UNIVERSITY OF
BEIRA INTERIOR

TII Conference 2011

26th - 28th of May 2011

Nizhny Novgorod, Russia

BEFORE PRESENTATION...SOME DATA ON UBI..JUST TO CONTEXTUALIZE:

8000 students

- 5 faculties
- Main R&D areas – Medical devices, Celular communication, Biomedical, Biotechnology, Materials, IT
- Incubator in Science park
- 22 spin-offs
- Medical incubator









VALUATING ACADEMIC PATENTS AS A TOOL FOR BOOSTING INNOVATION:

A REAL OPTIONS APPROACH

ROADMAP

1. Motivation
2. Goals
3. Need for patent valuation
4. Method proposed
5. Expected results
6. Final remarks

1.MOTIVATION

Need for reliable measurements under uncertainty, intangibility and lack of market data - REAL OPTIONS THEORY

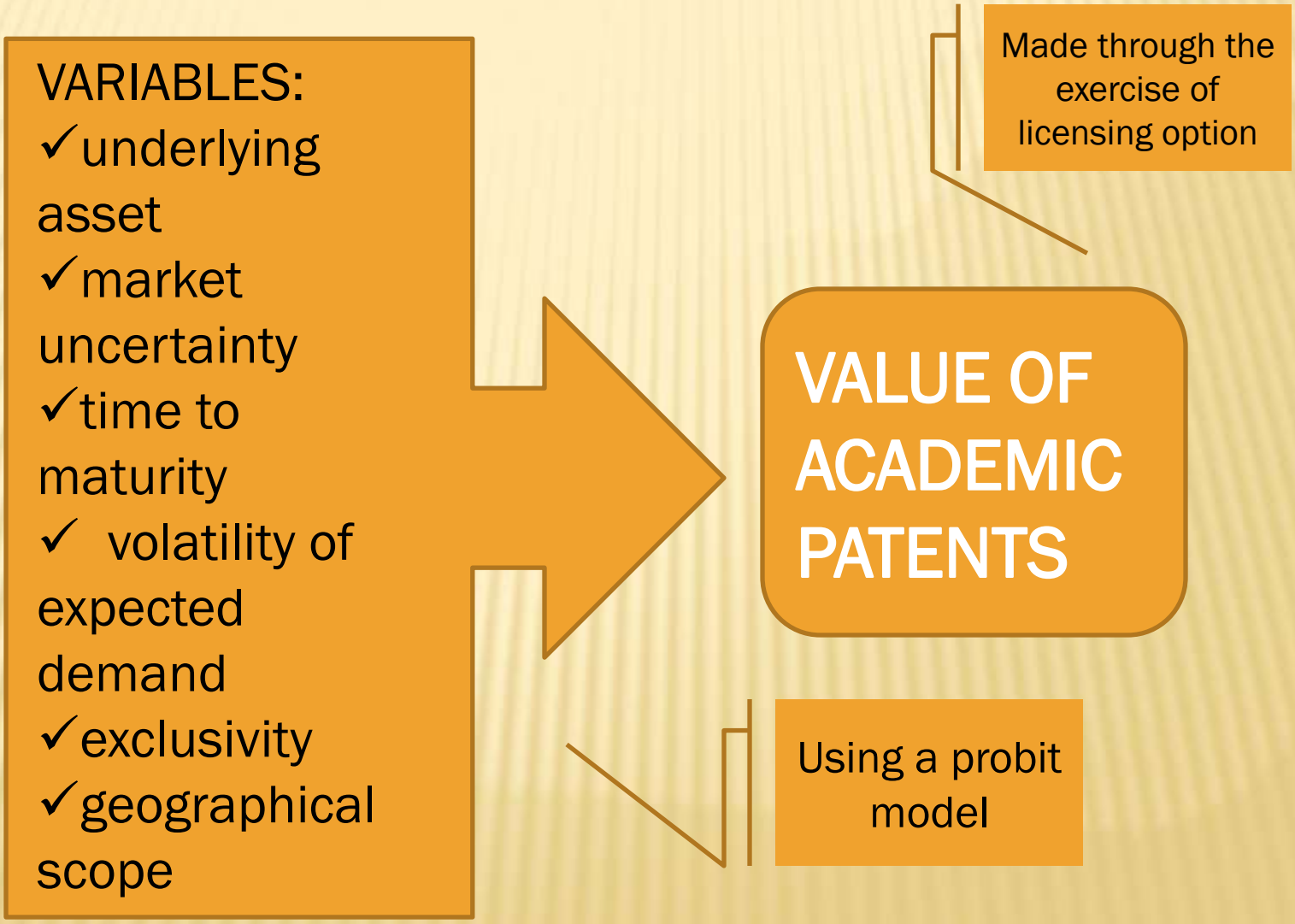
The field of academic patenting has not been target of many studies in patent valuation

Majority of academic patents are still on the proof of concept stage, being the optimal incentive strategy a mixture of royalties and sponsored research

Innovative tool

Since academic patents are target of uncertainty, volatility, few information and lack of historical and market-base data the use of ROT can be of great potential

Empirical model for patent valuation: ROT



2. GOALS

Main goal:

(i) To develop and propose an innovative methodology for valuing academic patents.

Secondary goal:

(ii) To study the influence of the determinants of patent value.

3. NEED FOR PATENT VALUATION

❑ For licensing, patent portfolio decisions
❑ As financing tools or investment assets to be used by financial institutions and VC
❑ Valuation needed for intangible assets to benefit from open market conditions
❑ Measure patent stock as knowledge indicators
❑ New indicators and application of rationales – justified by recent financial reporting standards

4.METHOD PROPOSED

Black-Scholes model can be appropriate when valuing real options - Black-Scholes option pricing model

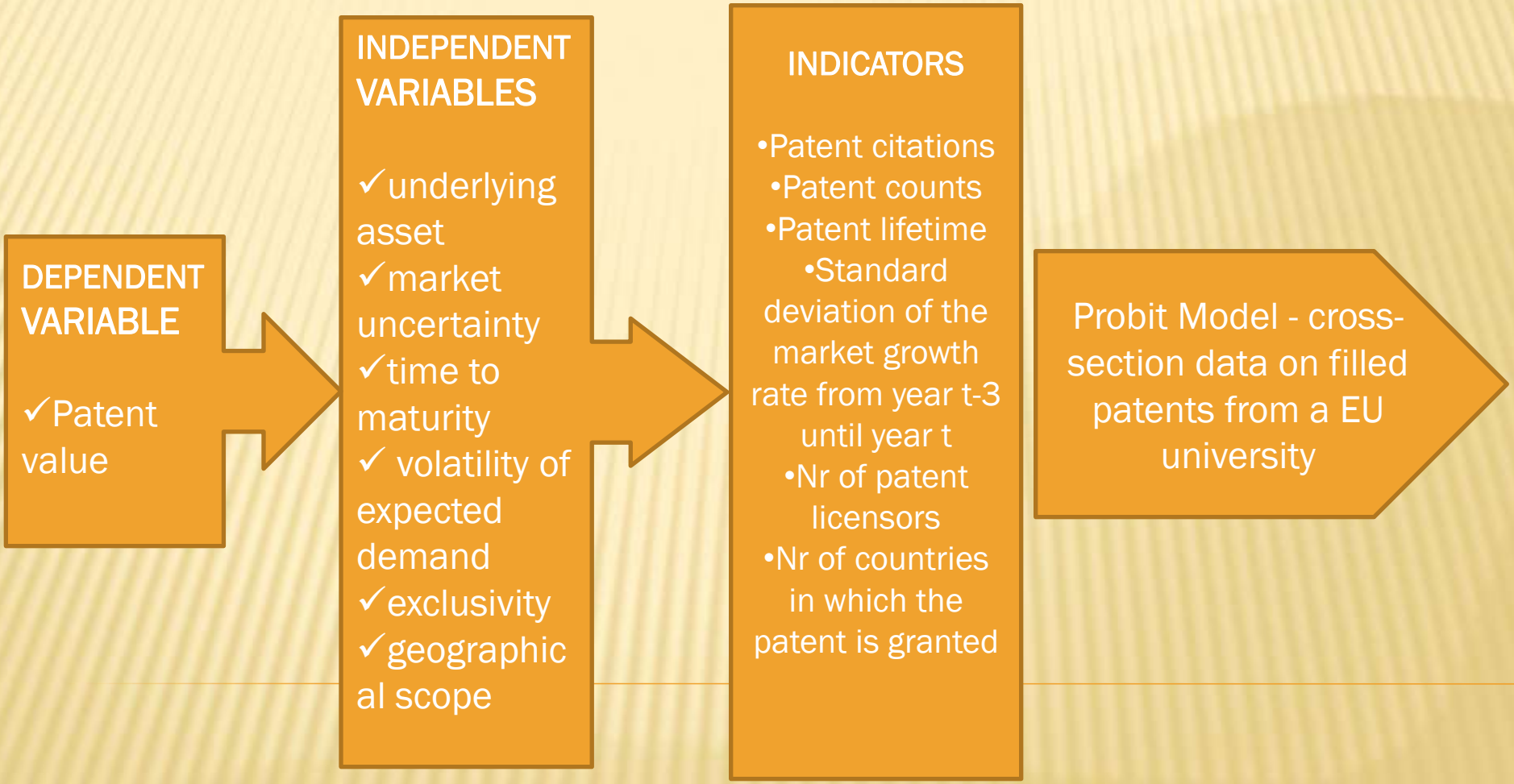
S, is the asset price
K, is the investment cost,
R is the risk-free rate,
t is the time to expiration.

Modulated by:

Being valid for both european and american options.

Empirical model of panel analysis to deal with the data set time series observations

4.METHOD PROPOSED



4.METHOD PROPOSED – PROPOSITIONS TO BE TESTED

Proposition 1: Academic patent value increases in accordance with the underlying asset value (S)

Proposition 2: Academic patent value increases in accordance with the time to maturity (t)

4.METHOD PROPOSED (CONT.)

Proposition 3: Academic patent value increases in accordance with an increase in the volatility of the expected demand (δ)

Proposition 4: Academic patent value increases in accordance with the exclusivity of the patent (e)

Proposition 5: Academic patent value increases with an increase in the geographical scope of the patent (g)

5.EXPECTED RESULTS

EXPLAINED VARIABLE	EXPLANATORY VARIABLES	TB ON PATENT VALUE DETERMINANTS
Academic patent value (APV)	Underlying asset value	++ Wu & Tseng (2006); McGrath (1997), Kulatilaka and Perotti (1998), McGrath and Nerkar (2004) and Ziedonis (2007)
	Time to maturity	++ (Wu & Tseng, 2006)
	Volatility of the expected demand	++ McGrath (1997), Kulatilaka and Perotti (1998), McGrath and Nerkar (2004) and Ziedonis (2007)
	Exclusivity Geographical scope Royalties agreed Warrants Equity	+ Oriani and Sobrero (2008)

6.FINAL REMARKS

- This study proposed a methodology for valuing academic patents and analysed the determinants of patent value.
- Since academic patents are target of uncertainty, volatility, few information and lack of historical and market-base data the use of ROT can provide a valuation model to apply when transferring these assets to industry.
- Collected cross-section data on filled patents from a recognized European university analyzed through the use of a Probit Model.
- Dependent (or explained) variable: the Patent value; and as Independent (or explanatory) variables: Underlying asset; Time to maturity; Volatility of expected demand; Exclusivity; Geographical scope.

6.FINAL REMARKS

- **Limitations:** complexity of the ROT analysis; lack of available data regarding academic patents; due to the uniqueness of patents it's very difficult to find a comparable price in the market for a target patent; the high uncertainty and information asymmetry in the patent trading market constraints the development of a standard patent appraisal model; early-stage phase of academic patents limits data available to process valuation; ROT and Monte Carlo methods are more realistic since they treat costs and revenues and also risk and uncertainty

6.FINAL REMARKS

- **Guidelines for future:** it will be interesting to cross check the data using other valuation methods and explain differences achieved in results; to compare international methods for valuing academic patents in the US and European context – this is already being done through a collaboration with COTEC, INPI and US partners in order to publish a guide on how to value intangibles.

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