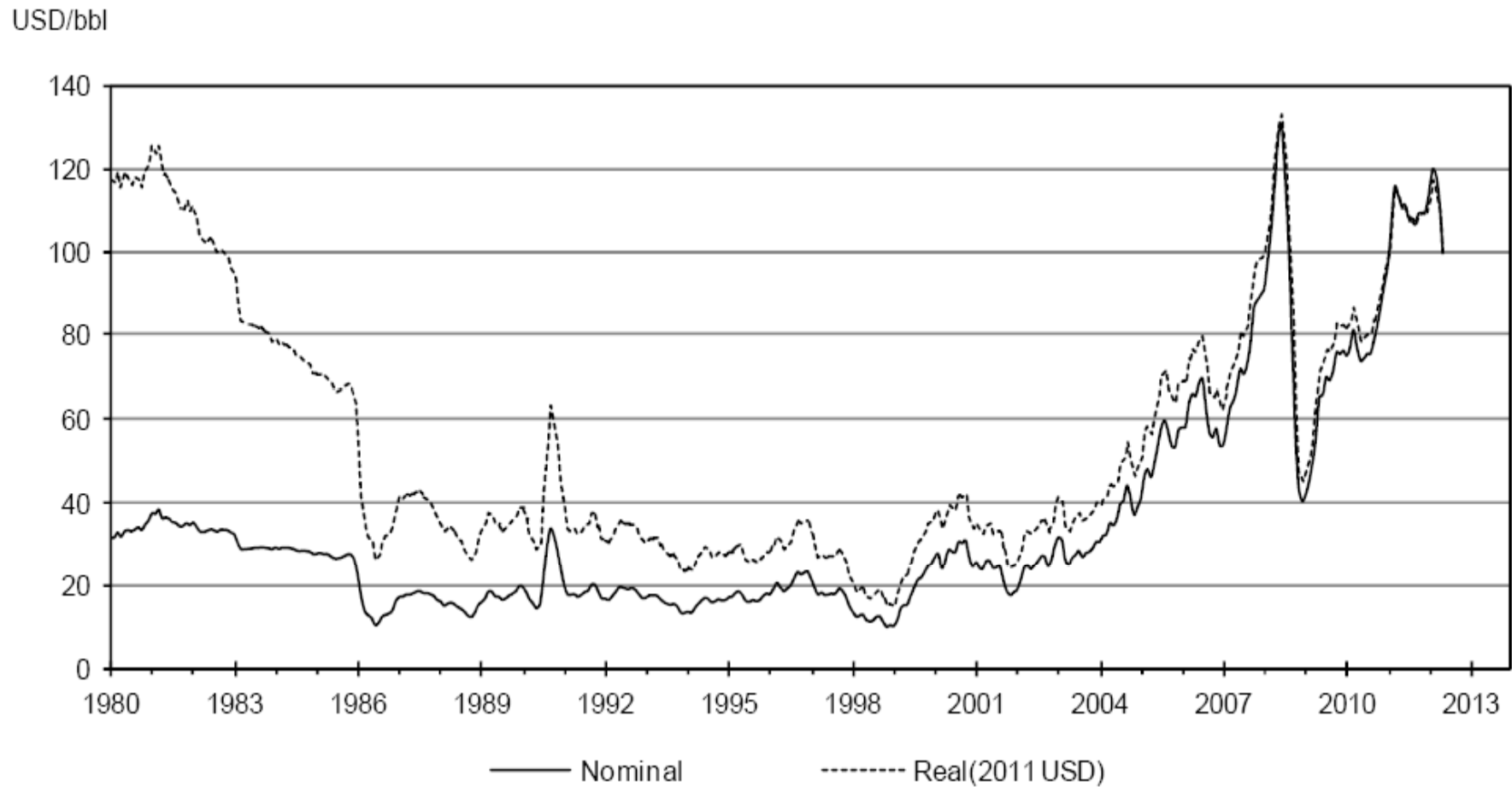
1) Energy prices – why collect them?

- Efficient policies require more and more up-to-date data
- Increased knowledge of pricing aspects of the international markets
 - Demand = supply logic vs. regulation
- International comparison of prices and taxes
- Price elasticity of different energy products
 - demand response
- Inter-fuel competition
- Inputs to various models and analyses
- Cost of living developments
- Energy products value chain
- Antitrust policy



1) Development in oil import costs (USD/bbl)

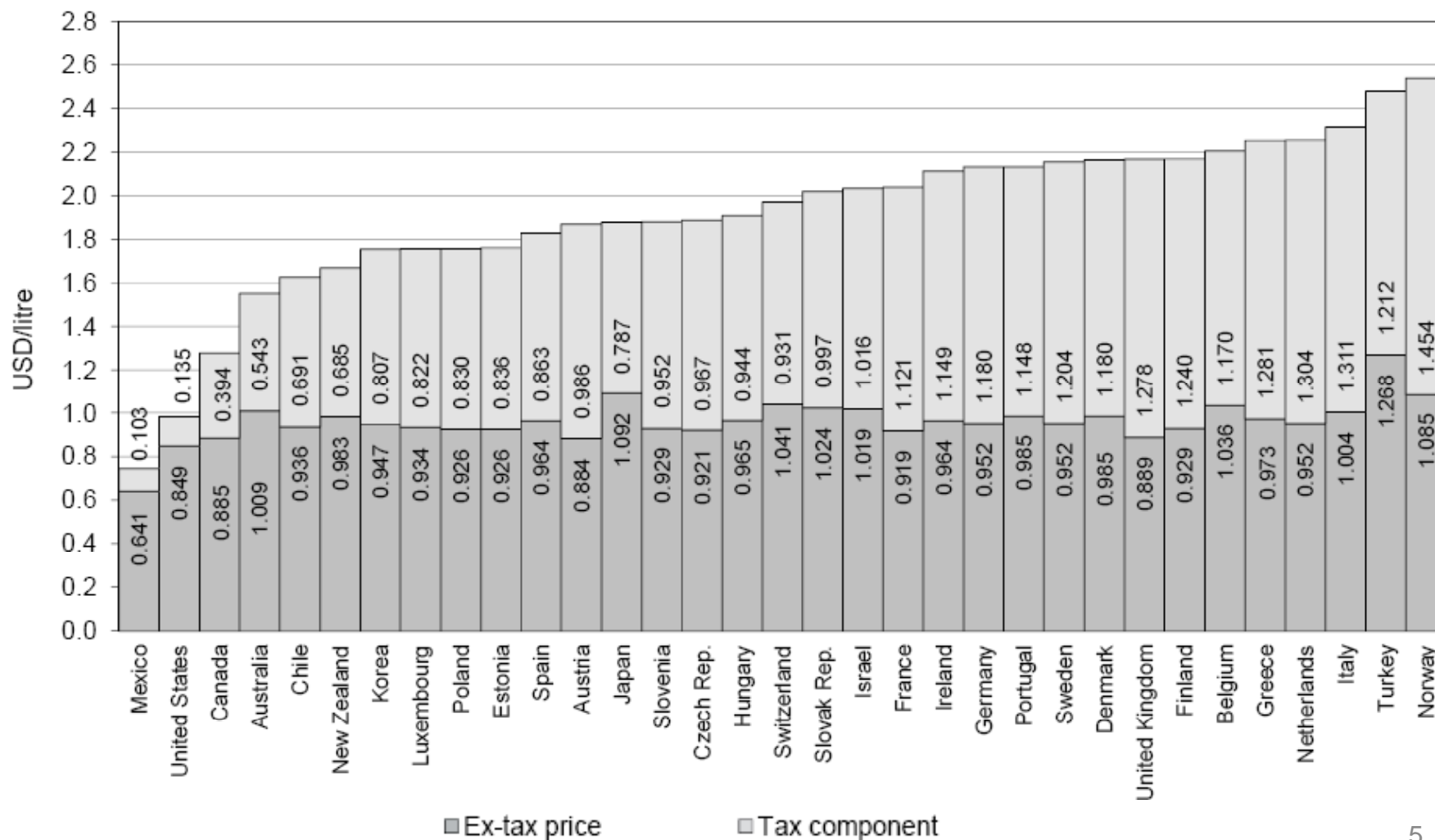
Figure 3. Nominal and real crude oil import costs (Total IEA)



1) International comparison – gasoline (USD/l)

Figure 16 - Unleaded gasoline¹ prices and taxes

1QXXXX



2.a) End-Use Prices

What the final consumer pays “from their pocket”

- Average prices for the entire country
- Including transport costs to the consumer
- Prices actually paid (net of rebates)
- Include all taxes which are **not refundable**
 - **VAT (Value Added Tax)** only for households (in EU)
- **Average prices \neq tariffs** → (gas and electricity)
 - average revenue per unit delivered
 - utilities data
 - average expenditure per unit purchased
 - consumption surveys
- If only tariffs available → weighted average of tariffs
→ the most representative tariff

2.a) Which End-Use prices?

- **Products (14)**
 - Oil products (10), natural gas, steam coal and coking coal, electricity
- **Sectors (3)**
 - **Households** – residential or individual consumers
 - **Industry** – industrial and manufacturing sectors
 - **Electricity generation** – prices paid by power plants
- **Price components**
 - Ex-tax price, Excise tax, VAT %, VAT amount
 - Total tax, Total price
- **Price indices (4 groups, 2 markets)**
 - Oil products, Natural gas, Electricity, Coal
 - Retail and Wholesale

2.a) End-Use prices – our data sources

- **Direct communication (via Questionnaires)**
 - Ministries, Statistical Offices, Governmental Energy Agencies, Utility firms
 - **Most preferable**
- Data from official publications
- Websites of institutions, utility firms
- We always explain what each price means
 - **Country notes**
 - **Product specifications**
 - **Tax information**
 - **Data sources**



2.a) End-Use prices – the **EPT** questionnaire



- All prices in **national currencies**
- MS Excel file
 - simple
 - user friendly
 - easy to fill out
- Always accompanied by a **country notes file**
 - MS Word
- **Quarterly**

	AUTOMOTIVE DIESEL					
	price for NON-COMMERCIAL USERS per litre					
	Ex-Tax Price	Excise Tax	VAT %	VAT Amount	Total Tax	Total Price
XX10	16.729	9.95	0.19	5.07	15.02	31.749
XX11	12.085	9.95	0.19	4.187	14.137	26.222
XX12	..	..	..	..	..	..
1QXX10	16.371	9.95	0.19	5	14.95	31.322
2QXX10	18.116	9.95	0.19	5.33	15.28	33.398
3QXX10	18.405	9.95	0.19	5.39	15.34	33.742
4QXX10	14.026	9.95	0.19	4.56	14.51	28.536
1QXX11	11.152	9.95	0.19	4.01	13.96	25.112
2QXX11	12.083	9.95	0.19	4.186	14.136	26.219
3QXX11	12.586	9.95	0.19	4.282	14.232	26.818
4QXX11	12.521	9.95	0.19	4.269	14.219	26.74
1QXX12	13.555	10.95	0.2	4.901	15.851	29.406
2QXX12	14.996	10.95	0.2	5.189	16.139	31.135
3QXX12	..	..	..	..	..	..
4QXX12	..	..	..	..	..	..

2.b) Prices Indices

- **Wholesale and Retail Energy Price Indices**
 - Often CPI (Consumer Price Index) – retail prices
 - Often PPI (Producer Price Index) – wholesale prices
 - Direct communication preferable (via **Questionnaires**)
 - Data from official publications or websites
 - National base year
 - We always explain what each index represents
 - **Country notes**
- **Growth rates of indices should be close to growth of end-use prices**
 - Differences – sources (different surveys), weighting schemes

2.c) Crude Oil Import Costs

Why do we need them?

- Obtain reliable crude oil price information
- Increase government knowledge of pricing aspects of the international oil market
- Capture development in import prices for particular crude streams in one country vs. another.
- Identify changes in volume over time among crude streams including trends in average API gravities.
- Observe trends in price differentials between crude streams imported into respective countries

2.c) Crude Oil Import Costs – data sources

- **SOM (Standing Group on the Oil Market) Questionnaire**
 - Highly confidential
 - Government Reporting Form for Crude Oil Imports
 - Started in 1975 (one of the founding objectives of the IEA)
 - Collects information on oil imports (CIF prices) into IEA countries broken down by major crude stream
 - **reporting obligation of IEA member countries**
 - **Collected MONTHLY**
 - Contains data on:
 - Number of importing companies
 - Gravity of the crude
 - Sulphur content of the crude
 - Total value of import by specific crude type
 - Total volume of import by specific crude type
 - Cost of crude imported



2.d) Other Price data

Spot Market Prices

- **yearly, quarterly and monthly averages**
 - Crude Oil – North Sea, WTI, etc.
 - Marine bunker spot prices
 - Oil Products- Gasoline, Gasoil, Jet/Kero, Naphtha, LSFO, HSFO (Low Sulphur Fuel Oil / High Sulphur Fuel Oil)
 - NW Europe, USA, Singapore

2.e) Common Challenges Encountered

- **Various Qualities of Product Used**
 - e.g. How to account for different types of coal, with varying prices and calorific values
 - Solution:
 - Use a weighted average for the price based on quantities of each type consumed
 - Explain methodology in Country Notes file and indicate the weighted calorific value etc.
- **Prices may be Cyclical**
 - e.g. Heating oil is used more commonly during winter months and the prices may vary by season
 - Solution:
 - Base the annual average price on a weighted average (by quarterly consumption) of the quarterly prices

2.e) Common Challenges Encountered (2)

- **Price data may not be available for the entire country**
 - e.g. Price data may only be available for the capital city or for a specific region
 - Solution:
 - Use the available data but add a note in the Country Notes file indicating the source and coverage of the data

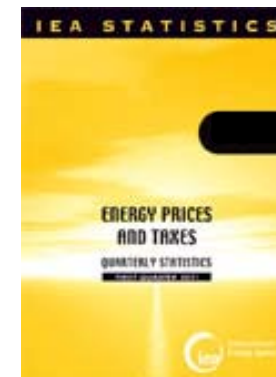
3) What information can be derived?

- Prices in **USD** and **USD PPP (Purchasing Price Parity)** per **unit** – international price comparison
- Prices in **USD** per **toe** – inter-fuel price comparison
- Regional prices (IEA, OECD Europe, OECD Total, etc.)
 - Weighted averages by consumption
- Indices of energy End-use prices
 - Estimation of missing prices
 - Households (H), industry (I) and combined index (H & I)

4) Where are prices published at the IEA?

- **Energy Prices & Taxes Quarterly Statistics**

- Quarterly
- Paper and pdf publication, online database



- **Oil Market Report – 3 tables**

- Monthly



- **Oil prices web bulletin**

- Monthly
- Free of charge - <http://www.iea.org/stats/surveys/mps.pdf>

- **Annual statistical publication**

- Several tables

4) Where do we report - End-use prices (nat.c)

- Excerpt from the quarterly book

STATISLAND

Table 2 - Average prices and taxes in Currency

	Premium unleaded (98 RON) gasoline (per litre)					Premium unleaded (95 RON) gasoline (per litre)				
	Ex-tax price	Excise tax	VAT	Total tax	Total price	Ex-tax price	Excise tax	VAT	Total tax	Total price
XXX1	0.405	0.415	0.164	0.579	0.984	0.338	0.415	0.151	0.566	0.904
XXX2	0.386	0.414	0.160	0.574	0.960	0.314	0.414	0.146	0.560	0.874
XXX3	0.385	0.415	0.160	0.575	0.960	0.319	0.415	0.147	0.562	0.881
XXX4	0.434	0.425	0.172	0.597	1.031	0.365	0.425	0.158	0.583	0.948
XXX5	0.520	0.425	0.189	0.614	1.135	0.436	0.425	0.172	0.597	1.034
XXX6	0.571	0.426	0.200	0.626	1.197	0.483	0.426	0.182	0.608	1.091
XXX7	0.581	0.448	0.206	0.654	1.236	0.486	0.448	0.187	0.635	1.121
XXX8	0.623	0.485	0.222	0.707	1.330	0.523	0.485	0.202	0.687	1.209
XXX9	0.510	0.485	0.199	0.684	1.194	0.386	0.485	0.174	0.659	1.045
XX10	0.622	0.485	0.221	0.706	1.328	0.505	0.485	0.198	0.683	1.189
XX11	0.732	0.525	0.252	0.777	1.509	0.607	0.525	0.226	0.752	1.358
3QXX11	0.738	0.525	0.253	0.778	1.516	0.620	0.525	0.229	0.755	1.375
4QXX11	0.743	0.525	0.254	0.779	1.522	0.610	0.525	0.227	0.753	1.363
1QXX12	0.780	0.525	0.261	0.787	1.567	0.664	0.525	0.238	0.763	1.428
2QXX12	0.829	0.526	0.271	0.797	1.625	0.690	0.526	0.243	0.769	1.458
3QXX12	0.791	0.526	0.263	0.789	1.580	0.659	0.526	0.237	0.763	1.422

5) Conclusion

- Energy prices are one of the building blocks that are necessary to develop a coherent energy policy within a country
- At the international level, energy price data feeds into most models that are looking at energy security, market regulations, consumption models, etc.
- Not always obvious to collect and present comparable price series, but it is sometimes possible to produce proxies to measure price changes

We are looking forward to future co-operation!

Thank you for your attention



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EXERCISES



Some basics for the exercises (1)



- Industry typically does not pay VAT or it is refunded at the end of the year
- Sometimes households do not pay Excise Tax (this will be indicated)
- Ex-tax price = Wholesale price + profit margin + charges
- Excise tax = all taxes except VAT
- VAT is given in % (levied on the sum of ex-tax price and excise tax)

Some basics for the exercises (2)

- Pay attention to orders of magnitude!
 - 1 MWh = 1000 kWh
 - 1 GWh = 1000 MWh
 - 1 billion of currency (€) = 10^9 €
- Weighted average prices =
Sum (prices x amounts) / Sum (amounts)
- Weighted average calorific values =
Sum (calorific values x consumption) / Sum (consumption)
- Weighted average VAT % =
Sum (% x time periods) / Number of time periods
e.g. Jan. + Feb. at 15%, Mar. at 18% is calculated as $[(15 \times 2) + (18 \times 1)] / 3$
- Average prices = **Sum (revenue) / Sum (consumption)**

Some basics for the exercises (3)

- When only Total Price is available, work backwards
Extax Price = [Total Price / (1 + VAT%)] – Excise Tax
- Pay attention to units!!
 - Mass = Volume (m³) x Density (kg/m³)
 - **Standard m³** = Normal m³ x 1.055
 - **GCV** amount = NCV amount / 0.9 (for natural gas)
 - 1 kWh = 3600 kJ
- For the exercise, calculate quarterly results before calculating weighted average annual price from quarterly results.