



OESTERREICHISCHE NATIONALBANK  
EUROSYSTEM

# Innovation and Green Finance: A Joint Schumpeterian Perspective

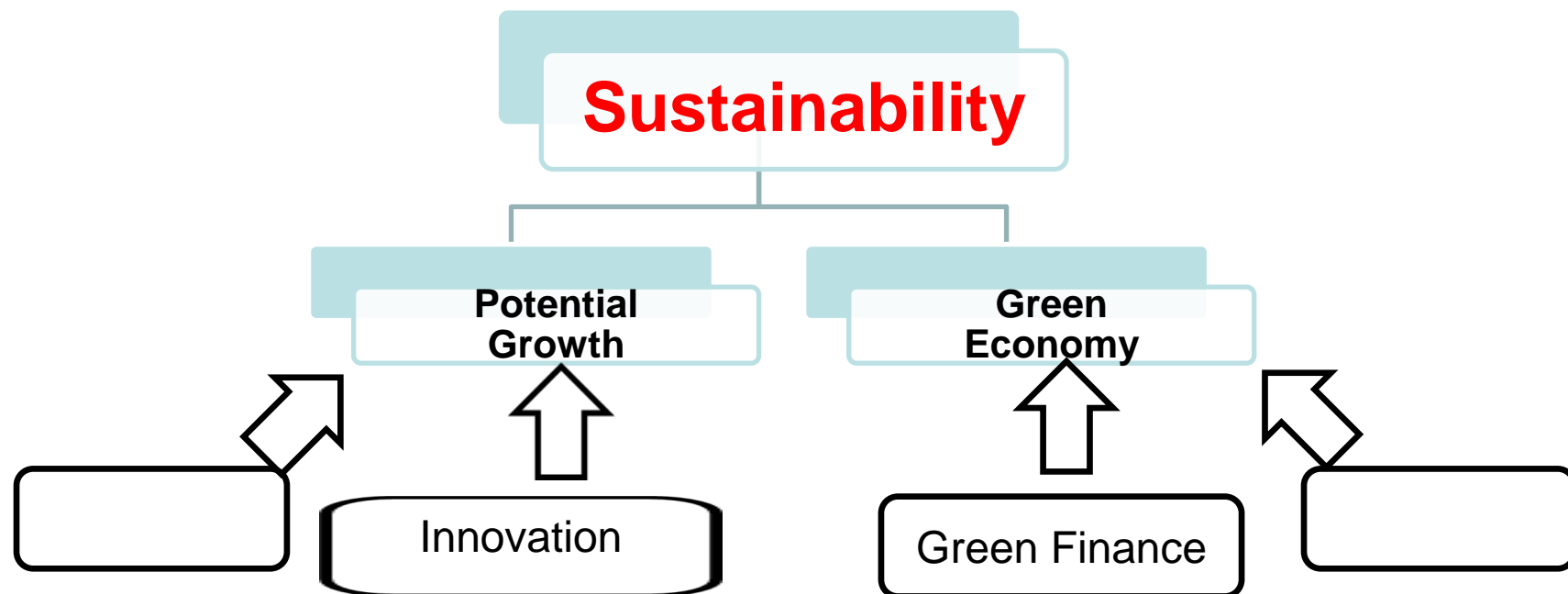
*Peter Mooslechner*

*Executive Director and Member of the Governing Board  
Oesterreichische Nationalbank, Vienna, Austria*

**BIT's 3<sup>rd</sup> Annual Global Congress of Knowledge Economy  
Qingdao, China, November 10, 2016**

## Prologue (I): Is there a central global topic today?

*If there is any topic of a really encompassing global nature today, my choice would be the „quest for sustainability“! Why?*



*2 important determinants, obviously among many others*

► **Closely connected factors from a Schumpeterian perspective!**

## Prologue (II): UN Sustainable Development Goals cover a very wide range of issues

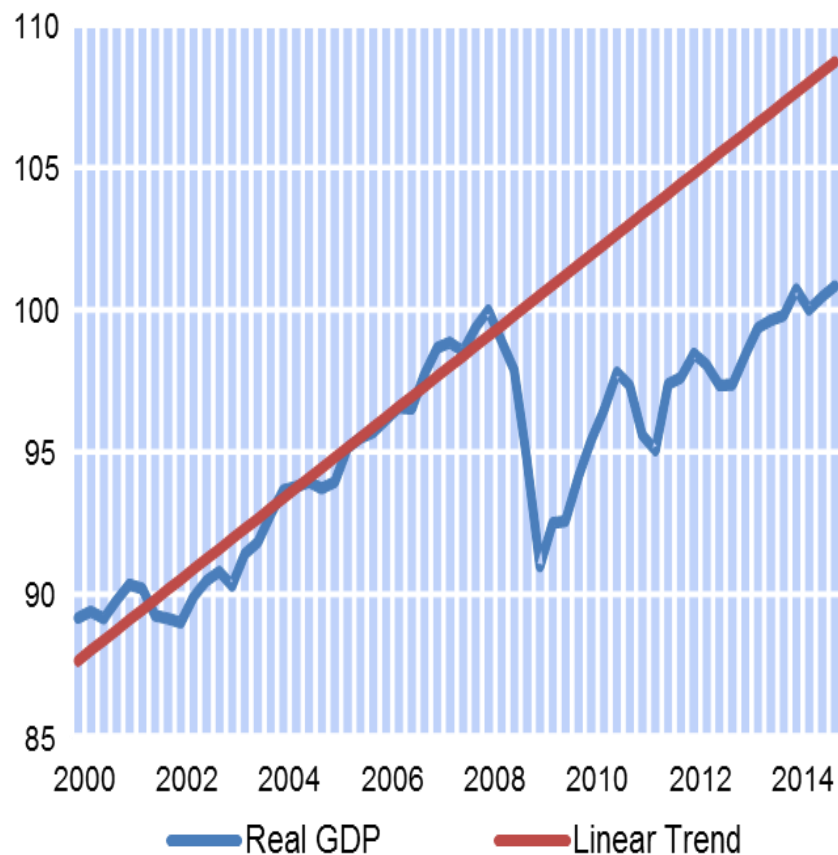


(c) Vereinte Nationen

# Prologue (III): Growth falling behind potential

## Aggregate GDP-Growth of G4 Countries\*

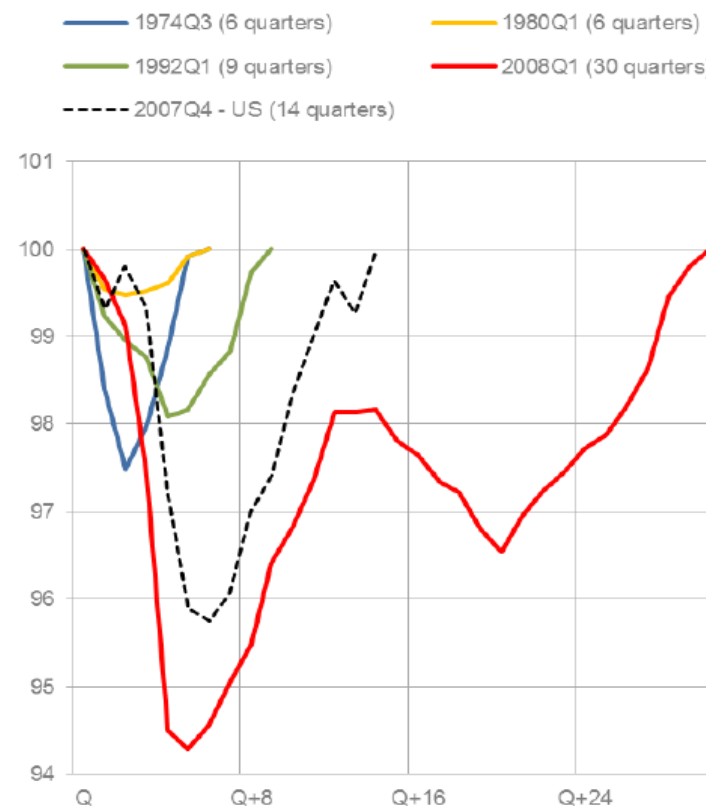
Index 2008Q1 = 100



Source: Own calculations G4= Euroarea, Japan, UK, USA,

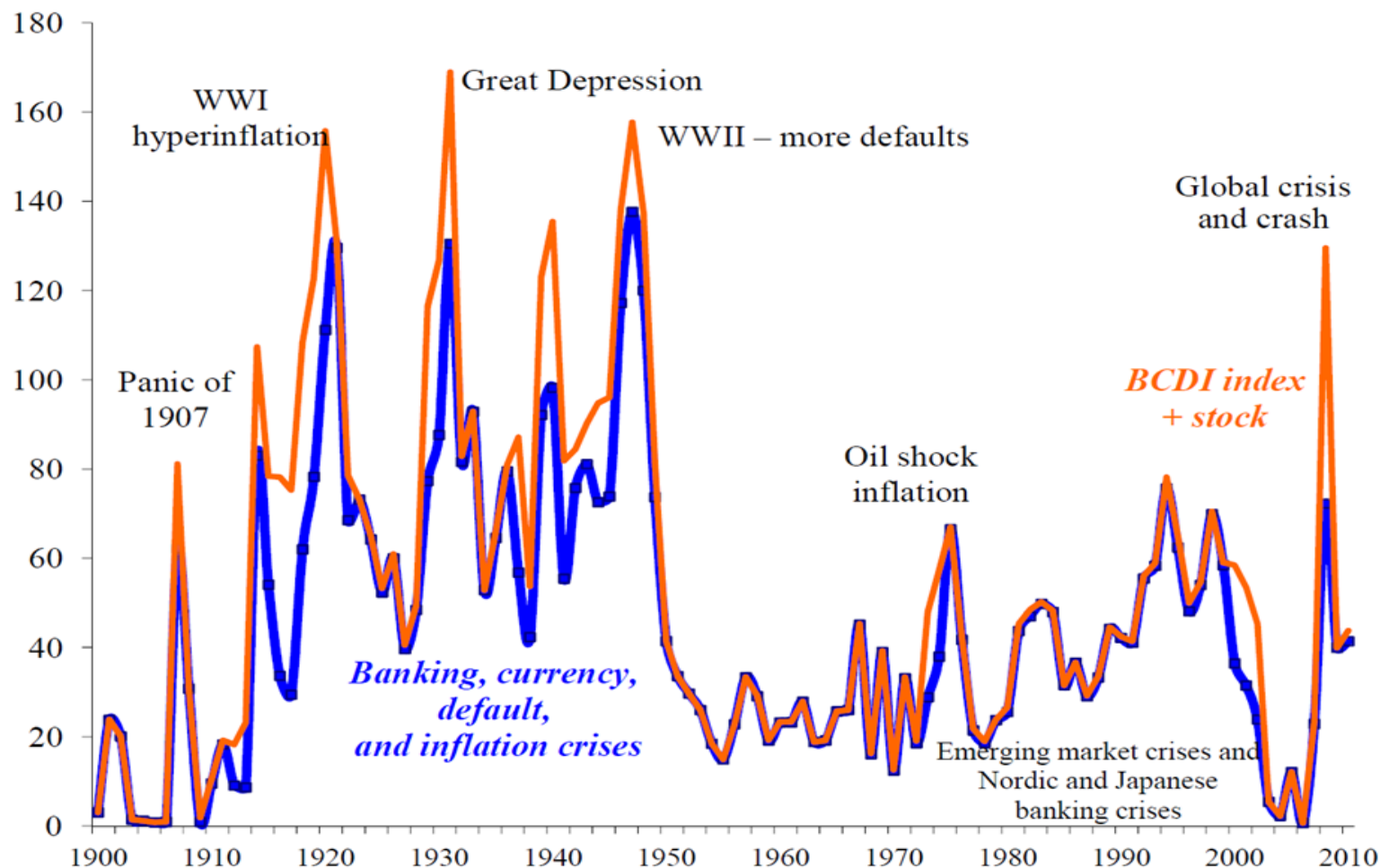
## Euro area GDP growth across recoveries

(Peak of business cycle = 100)



Sources: Eurostat, United States Census Bureau and ECB calculations.  
Latest observation: 2015Q3 for the euro area.

## Prologue (IV): Decades of relative stability behind us?



Source: Reinhart and Rogoff (2013)

# Outline

- **Schumpeter's Legacy**
- **Re-Allocation of Ressources and the Financial System**
- **The Challenges of Investment / Innovation Financing**
- **Green Financial Market Developments at a Glance**
- **3+ International Examples/ Initiatives**

# I. SCHUMPETER'S LEGACY



# Schumpeter (I): Geographical roots....



The World



Europe

The Habsburg Empire



Today's Austria and the Czech Republic

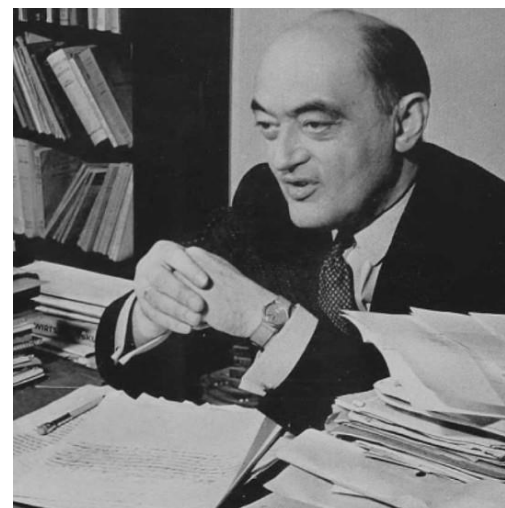
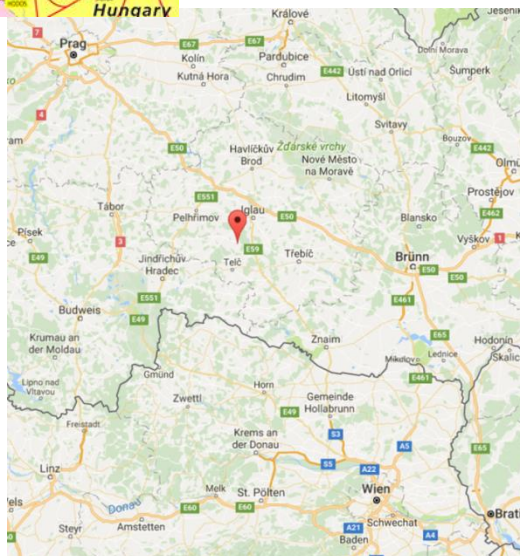


# Schumpeter (II): ...in a small European city

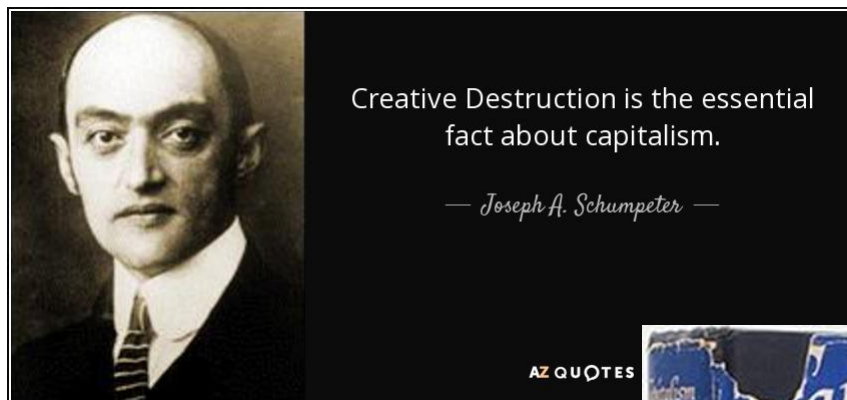


Triesch/Trest in between

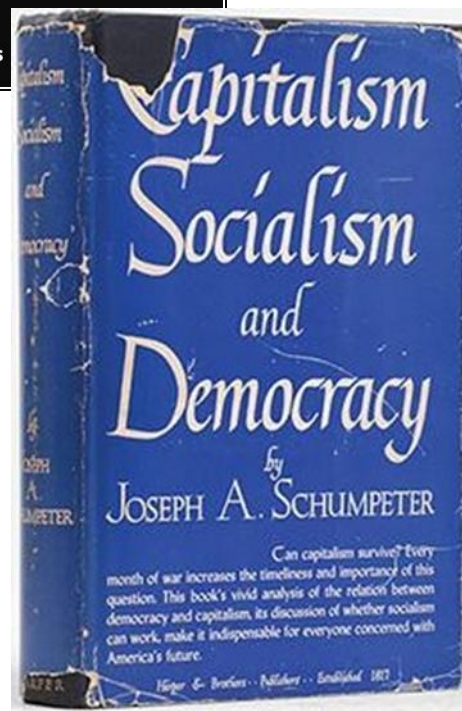
Vienna – Prague  
250km



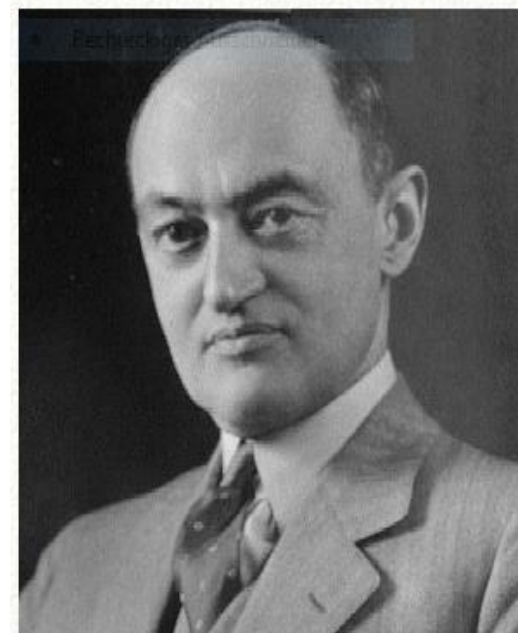
## Schumpeter (III): Famous for many things...



- **University of Czernowitz (today Ukraine)**
- **University of Graz (Austria)**
- **University of Bonn (Germany)**
- **Harvard University (USA)**
- **Finance Minister**
- **Banker**



Joseph A. Schumpeter, 1883-1950.



*Joseph A. Schumpeter*

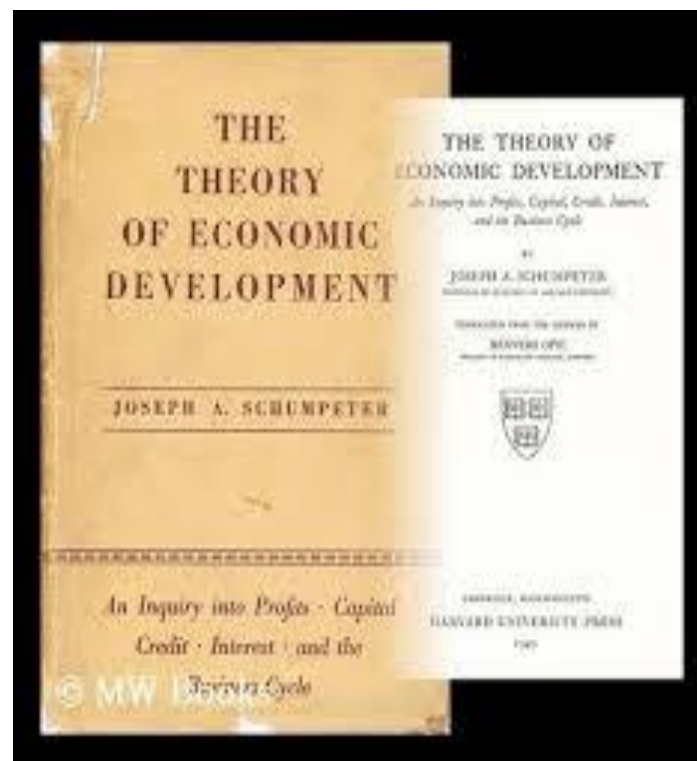
## Schumpeter (IV): Why worth to be mentioned?

***Almost forgotten: His early work on Economic Development!***

**Published in German 1911**



**English Translation 1934**



**► Specific issue: Central role of Financial System in reallocation!**

## **II. RE-ALLOCATION OF RESSOURCES AND THE FINANCIAL SYSTEM**

# The basic concept: Economic dynamics, resource allocation and innovation

## **Creative destruction:**

**A process to replace old production methods and goods**

- The entrepreneur destructs the prevailing equilibrium / steady state
- Schumpeter's model is dynamic in nature, driven by powerful long-run forces
- Innovation is not part of the business cycle fluctuations but an impact of change striking from „the outside“
- The main driving forces are changes in the method of production
- Schumpeter-type economic progress comes in ‚rushes‘, in structural upswings dominated by some new industry
- **The Financial System is an important and integral part of the relevant institutional setting of an economy**



## The core factor: The fundamental role of „Financing“

**'The banker . . . authorizes people, in the name of society as it were, to . . . (innovate)' (Schumpeter, 1934)**

- The central question: How can innovation and new investment opportunities be realized?
- The financing of innovation or a new industry always means expansion of financing
- Entrepreneurs need financing to gain command over inputs engaged in 'old-style' productions in order to recombine resources for their innovative ideas
- The Financial System stands between those who wish to form new combinations of resources and the old possessors of productive means
- From this perspective financing becomes a necessary prerequisite for innovation, which in turn is the fundamental source of economic dynamics

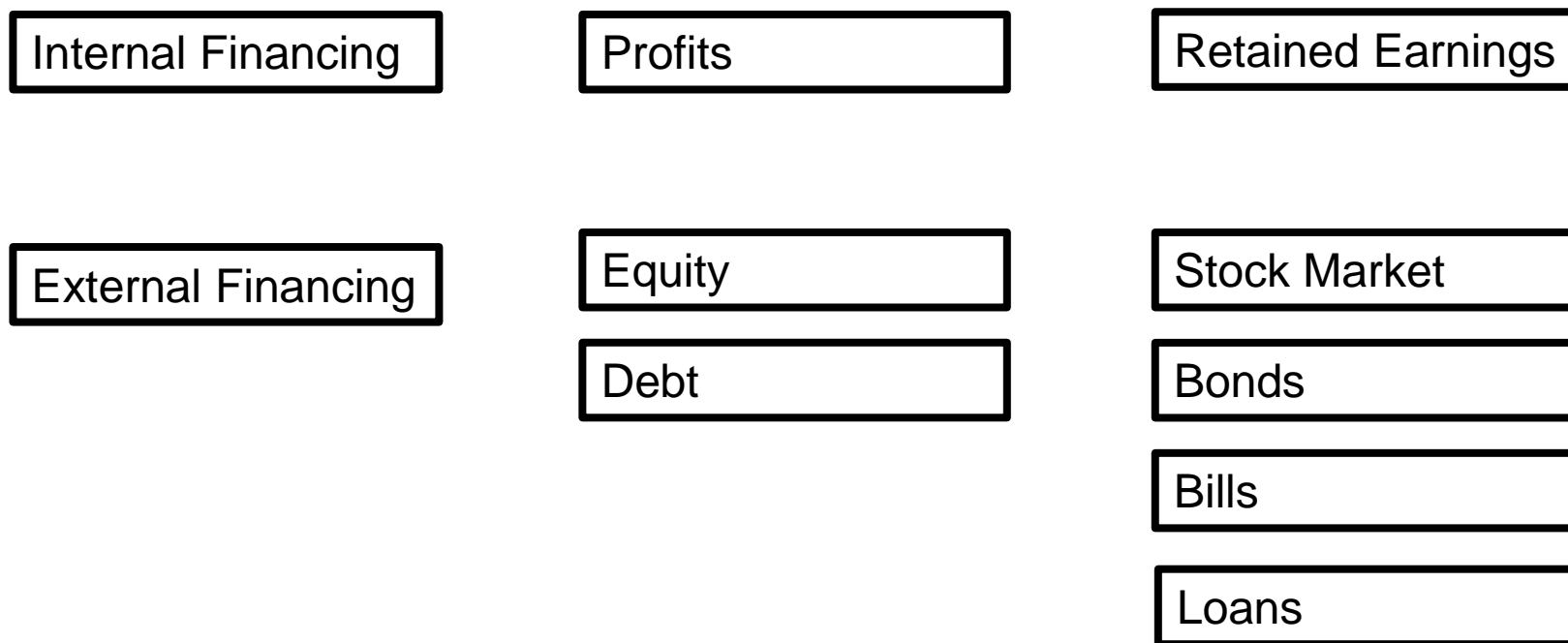
## The „Finance Motive“: A reminder

- The connection between finance and economic growth was of almost no importance in the thinking of (neo)classical economists
- **Schumpeter** was among the first (and few) to put the role of the Financial System at the center of economic development
- **Keynes** in his 'Monetary theory of production' (1933) as well as in 'The general theory of employment' (1937) very much stressed the importance of (ex-ante) finance (the “Finance Motive”) for the dynamics of a monetary economy
- He qualified the existence of mechanisms to finance investment, as a central condition for sustained growth
- He strongly underlined the importance of the respective institutional setting (the Financial System of an economy) for macroeconomic performance
- **Wicksell** was one of the few other economists to underline this



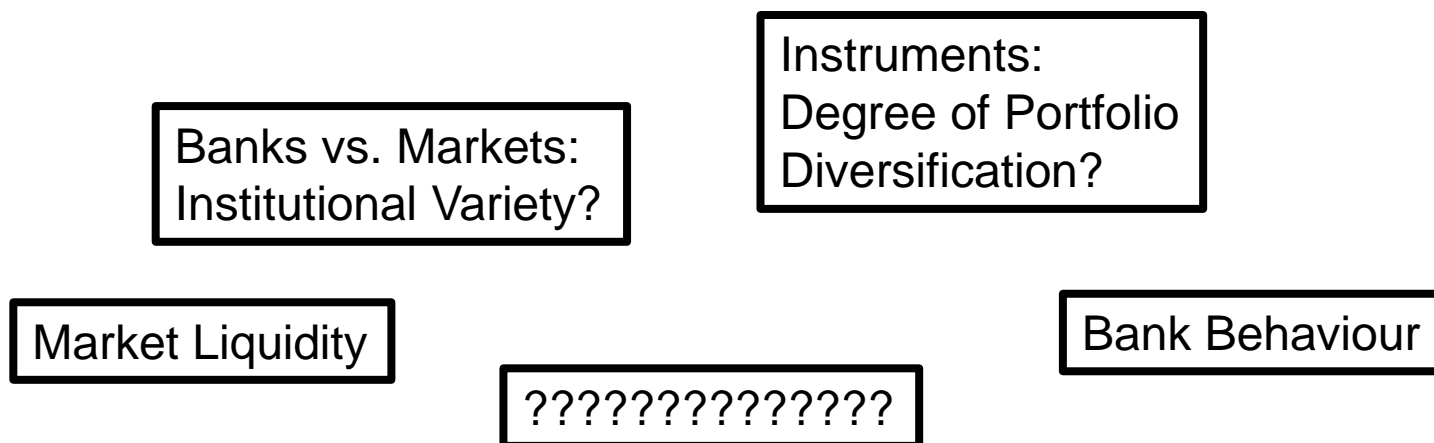
# **III. THE CHALLENGES OF INVESTMENT / INNOVATION FINANCING**

# The overall structure of investment financing: Characteristic differences – different characteristics



► ***Which elements of the Financial System may ease/promote the reallocation of resources?***

## Which kind of Financial System efficiency?



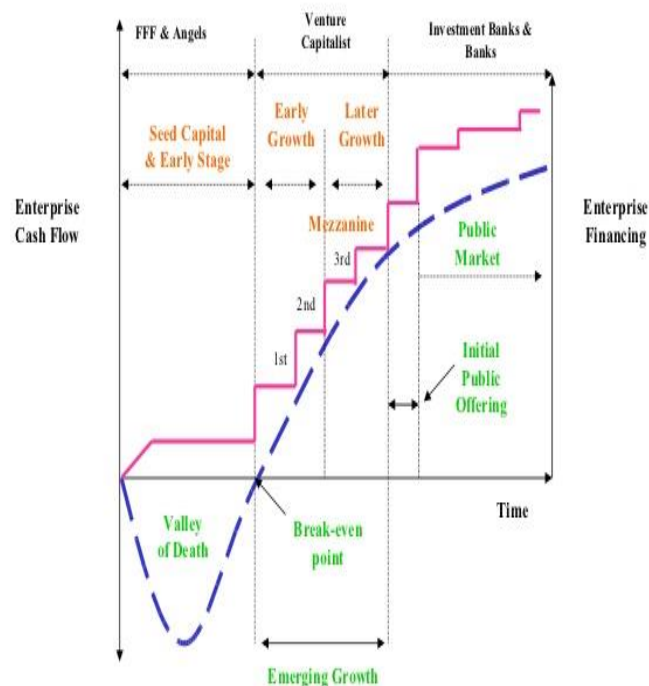
### Efficiency Criteria:

- **Information-Arbitrage Efficiency**
- **Fundamental-Valuation Efficiency**
- **Full-insurance Efficiency**
- **Functional Efficiency**

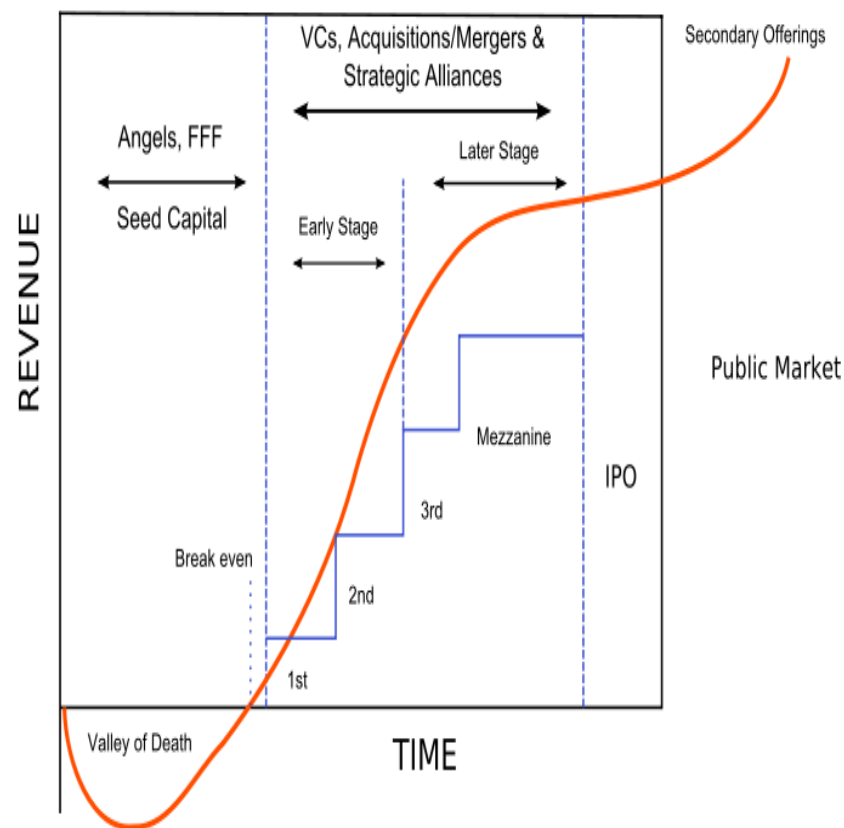
*Tobin (1984)*

# The special case of innovation financing

## Financing Life Cycle



## Startup Financing Cycle



<http://www.drawpack.com>  
your visual business knowledge

business diagrams, management models, business graphics, powerpoint templates, business slides, free downloads, business presentations, management glossary

## Even more complicated: The „Structural Financing Gap“ for „Green Finance“ (Gosh – Nanda (2015))

Capital Intensity	High	<b>Project Finance/Existing firms</b> <ul style="list-style-type: none"> <li>• Wind farms</li> <li>• Utility-scale solar</li> <li>• First-generation biofuel refineries</li> <li>• Manufacturing of solar cells using established technologies</li> </ul>	<b>Hard to Fund (“Valley of Death”)</b> <ul style="list-style-type: none"> <li>• First commercial plants for unproven technologies</li> <li>• Advanced biofuel refineries</li> <li>• Offshore wind farms</li> <li>• Carbon sequestration</li> </ul>
	Low	<b>Bank Debt/ Existing firms</b> <ul style="list-style-type: none"> <li>• Wind and solar component of proven technologies</li> <li>• Internal combustion engines</li> <li>• Insulation/building materials</li> <li>• Energy efficiency services</li> </ul>	<b>Venture Capital</b> <ul style="list-style-type: none"> <li>• Energy efficiency software</li> <li>• Lightning</li> <li>• Electric drive trains</li> <li>• Fuel cells / Power storage</li> <li>• Wind and solar components of unproven technologies</li> </ul>
		Low	High
		Technology risk	

Fig. 2. Many Green sector ventures are “hard to fund”  
Source: Ghosh and Nanda (2015).

## The (very) challenging transition phase

The question arises as to how the financial framework can contribute to an orderly transition to a “Green(er) Economy”.

There are 2 main dimensions to this issue :

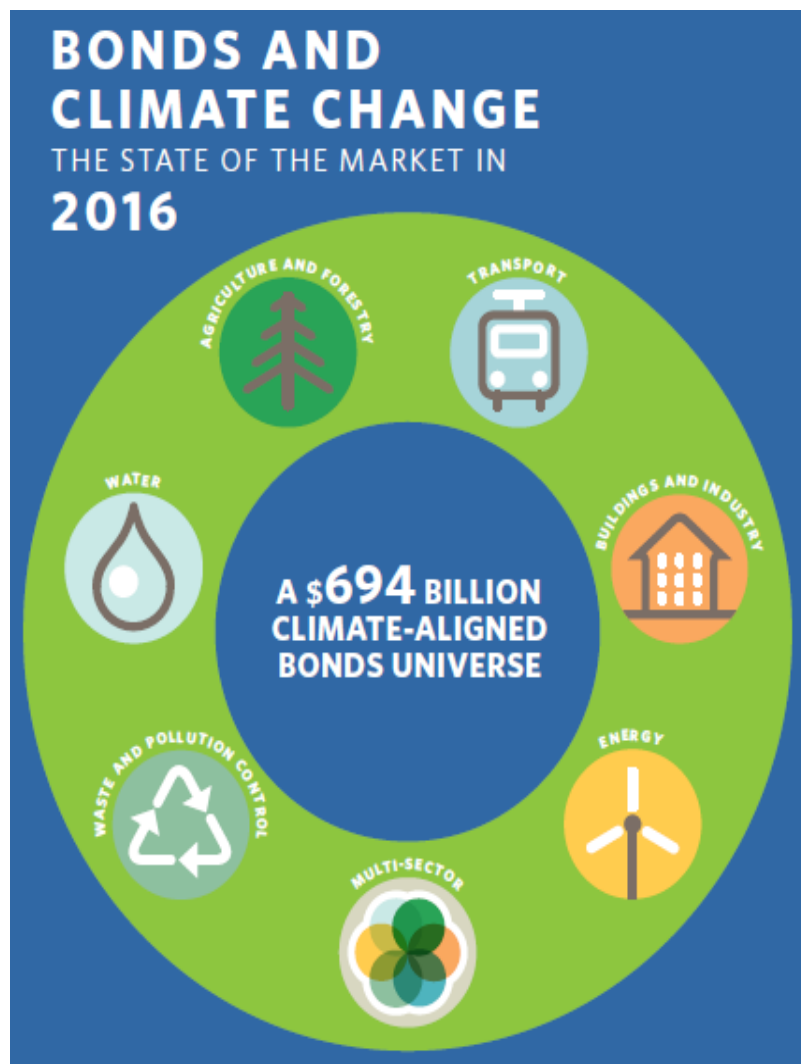
1. The first dimension concerns the **minimisation of financial instability risk** linked to climate change and the transition.
2. The second dimension relates to **creating a supportive policy environment that facilitates an efficient reorientation of investment** towards environmentally sustainable applications.

Interactions exist between these two dimensions as, for instance, natural disasters may lead to significant financial impacts for investors while a timely reorientation of investments towards environmental sustainability would reduce transition risks.

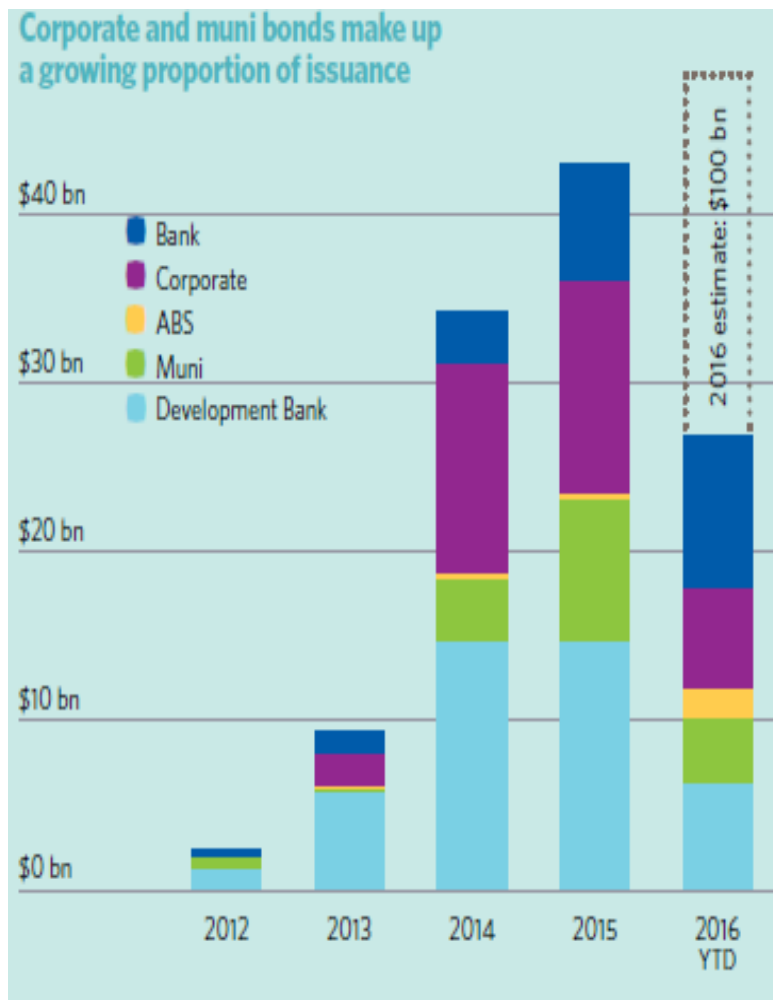
## **IV. GREEN FINANCIAL MARKET DEVELOPMENTS AT A GLANCE**



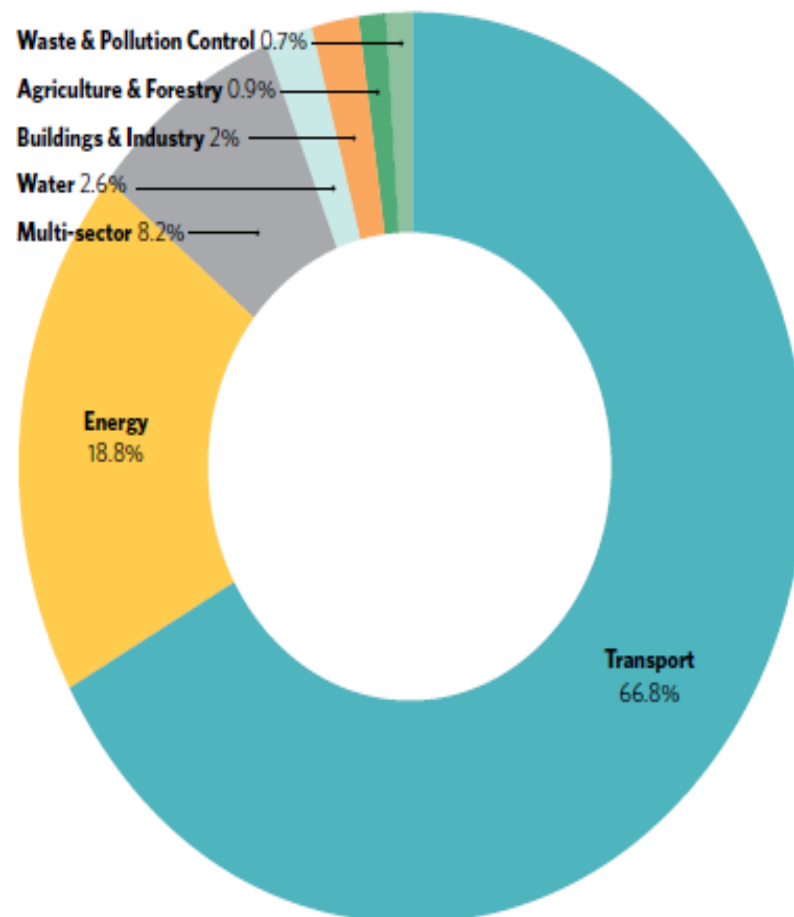
# The Green Bond Market (Source: HSBC)



# Market developments and structures



**Transport and Energy are the largest climate themes**



# The Green Bond Principles (GBP 2014)

## Four Pillars of the Green Bond Principles

1. Identify use of proceeds	2. Develop process for project evaluation and selection	3. Determine strategy for management of proceeds	4. Develop reporting strategy and commitments
<ul style="list-style-type: none"> <li>• Determine Eligible Sectors / Project Categories <ul style="list-style-type: none"> <li>- Renewable energy</li> <li>- Energy efficiency</li> <li>- Pollution prevention and control</li> <li>- Sustainable management of living natural resources</li> <li>- Terrestrial and aquatic biodiversity conservation</li> <li>- Clean transportation</li> <li>- Sustainable water management</li> <li>- Climate change</li> <li>- Eco-efficient products, production technologies and processes</li> </ul> </li> <li>• Identify specific projects – existing and pipeline</li> <li>• Estimation of share of new financing vs. re-financing</li> </ul>	<ul style="list-style-type: none"> <li>• Determine Evaluation and selection process</li> <li>• Define Eligible Sectors eligibility criteria – some issuers define criteria upfront, other issuers ensure a strong internal governance process to review each project as it is identified</li> <li>• Define governance structure</li> <li>• Define sustainability objectives</li> <li>• Determine exclusions, if any</li> <li>• The GBP recommend that an issuer's process for project evaluation and selection be supplemented by an external review</li> </ul>	<ul style="list-style-type: none"> <li>• Determine method for allocation of funds from net bond proceeds</li> <li>• Ring-fenced special accounts = tracking method; OR</li> <li>• Allocating funds to green projects = earmarking method</li> <li>• Consider volume and timing of allocations to projects</li> <li>• Consider temporary investment structures and the 'adjusted' balance, rather than the 'unallocated' balance as it is understood that some projects repay early, or get sold and so unallocated balances can go up as well as down</li> </ul>	<ul style="list-style-type: none"> <li>• Issuers should make, and keep, readily available up to date information on the use of proceeds to be renewed annually until full allocation, and as necessary thereafter in the event of new developments</li> <li>• Consider Project or Portfolio level reporting <ul style="list-style-type: none"> <li>- Include description of Eligible Sectors funded and amounts allocated</li> <li>- Include a list of the projects to which proceeds have been allocated, as well as a brief description of the projects and the amounts allocated, and their expected impact where possible</li> </ul> </li> <li>• Communicate ....via reports, newsletters, website update etc</li> <li>• Independent assurance on annual report</li> <li>• Impact reporting considerations?</li> </ul>

## Also the Stock Market, in the end....

### 3 things stock exchanges can do to promote green finance


**Provide guidance & training**


**Make Visible**


**Promote Green standards**

- 1 Provide guidance & training**
  - Provide guidance and training on sustainability reporting and climate risk disclosure; Support the [SSE Global Guidance Campaign](#)
  - Train local issuers & investors on green finance market innovations, standards and regulations
  - Provide guidance for international investors on local green products
- 2 Make visible**
  - Create green equity indices
  - List labelled green bonds, and create a green bond index
  - Encourage issuers to increase transparency and label green bonds
- 3 Promote standards development**
  - Participate in green finance standard setting consultations
  - Introduce listing rules for green bonds
  - Promote adoption of recognized green finance standards in your market

## **V. 3+ INTERNATIONAL EXAMPLES/ INITIATIVES**

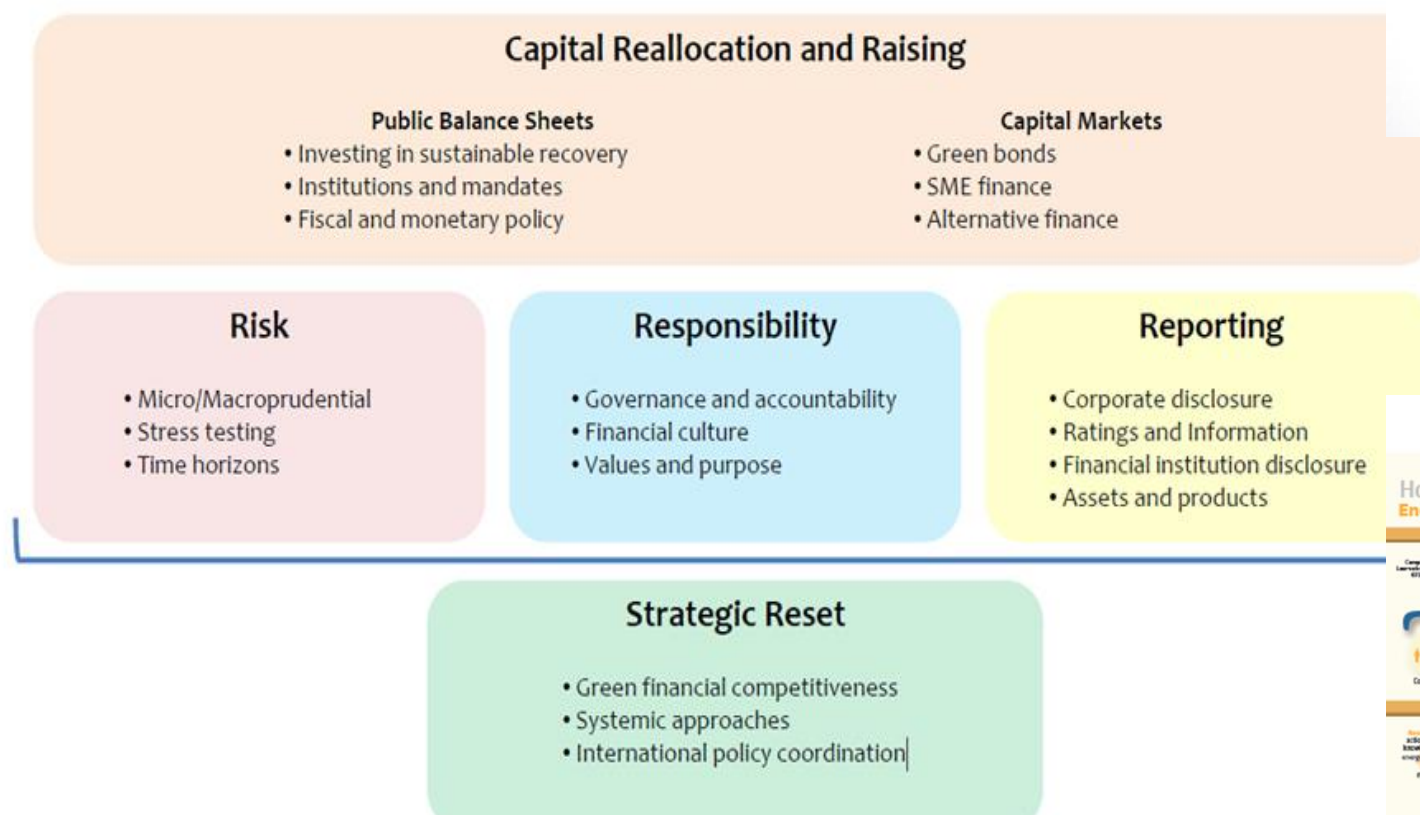
## The fundamental G20 initiative

**G20: The GFSG has been launched under China's Presidency of the G20.**

**“identify institutional and market barriers to green finance, and based on country experiences, develop options on how to enhance the ability of the financial system to mobilize private capital for green investment.”**

**Key options to enhance the ability of the financial system to mobilize private capital for green investment:**

- 1. Provide strategic policy signals and frameworks**
- 2. Promote voluntary principles for green finance**
- 3. Expand learning networks for capacity building**
- 4. Support the development of local green bond markets**
- 5. Promote international collaboration to facilitate cross-border investment in green bonds**
- 6. Encourage and facilitate knowledge sharing on environmental and financial risk**
- 7. Improve the measurement of green finance activities and their impacts**



## The Financial System We Need, Oct. 2015



# The EU Capital Markets Union Action Plan

The CMU Action Plan recognizes that Europe requires significant new long term and sustainable investment to maintain and extend its competitiveness and **shift to a low-carbon and resource-efficient economy.**

The Commission Services engaged in several activities in the area of **encouraging finance for sustainable and green investments**, including:

- (i) on 2 March 2016, the Commission published a Communication explaining how it will take forward implementation of the Paris Agreement
- (ii) a public consultation on how institutional investors, asset managers and other service providers in the investment chain factor in ESG (environmental, social and governance) information and performance of companies or assets into investment decisions closed on 31 March 2016
- (iii) a public consultation to prepare guidelines to assist large public-interest entities when disclosing social and environmental information in accordance with the Directive on disclosure of non-financial and diversity information ended on 15 April 2016
- (iv) a study on the potential of the bond market to finance resource-efficient investments is under preparation
- (v) the Commission Services are contributing to the work of the G20 study group on green finance.”

# The OECD Centre on Green Finance

The OECD is contributing  
to green finance and investment :

- Assess the impacts of climate policies and investments on low-carbon investment
- Understand the role that financial instruments can play in reducing risks and transaction costs
- Promote the development of instruments (e.g. green bonds) for institutional investors
- Understand the range of current practices by institutional investors in the areas of investment governance and the integration of ESG factors, including climate risks
- Obtain quantitative insights into the impact of measures and regulations on investment and innovation in renewable energies



## **(Instead of) Conclusions: 5 Important Messages...**

- **Take Schumpeter's legacy seriously, that the functioning of the Financial System determines resource re-allocation**
- **Develop a Financial System environment that promotes the transition to a sustainable economy**
- **Standardization in every respect is key for creating an attractive financial market environment**
- **Transparency on market criteria, instruments and products will enhance volumes**
- **International coordination of initiatives is essential**



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# Climate-related Financial System Risks

