Hedging revenue risks in tolled infrastructure contracts

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TOLLED INFRASTRUCTURE CONTRACTS

- All over the world, **tolls** in transport infrastructure **are getting more common**:
  - as a way to **relieve public budgets**, getting the revenues necessary for its construction, operation and maintenance
  - as a way to internalize external costs and **manage demand**
  - simply as a way to **get funds for the Administration**
- Most frequently, both when new construction is involved and not, **a Contract will be signed** between the legally responsible Public Entity and a Company or Agency who will be the Concessionaire
  - This company will be in charge of providing the specified services **over a period of several decades**
  - It may be **in the public or more frequently in the private sector** (in the latter, it is called a Public-Private Partnership – PPP)
  - And in many cases it will take **some (toll) revenue-related risks**

TOLLED INFRASTRUCTURE CONTRACTS

- The **transferred risks** are partially protected by the contract:
  - by the **stability of the nature and specifications of the services provided**,
    - And of the underlying technologies, consumer preferences and public policies
  - by the **long term of the contracts**
    - extra protection for an eventual short and mid term underperformance
- But the **long term of the contracts plays against the stability** of the underlying factors

TOLLED INFRASTRUCTURE CONTRACTS

- **Traditional approach:**
  - **Assume stability, contract duration for full amortization**
    - Often, instability in the first third of contract is fatal, forcing renegotiations and big cost increase for public side
    - Other times (fewer so far): policy or technology changes create strong loss of welfare, but high expected costs of renegotiation create a "locked-in" situation for public side
- **Alternative approaches:**
  - **Shorter contracts** to avoid "locked-in" situation of public side
    - Partial amortization, higher exposure to initial volatility
  - **Targeted protection** against most important risks **through financial derivatives** (hedging)

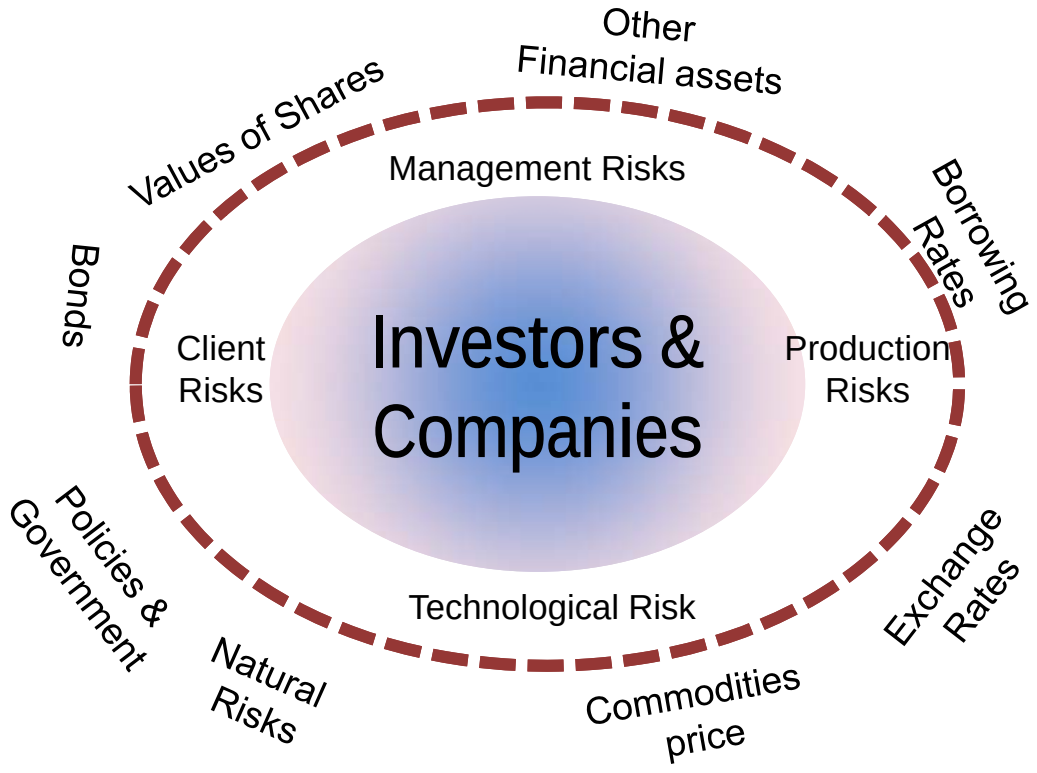
Who is involved? Which risks for each party?

	Public Entity (Principal)	Agents	
		Service Providers	Investors / Financial
Main Risks	• **Obligations breach by the concessionaire** • **Opportunistic behaviour** from the concessionaire taking advantage from asymmetry of information • **Contract rescue** due to business failure	• **Income risk,** usually related to **demand** • Macro-economic context: Inflation, Growth, Interests, • **Consumer capability** to buy • **Technological Risks** (both internal and external) • **Construction and operational** risks	• Payment breach • Non-profitable **business model/management** • **Product failure** • Public entity capacity to cover obligations in case of contract rescue

- **Can these Risks be controlled by each party?**
- **Can strategic alliances be created to share and better manage risks?**
- **Can third-parties be involved to secure the risks?**

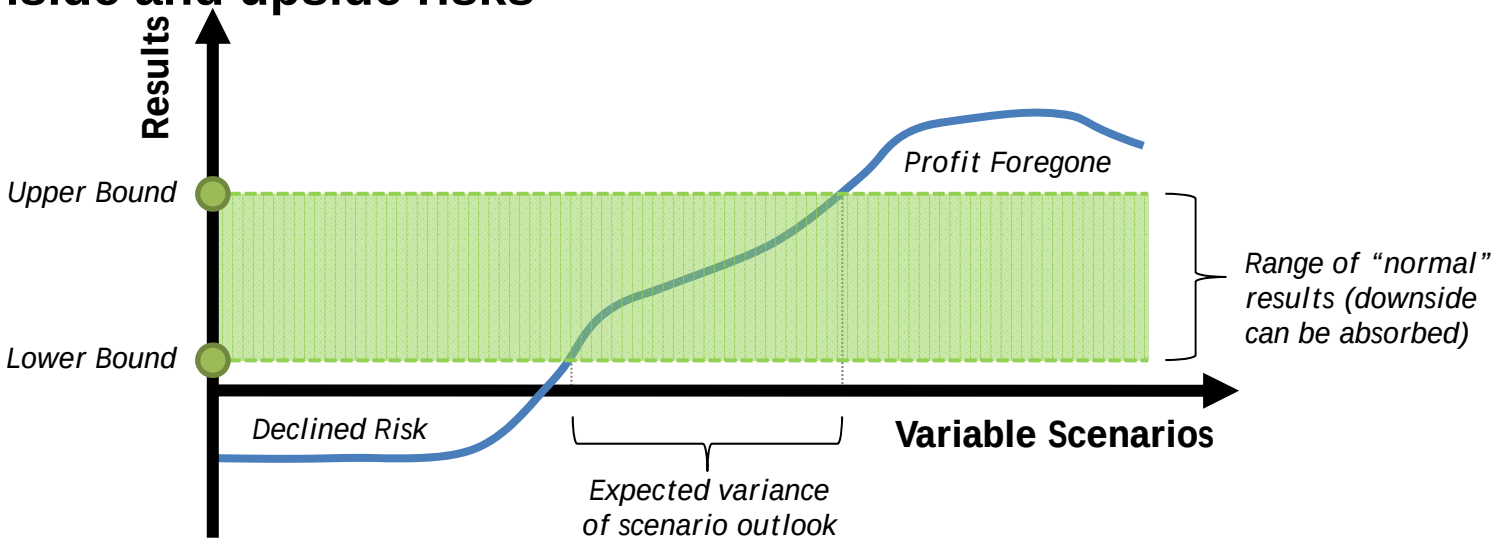
Business can be volatile…

- **Business** is exposed, not only to **internal risks** that can be somehow "controlled", but also to **risks that companies and investors cannot or don't have the competence to control**.
- Many of these **external risks** can be hedged/covered by the use of **financial options (hedging)**



Assessing the risks and getting protection

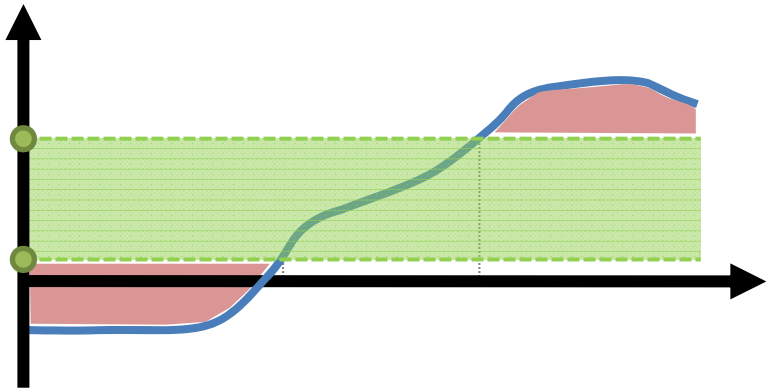
- Each infrastructure contract is unique, implying that no perfect market can exist to **evaluate and price the risk** of its results
- However, some key variables are **not fully controlled or predictable**, and **information is asymmetric**, creating business **opportunities** for risk management products or derivative products.
- Hedging only for downside risks will be expensive, but **hedge protection may have a low cost** if it is contracted as a "collar", **jointly dealing with downside and upside risks**



Hedging is also an insurance and an opportunity to focus on the core business

- It may bring **tranquility to managers**, by protecting against market fluctuations and other factors not directly concerned with the core business. This will make **more resources available for the direct activities of the business and for the decision making process**.

- In addition, this tranquility leads to **a less stressful relationship between the parties in a PPP** (reduce "the blame game"), promoting **better overall results**



Several types of risk can be hedged, including:

- **Generic (wider markets, more efficient pricing):**
  - Commodity prices, currency exchange rates, interest rates
- **Contract-specific (thin markets, less efficient pricing)**
  - Transaction volume, Credit, Equity

- The market for hedging the revenue of a specific concession is very thin, or even not available
  - Preferable to **hedge on the factors underlying that revenue**

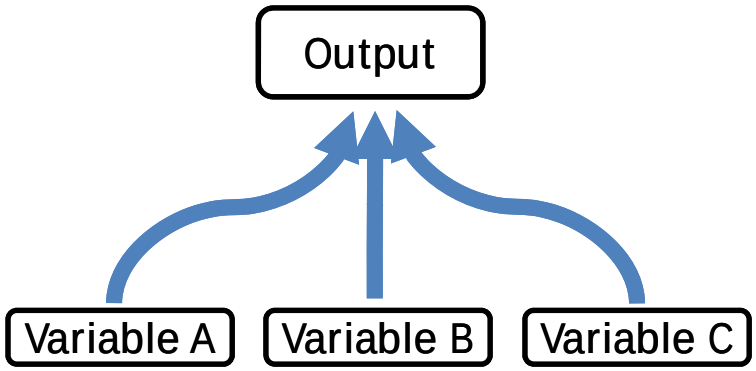
- For each type of risk several questions:
  - Which party has better capacity to **manage the underlying factors**
    - What **incentives** to do so?
  - Which party is most **affected by the instantiation of that risk**
    - What **protections** against it?

SYSTEMS DYNAMICS: UNCOVERING COMPLEX RELATIONS

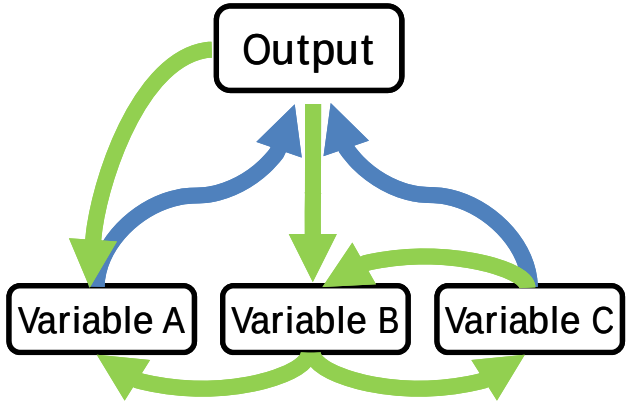
- **In a partnership, joint identification of risks, their factors, and critical thresholds of capacity to absorb them is essential**
  - These should be the bases for risk allocation

➢ A good grasp of the risks and corresponding profiles in a long term concession requires a **profound perception of the underlying system variables and agents**, which is mostly **achievable by careful modeling**

  - The traditional transport demand models are not suitable (too simple) and must be replaced by ***Systems Dynamics models***



Traditional Modelling



System Dynamics Modelling

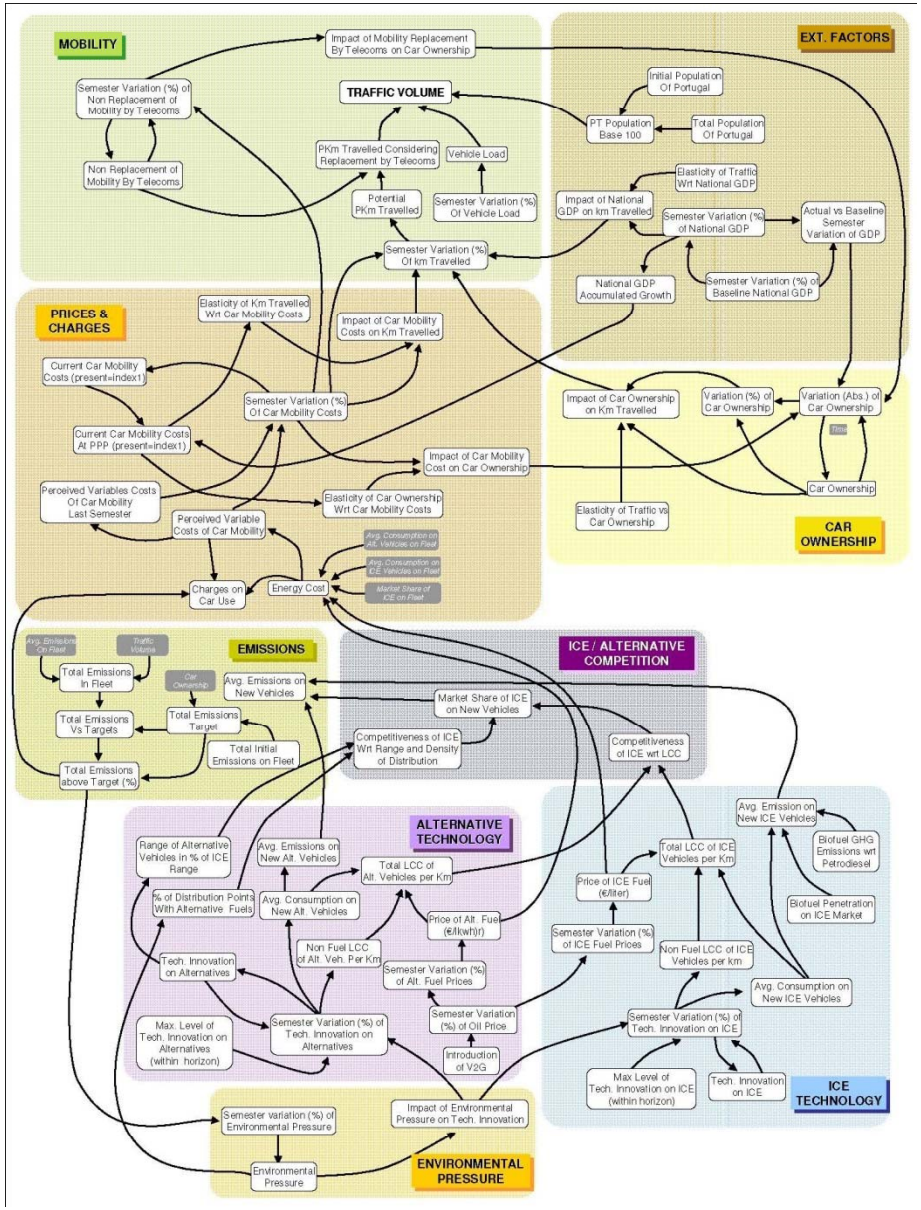
SYSTEMS DYNAMICS: UNCOVERING COMPLEX RELATIONS

- The central concept to system dynamics is **understanding and describing the interactions among the variables in a system**
  - Frequent occurrence of feed-backs

- Dealing not only with the **"outside" driving variables** (e.g.: socio-economics, technologies, policies) but also the **specific variables** associated with the business (e.g.: traffic demand, fuel consumption, emissions, …) these models constitute a **powerful tool**:
  - Interpretation and analysis of the **interactions and inter-dependency loops** among variables and of "factor to output" cycles;
  - Observation of the **development through time** of these relations;
  - Identifying the set of variables that represent the **main drivers of the system or simply the critical factors** of a specific output variable.

SYSTEMS DYNAMICS: UNCOVERING COMPLEX RELATIONS

- Just a glimpse of a real application of a Systems Dynamics Model
  - In a 2010 study for the "long-term forecast of traffic volumes in Portuguese Motorways"
  - Modules:
    - Environmental pressure
    - ICE Technology
    - Alternative Technologies
    - Competition betw. ICE / Alternatives
    - Emissions
    - Prices and Charges
    - Car Ownership
    - External factors
    - Mobility



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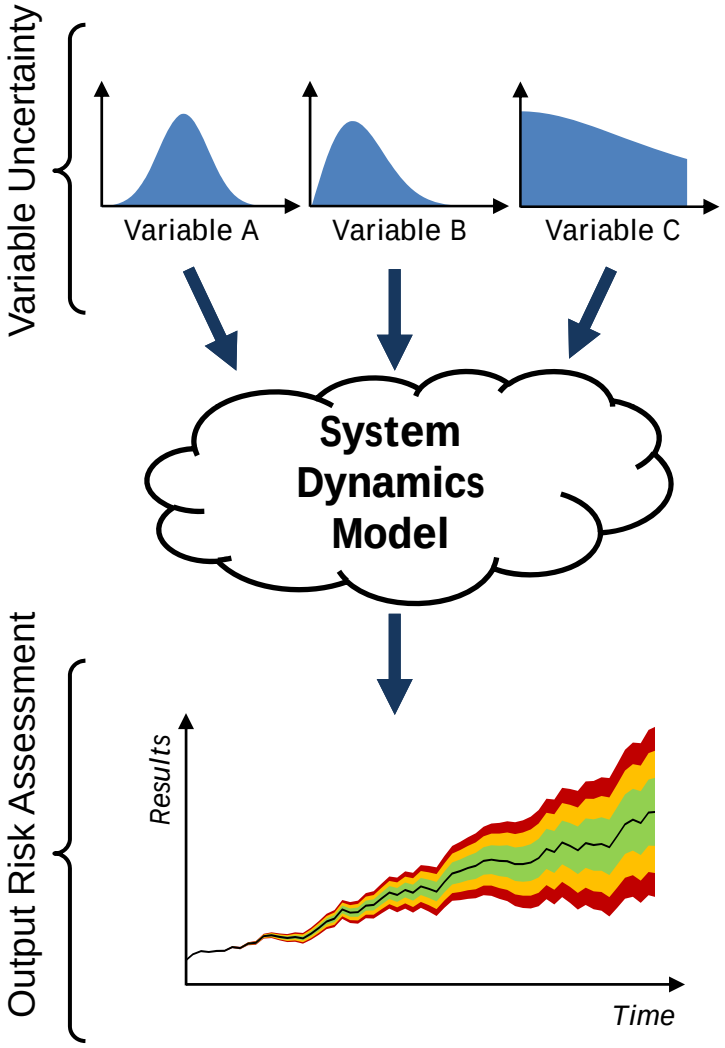
SYSTEMS DYNAMICS: UNCOVERING COMPLEX RELATIONS

- Based on the expected variances of each variable, a **system dynamics model allows estimation of the variance of the key output variable(s)**.
- Knowing the **impact of a partial set of variables on the output** provides a **strong advantage when assessing and managing risk**.
  - Which controllable variables are most important to keep under control?
    - ***Put in place control mechanisms***
  - Which uncontrollable variables are most critical as factors for the results (preferably generic)
    - ***Hedge them !***



Thank you for your attention !

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