

Electricity Sector Reform: What Have We Learned?

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Outline

- ❖ Reforms background and context
- ❖ Selected issues
 - Environmental impact
 - Pricing and subsidies
 - Access
 - Role of capital
 - Emerging issues
- ❖ Lessons learned
- ❖ Reform steps
- ❖ Reforms status around the world

Liberalisation: Background

“The Government’s view of the economy could be summed up in a few short phrases:

If it moves, tax it. If it keeps moving, regulate it. And if it stops moving, subsidize it.”

“Economics are the method; the object is to change the soul”



Current State

- ❖ The reforms of the 1990s marked withdrawal of the state from the sector
- ❖ In recent years, some return to state intervention
 - Many reforms have not delivered the expected benefits
 - Climate change, energy security concerns, and social policies require intervention in the sector

Many reforms are stalled

Electricity Liberalisation 101:

Generic Model (Inputs)

- ❖ **Vertical separation**
 - Generation, Transmission, Distribution, Retail
- ❖ **Competition in Generation**
 - Entry by new producers
 - Full-blown markets
- ❖ **Competition in retail**
- ❖ **(Independent) Regulation of T & D networks**
 - Access for competition over networks
 - Incentive regulation for improving efficiency
- ❖ **Privatisation (Optional?)**
- ❖ **Pricing/subsidy reform** – Tariff re-balancing, or cost-reflective pricing

Reform Effects (Outputs)

❖ Microeconomic:

- Efficiency
- Prices / subsidies
- Quality of service

❖ Macroeconomic:

- Access
- Economic welfare / equity
- Economic growth

❖ Innovation

❖ Environment

Reform inputs and outputs linked through institutional factors

Drivers of Power Sector Reforms

Sector level drivers

Developed countries:

- **Excess capacity,**
- **Use of costly technologies,**
- **Economic inefficiency,**
- **Demand for lower prices**

Developing countries:

- **Capacity shortage**
- **Burden of subsidies,**
- **Low service quality,**
- **High energy losses,**
- **Poor access,**
- **Capital constraints**

External drivers

- a) Political and economic ideology: faith on the forces of market, competition and privatization
- b) Technological innovation: such as the development of CCGTs
- c) Macroeconomic events: such as the post-Soviet economic transition (1989), Latin American debt crisis (1980s), Asian financial crisis (1997-1998)
- d) Capital raising options: privatization of state owned energy assets
- e) OECD energy deregulation: creation of new energy multinationals looking for new investment opportunities
- f) Lending policies: such as those of the World Bank and IMF with strings attached
- g) National economic reform context: as a result of economic crisis and structural adjustment programs

Initial Condition of Reforms – Differ

- ❖ Structure
- ❖ Size
- ❖ Ownership
- ❖ Geography
- ❖ Resource base
- ❖ History
- ❖ Institutions
- ❖ ...

Assessing Reform Performance – Not Easy

- ❖ **Efficiency and productivity analysis** – markets, sectors, networks
- ❖ **Micro-econometric methods**
- ❖ **Macroeconomic methods**
- ❖ **(Social) cost benefit analysis** – what counterfactual?
- ❖ **Case studies** (intensive, extensive, comparative)

Restructuring

❖ Vertical integration

➔ Economies of scale and coordination

❖ Vertical separation

➔ Gains from competition, higher transaction cost

❖ Unbundling makes the extent of inefficiencies along the value chain visible

○ Which can be corrected with cost-reflective pricing

Selected Issues

The Environment (1)

- ❖ Reform / cost-based pricing improves energy efficiency
- ❖ TE reduces carbon intensity
- ❖ Are reforms damaging to the environment?
 - They can be, but not because of reforms per se
 - Rather, a question of having a sound environmental policy
- ❖ **Social acceptance** - The changing role of public in environmental policy and towards the sector – e.g. Norway
 - Old decision frameworks less effective than before
 - New governing framework and processes required

The Environment (2)

❖ Non-Technical Losses

- Leads to waste
- Negative environmental externalities
- Damages the revenue base of the utilities
- Prevents improvement in extension and improving quality of service
- Places many users beyond the reach of energy and environmental policies

Global Energy Subsidies

Figure 1: Distribution of Global Energy Subsidies (480 billion USD)

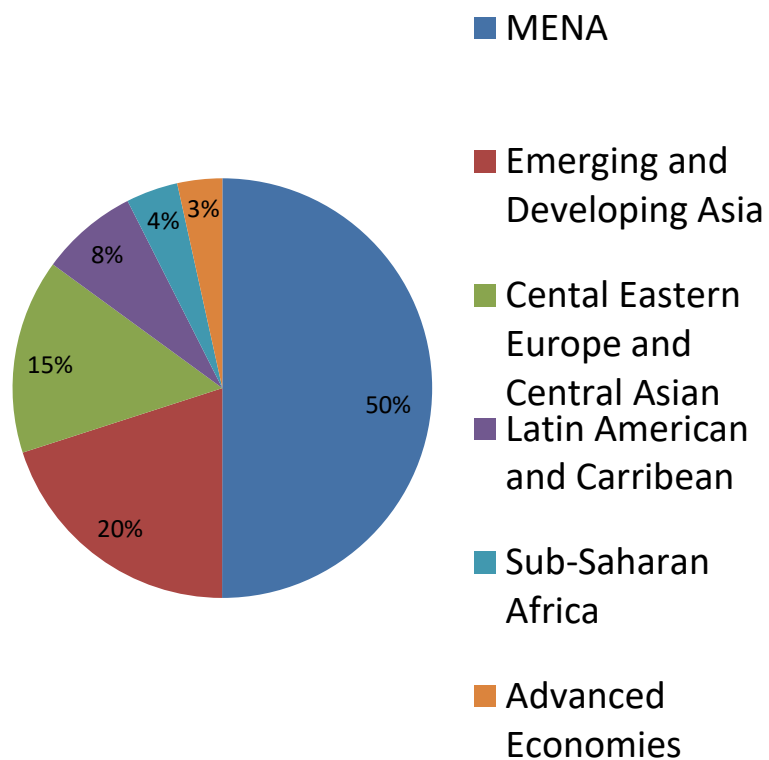
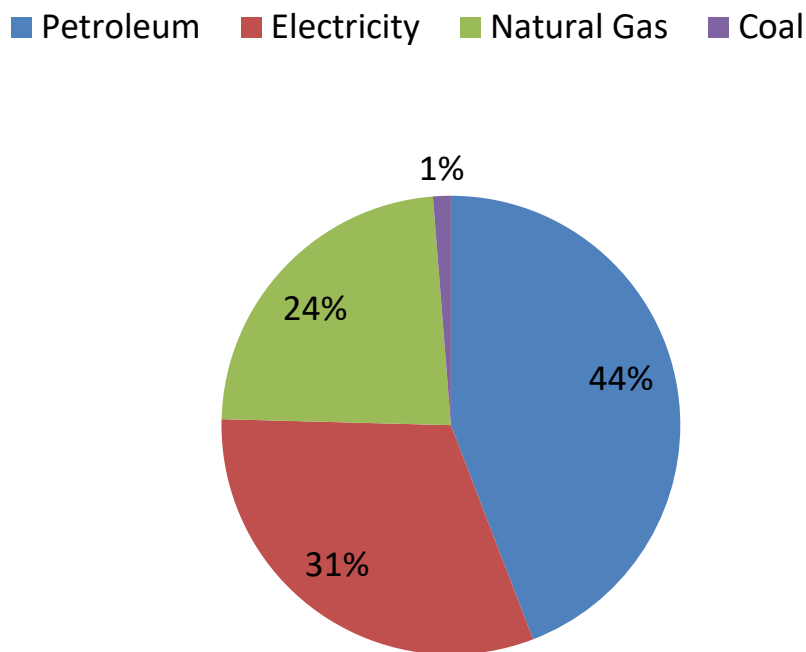


Figure 2: Distribution of Global Energy Subsidies by Energy Sources (480 billion USD)



Pricing and Subsidies

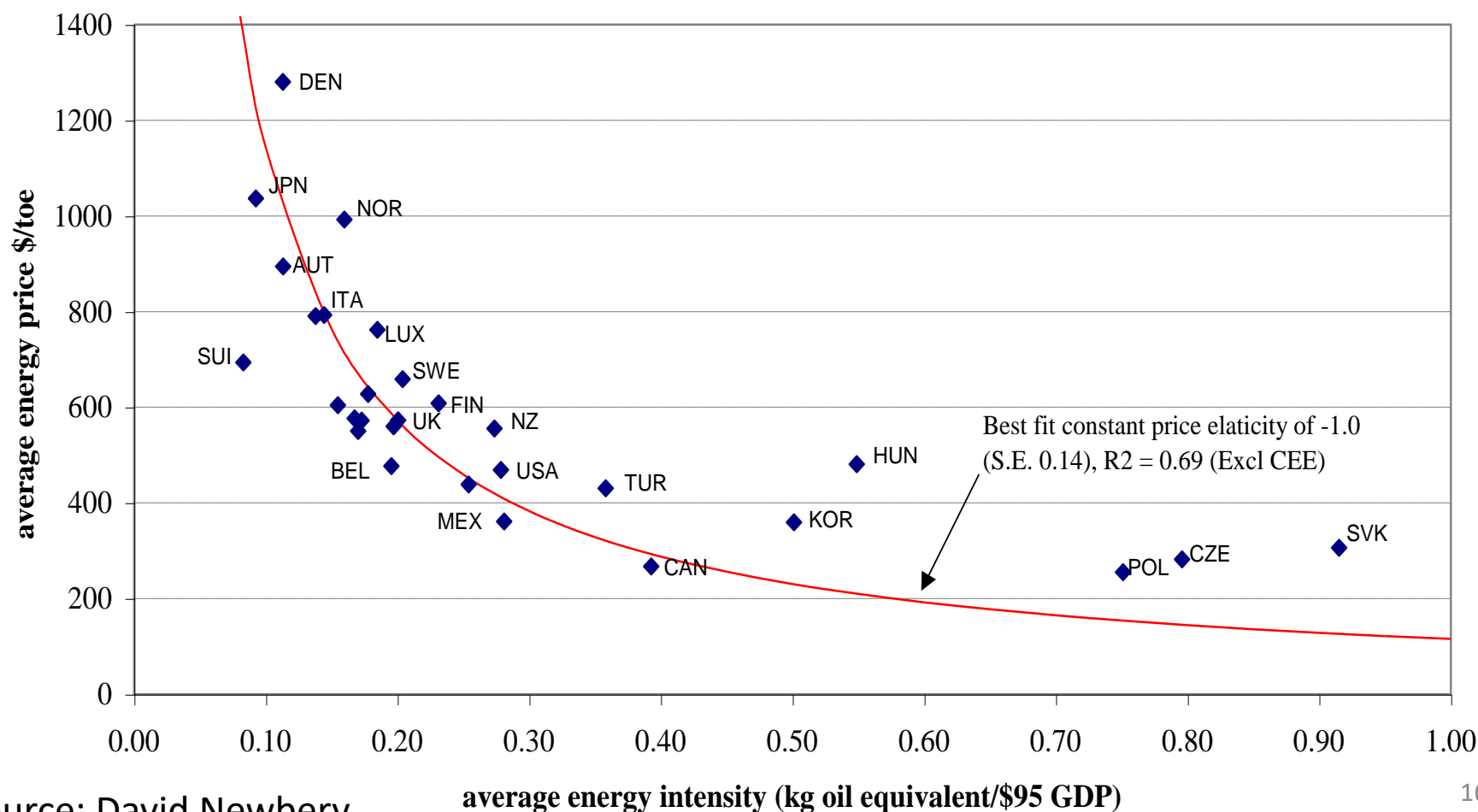
❖ Reasons for energy subsidies:

- Security of supply
- Industrial policy
- Job creation

- Income buffering
- Energy poverty
- Redistribution of wealth / income

Prices Matter for Energy Intensity!

Cross-section relation between average energy intensity and average energy price
1993-99



Pricing and Subsidies (1)

Supply-side tools and interventions	Demand-side tools and interventions
<ul style="list-style-type: none"> ❖ Direct public funding for research and development ❖ Indirect subsidies to innovators ❖ Production tax credits, accelerated depreciation, matching grants, loan guarantees, procurement programs, purchase guarantees, price guarantees ❖ Government financed seed and venture funds ❖ Monetary prizes 	<ul style="list-style-type: none"> ❖ Financial incentives for user take-up e.g. feed-in-tariffs, investment tax credits, rebates, concessionary financing, tax-exempt financing, matching grants, green certificates ❖ Pricing policies – e.g. externality pricing via taxes and cap-and-trade, price stabilization such as price floors ❖ Regulatory mandates such as portfolio standards, efficiency codes and standards ❖ Government procurement ❖ Industry and market restructuring such as unbundling, regulation, nationalization
<p><i>Source: Adapted from World Economic Forum (2013)</i></p>	

Table 1: Demand/Supply side policy tools/interventions

Pricing and Subsidies (2)

- ❖ Pricing and subsidy reform a critical component of the wider reform
- ❖ An important source of inefficiency and build up of debt in pre-reform sectors
- ❖ \$US 400 billion or 0.7% of global GDP. IMF (2013)
- ❖ Help reduce debt
- ❖ Help introduce competition and price-mechanism
- ❖ Improve the environment

But, pricing reform is not enough, other policies must provide substitutes, technologies, etc.

Pricing and Subsidies (3)

- ❖ Richer households benefit disproportionately from subsidies
- ❖ Fossil fuel subsidies as barrier to deployment of renewable energy sources
- ❖ Subsidies most effective when aimed at providing access
- ❖ Short term gains small. Main gains from subsidy reform in the long term
- ❖ Thus a gradual approach should be preferred

Access

- ❖ Reforms do not automatically improve access
- ❖ But, to benefit from reforms one has to be connected

- ❖ **Negative externalities** - Energy use

- ❖ **Positive externalities** - Access
 - Smart market-based capital subsidy programmes improve access

The Role of Capital

- ❖ Energy sector is capital intensive
- ❖ Governments have lower borrowing costs than private sector
- ❖ Private sector is more efficient
- ❖ Governments should reduce risk premiums
 - So performance of reform depends on how efficient the government is initially, efficiency of private sector, private vs. public cost of borrowing, risk premium
 - There may be scenarios where public sector is the option – e.g. political/regulatory uncertainty leads to very high cost of borrowing

Emerging Issues

- ❖ The urban poor
- ❖ Link to urban environmental quality
- ❖ Combine reform with environmental, climate change, renewable objectives
- ❖ The changing nature of public engagement with the sector

Lessons (1)

- ❖ Reforms tend to improve technical and economic efficiency of the sector
- ❖ Reforms may not automatically increase consumer welfare
 - Through “incentive regulation” of natural monopolies and “competition” where markets can exist.
 - Effective regulation / policy required to ensure efficiency gains are passed to consumers

Lessons (2)

- ❖ Reforms not inherently damaging to the environment, but they can be
 - Need to get the environmental policy right
- ❖ Reforms do not directly reduce poverty, but they can
 - Need to design smart policies targeted at the (fuel) poor
- ❖ Reforms will not automatically improve access
 - Need smart market-based capital subsidy schemes

Lessons (3)

- ❖ Reform only on the paper will not deliver social benefits
- ❖ Prices and pricing are at the heart of most inefficiencies and shortcomings in the sector
- ❖ So, do not leave the price reform to private actors.
 - Political economy sensitivities are high. Pricing reform before privatisation
- ❖ The relatively more successful reforms have adopted home-grown models

Lessons (4)

- ❖ Do not compromise economic principals for political approval – California
- ❖ Do balance economic efficiency and equity
- ❖ Do introduce cost-reflective pricing – But do it yourself, and slowly!

Lessons (5)

- ❖ The potential for efficiency improvement in networks was only realised later
- ❖ Legitimacy important – and linked to transfer of efficiency gains and ensuring equity and access
- ❖ Where markets are difficult to organize consider “competition for the market” instead of “competition in the market”

Lessons (6)

- ❖ Reforms remain work in progress,
 - Need to be continually modified and adapted

- ❖ Developed countries better in creating markets, but have market power problem

- ❖ Climate change and security of supply issues call for intervention in the market
 - Complicating the liberalisation

Lessons (7)

- ❖ Evidence of reforms remain mixed
- ❖ Many LDCs are still 'reforming'
 - Or rather, their reforms have stalled
- ❖ Some seem to have progressed on the paper
- ❖ Reflecting the difficulties of implementing reforms

Lessons (8)

- ❖ The reforms have not been a run away success
- ❖ But, the underlying motivations remain
- ❖ Infeasible to return to the pre-reform era, much has changed
- ❖ Need to keep re-inventing reform models and processes

Reform Measures – A Summary

Restructuring

❖ Vertical integration

➔ Economies of scale and coordination.

❖ Unbundling

➔ Gains from competition, but higher transaction cost

❖ Unbundling – makes visible the inefficiencies along the value chain

○ These can then be corrected with cost-reflective pricing

Electricity Market Reform Models

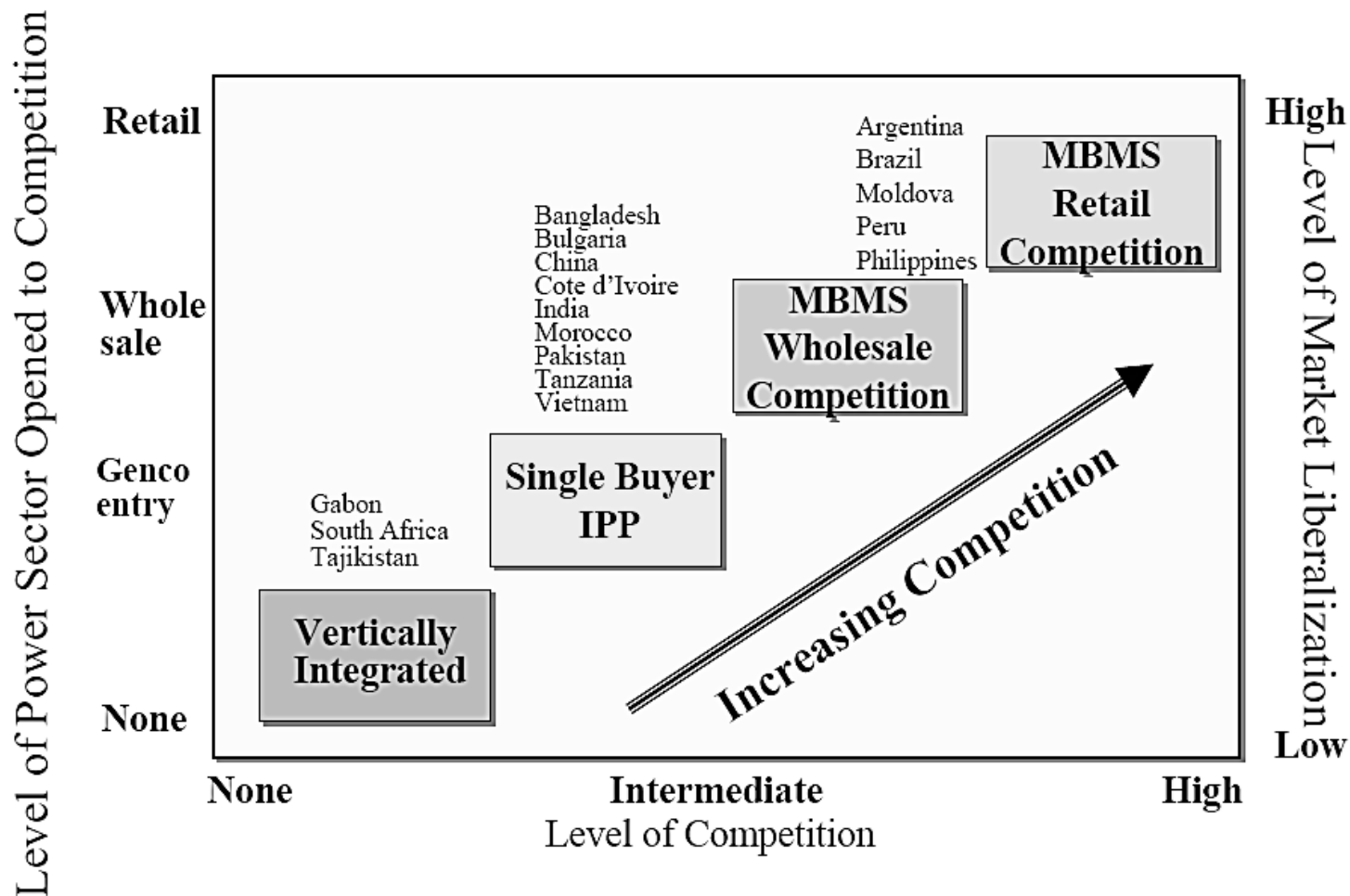


Figure 2: Electricity market models transitioning
Source: Adapted from USAID (2004)

Regulation

- ❖ Independent regulation still a difficult job in many countries
- ❖ Regulators need to ensure efficiency gains are passed to consumers
- ❖ Incentive regulation of networks – Promising but need to improve
- ❖ Reforms initially about competition in the markets
 - The efficiency improvement potential of the networks was discovered later. (Jamasb and Pollitt, 200x)
 - Technology and innovation policy were also overlooked

Wholesale Competition

- ❖ Choice of market model.
- ❖ Consider “competition for the market” vs. “competition in the market”.
- ❖ Competition more difficult in small system.
- ❖ Market power
- ❖ Capacity markets?
- ❖ V. integration with retail supply
- ❖ Interconnections

Retail Competition

- ❖ Tendency to market concentration in most countries
- ❖ Inelastic demand
- ❖ Price competition not profitable
- ❖ Vertical integration of generation and retail supply unhelpful
- ❖ Non-price competition strategies become attractive
- ❖ Are the current business models sustainable?

Privatisation

- ❖ Not a prerequisite, but ...
- ❖ Norway – An interesting example
- ❖ Must be done for right reasons – e.g. not for the sale proceeds

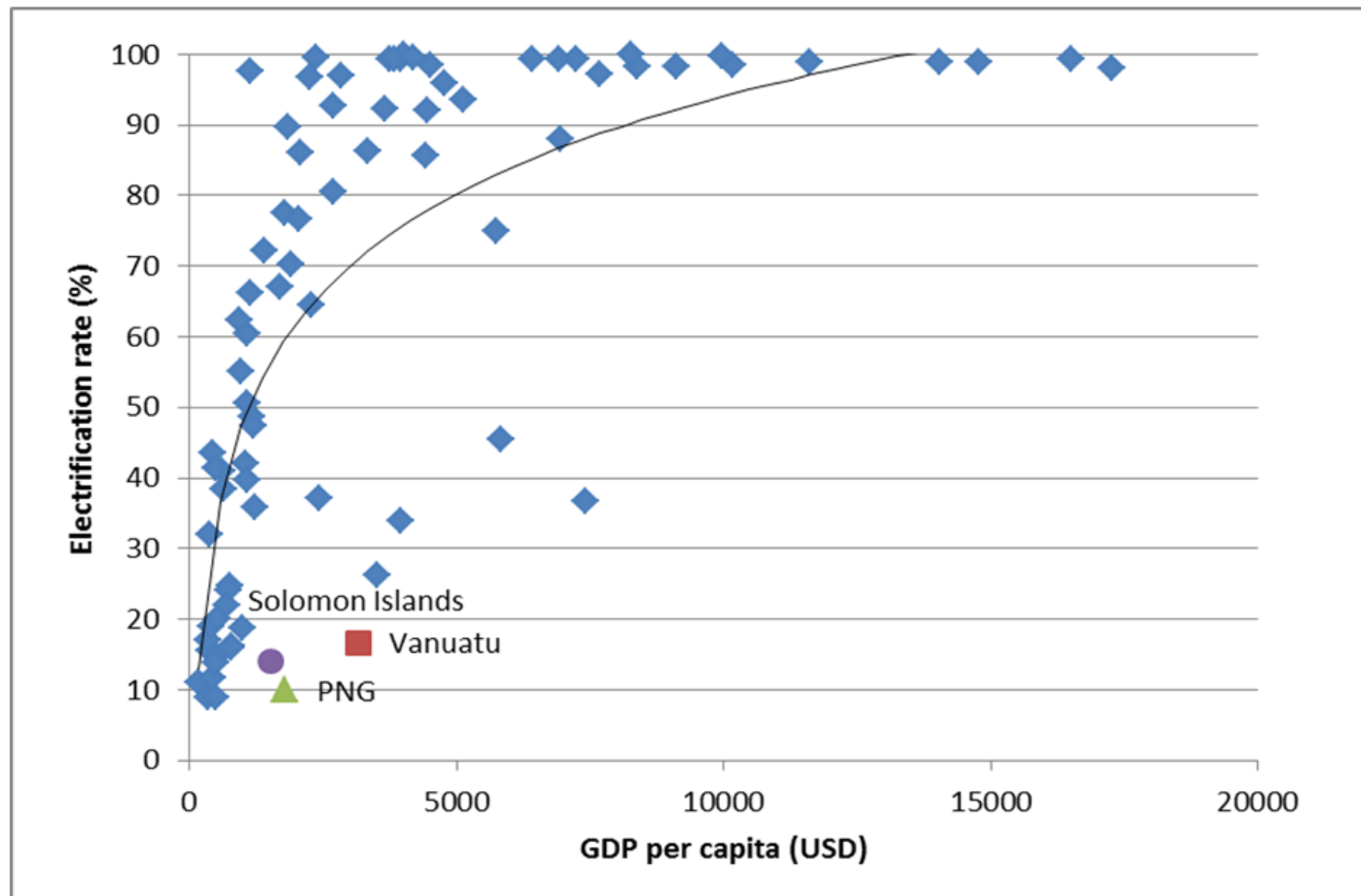
- ❖ Privatisation vs. IPPs, or management contracts
- ❖ Private sector efficiency gains must outweigh higher cost of capital
 - How to reduce cost of capital for private investors?

Pricing / Subsidies

- ❖ Tariff re-balancing prior to privatisation.
- ❖ Resource rich countries have highest subsidy levels

- ❖ Subsidy for access vs. consumption.
 - Market mechanisms for capital subsidies
- ❖ Interesting experiments in some countries
 - E.g. Iran - Substituting subsidies with cash payments

Access



Regional Trade

- ❖ A useful way to increase competition
- ❖ But, should not only benefit exporters
- ❖ Despite economic benefits there are political issues

Reforms Around the World

Developing Countries (1)

- ❖ Benefits of market-based reform for small systems potentially smaller.
- ❖ Full-blown market restructuring and reforms may not be necessary
- ❖ Important given any market structure is the quality of institutions that sets 'the rules of the game' and its 'governance arrangements'.
- ❖ Importance of 'quality institutions' increases with adoption of more market-based elements.
- ❖ Vertical separation in the form of accounting unbundling desirable to the minimum.
- ❖ Tariff rebalancing essential before private participation. Also acts an incentive to private investors than a deterrent.

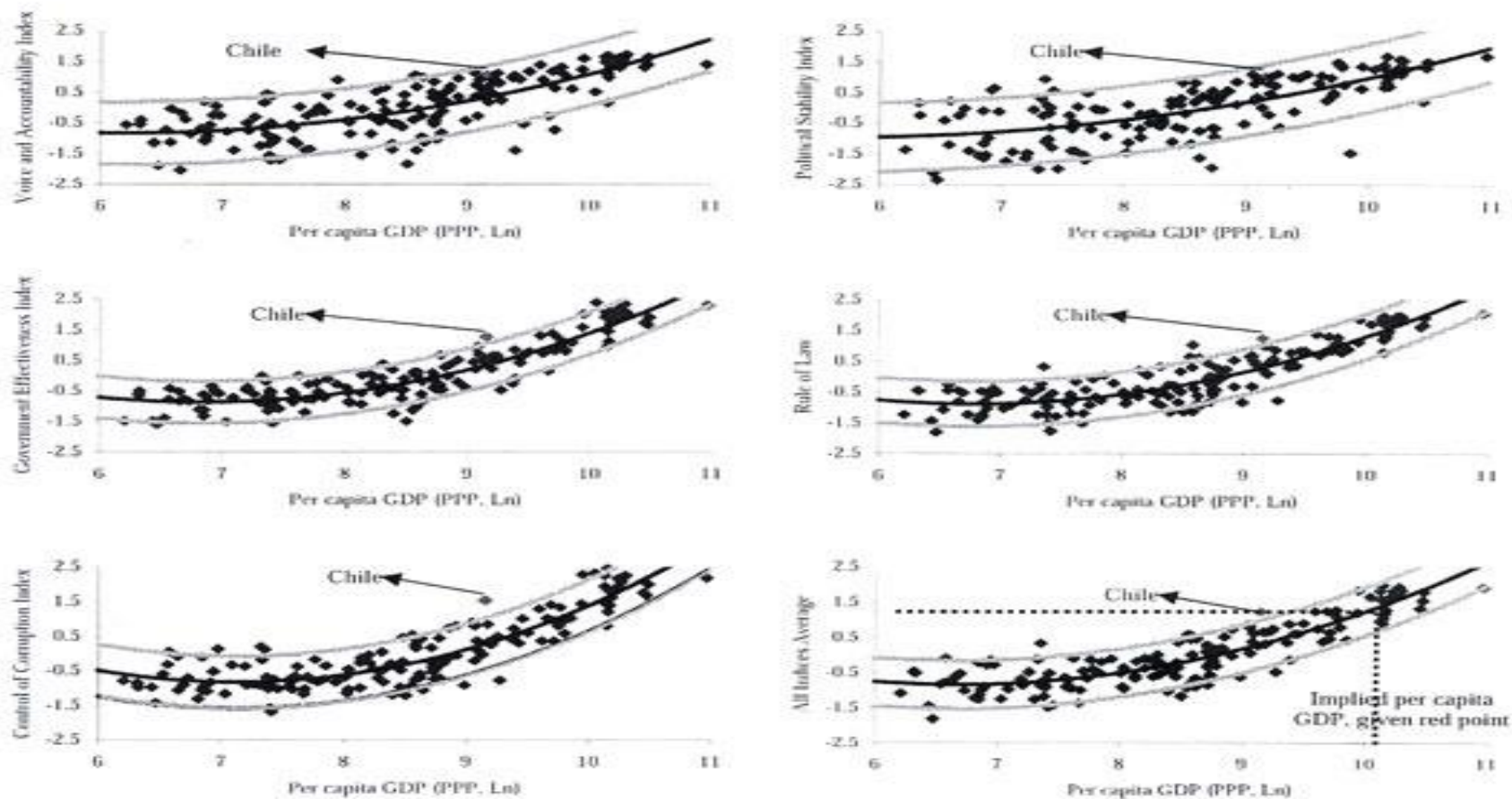
Developing Countries (2)

- ❖ **Africa** - Inability of some countries (e.g. Sub Saharan Africa) became evident. Lack of private sector interest.
- ❖ **Asia** – Overall dispiriting (Japan: reform under consideration, Korea: reforms frustrated, India: reforms difficult, China: reforms postponed, Russia: reforms repealed)
- ❖ **Middle East** – Reforms (and destined to be) advancing (e.g. Oman as a pioneer of electricity markets reform and privatization in the Middle East); single buyer model (several variations) in MENA countries; Algeria, Saudi Arabia and Iran longing for a wholesale market
- ❖ **Latin America** – markets continue to develop (Chile, Colombia and Peru); reforms reversal such as renationalisation (Brazil, Argentina, Venezuela, Dominican Republic)

Developing Countries (3)

- ❖ **India** – Institutions have shown better progress in renewable energy promotion than promotion of power sector reforms
- ❖ **Iran** – Reduced energy subsidies and replaced with cash payments to all households
 - A text book exercise, but
 - Underestimated the ability to sustain the payments over time
 - Under-developed tax/admin. prevents a program targeting the poor only

FIGURE 12
RELATION BETWEEN PER CAPITA GDP AND INSTITUTIONAL
DEVELOPMENT INDICES IN 161 COUNTRIES, 2002



Source: Author's estimations based data from World Development Indicators (2005) and Kaufmann *et al.* (2005).

Note: Author's regression line is in black and lines for confidence intervals at 90% are in grey.

SCHMIDT-HEBBEL, KLAUS. **Chile's Economic Growth.** *Cuad. econ.* [online]. 2006, vol.43, n.127, pp. 5-48. ISSN 0717-6821.

Transition Economies

- ❖ Quick to privatise
 - But, not as a part of a well planned reform program
- ❖ Many reforms have been superficial
 - As a result they have not shown the expected benefits. (Nepal & Jamasb, 2012)
- ❖ However, energy efficiency has improved in these countries. (Nepal & Jamasb, 2014)

BRICS

- ❖ **Brazil** – Large hydro resources, privatization before regulator, relative success
- ❖ **Russia** – Two reforms. From central planning to corporatisation. Second, market based reforms
- ❖ **India** – Difficult and slow reform, pricing a major issue, Some progress on renewables
- ❖ **China** – Slow reform, fear of disruption to economy, some market experiments
- ❖ **South Africa** – Focus on distribution, progress with electrification, low prices

The European Union

- ❖ Some countries have been reluctant reformers
- ❖ Therefore, compliance with the Directives does not always equate to reform performance
- ❖ Climate change, supply security, and renewable objectives complicate implementation of reforms

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Thank you!