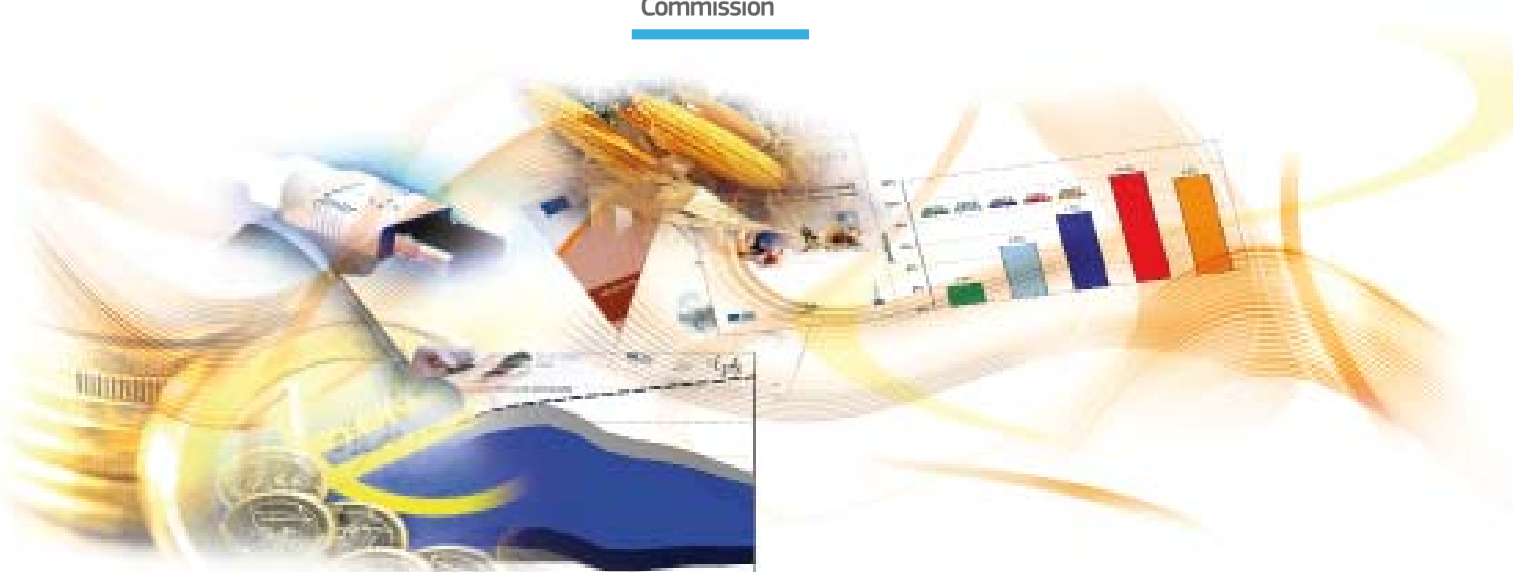




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J R C T E C H N I C A L R E P O R T S

4th European Conference on Corporate R&D and Innovation: Financing R&D and Innovation for Corporate Growth in the EU (CONCORDi-2013)

Background Note

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4th European Conference on Corporate R&D and Innovation:
**Financing R&D and Innovation for Corporate Growth in the EU:
Strategies, Drivers and Barriers**

(CONCORDi-2013) ¹

Background Note ²

Fernando Hervás, Pietro Moncada-Paternò-Castello, Sandro Montresor and Antonio Vezzani³

Seville, 12 September 2013

1. Introduction

Corporate investments in R&D and innovation present a number of specificities which make their financing more difficult than other ordinary investments. These specificities refer mainly to the long-term nature of innovation projects, their intrinsic risk and the lack of collateral assets (needed to protect lenders against borrowers' default), the difficulties of reaping their benefits, the asymmetric information and hazardous behaviours pervading the relationship between lenders, equity investors and borrowers. The implications of these characteristics on the availability and cost of capital would affect the optimal level of innovation investments, both at company and at aggregate levels.

Grounded on extensively documented theoretical and empirical evidence, governments have decided to intervene to counteract market failures and ease the financing of innovation of individual firms. A wide array of instruments have been put in place, from subsidies to tax incentives, through regulatory changes in the fiscal and legal environments to improve the functioning of the financial and capital markets.

In a context where investments in innovation are at the core of firm's competitiveness strategies and of countries and regions' "growth and jobs" policy agendas, a better understanding of the current and emerging drivers and barriers for innovation financing is crucial. In a world with a fast-changing technological and economic environment, firms are confronted with new complex strategic choices. At the same time, governments need to tailor their instruments to the needs of specific firms, very often in a context of difficult fiscal adjustments and important regulatory changes in the financial system in the wake of the 2008-2009 crisis.

¹ CONCORDi-2013 website: <http://iri.jrc.ec.europa.eu/concord/2013/index.html>

² This document benefits from the input provided by Dr Maria Del Sorbo (European Commission, JRC-IPTS), Member of CONCORDi-2013's Steering Committee, as well as from the contributions and editorial suggestions offered by the members of CONCORDi-2013 Scientific Committee, and in particular by Prof Bronwyn H. Hall (University of California at Berkeley, USA and Prof Marianne Guille (Université Panthéon-Assas, France). The lists of members of the Scientific Committee as well as the Steering Committee are in Annex III of this document.

³ Members CONCORDi-2013's Steering Committee, all from European Commission, JRC-IPTS.

Despite the relevance of the issue, scientific knowledge in the area of financing R&D and innovation and its link to firm's growth across the EU is less broad and deep than knowledge in other areas relating to the economics of innovation. Furthermore this issue is far from being resolved in terms of policy.

The CONCORDi-2013 Conference intends to gather cutting edge scientific knowledge on the financing of R&D and innovation for firms' growth to deliver relevant policy messages and provide sound support for policy making. In addressing this aim, the Conference is structured around two main topics, which represent the two sides of the same coin. On the one hand (Topic 1), the issue will be addressed from a company perspective, by focusing on the kind of financial sources that they deem necessary to invest in innovation, the constraints that they perceive in accessing them, and the strategic choices they need to take to transform them into superior innovation and growth. On the other hand (Topic 2), a policy perspective will be adopted, by addressing the effectiveness of the financing facilitators to which firms resort (e.g. venture capital, business angels and crowdsourcing), the policy needs that they pose, and the kind of actions and measurements needed to address them.

This background note intends first to summarise the main research questions tackled within the two topics of the Conference, highlighting - in Section 2 which follows - both the current academic understanding and the extent to which the selected papers reinforce, challenge and/or bring additional value to the existing knowledge. Section 3 summarises the current policy agenda in Europe to support corporate financing of innovation. Section 4 proposes a number of scientific and policy relevant questions which the Conference will address.

2. State-of-the-art results and the CONCORDi-2013 value added

2.1 Financial sources, constraints and firms' growth strategies

The financing of R&D and innovation activities is susceptible to market failures. Extensive evidence has shown that these failures are mainly related to the innate uncertainty of innovative projects, the difficulties innovators face in appropriating their benefits, and the asymmetric information and moral hazard that pervade relationships between lenders, equity investors and borrowers (Hall and Lerner, 2010). Moreover, a significant part of a firm's R&D investments is represented by the wages and salaries of highly educated workers, on whose embedded knowledge the innovative firm builds up its competitive advantage over time. Given that this knowledge capital is lost, when scientists and engineers get fired or quit their jobs, eventually in favour of their rivals, firms face high adjustment costs that affect the required rate of return and therefore tend to smooth their R&D spending over time (Hall *et al.*, 1986).

Research on financial sources and constraints to firms' growth strategies has grown enormously in recent decades, producing an extensive number of state-of-the-art results, whose research and policy implications merit further scrutiny. For example, evidence on the consequences a firm's capital structure has on its capacity to finance R&D and innovation (and vice versa) has shed new light on the relative merits of bank-based versus market-based financial systems as sources of finance (Dosi, 1990; Brown *et al.*, 2009). However, whether this generates country-specificities within Europe in the finance-innovation-growth link that could be exploited by policy-makers for the sake of innovation deserves further investigation (Revest and Sapio, 2012).

The related issue of the gap between the external and internal costs of R&D investments is also in need of further analysis. The ways in which companies could mitigate the opacity of their innovative projects in investors' eyes and their lack of collateralisable assets, the remedies against the morally hazardous behaviours (e.g. self-dealing) of their managers with

respect to internal cash-flows, and their understandable reluctance to invest external capital in risky projects, are only some of the issues on which future research is needed (Hall and Lerner, 2010). Firms' ability to deal with these issues can actually reduce the "financing gap" between "the rate of return required by an entrepreneur investing his own funds and that required by external investors" (ibidem, p. 4). This wedge is the underlying reason for the failure of the innovation-finance link, as profitable innovations that require external funds may not be provided, even if their appropriability is not an issue.

Furthermore, the literature and available evidence confirm that firm' specificities, such as location, sector of activity, size and age, need to be considered when analysing the magnitude and implications of the "financing gap". In this respect, younger and smaller firms have more difficulties in gaining access to finance and in obtaining long-term loans and they are commonly characterized by lower levels of equity capital (Cooley and Quadrini, 2001). These generally more severe financial constraints affect their innovation investments and, as recent research shows, their growth performance and persistence (Ciriaci *et al.*, 2012).

The 9 papers that have been selected for presentation in Topic 1 at the Conference; all provide an important value added to these state-of-the-art results and extend them along different directions.⁴

A first group of papers investigates the firm's financial constraints within the broader context of their innovation process (Annex [1], [2], [3]). Financial constraints are investigated along with non-financial ones (e.g. market constraints), and their relative importance is disentangled for each of the different stages of the innovation process and with respect to both innovation inputs and outputs.

A second group focuses on the inner functioning of the firm's financial constraints to innovation and brings to the fore different mechanisms for attenuating them (Annex [4], [5], [6]). In particular, these papers consider the role of scientific disclosure in raising the firm value and its investment attraction, that of patent applications in compensating for information asymmetries and lack of collaterals, and that of the level of equity in reducing the firm's sensitivity to cash-flow variations.

A third group addresses in a novel way the direct and indirect impact that the firm's financial constraints exert on its competitive behaviour and on its economic performance (Annex [7], [8], [9]). Brand new theoretical and econometric models are put forward to address how financial constraints intertwine with product competition in enabling firms to use their R&D to gain export market shares and to undertake virtuous patterns of growth drawing on their new technology base.

2.2 Public policies, policy means and financing facilitators

The evidence on the failures that affect the financing of R&D and innovation has stimulated a lot of work on the need for public policy to overcome these failures at different levels – national, supra- and sub-national – and on the policy measures needed to actually achieve it. In parallel, a related field of research has expanded on the role of financing facilitators, like venture and seed capital, business angels, and crowdsourcing, to mention a few.

State-of-the-art results are rich also in this case (O'Sullivan, 2006; Hall and Lerner, 2010) and shed light on important specificities for Europe with respect to the US, such as: the

⁴ Text-based highlights of the papers – referred to with numbers in squared brackets – are available in an Annex at the end of the note.

quantitative and qualitative deficits of its venture capital industry; the failures of its high-tech stock markets and the shortage of high-risk loans (Revest and Sapio, 2012). Furthermore, these results have opened up new issues that deserve closer scrutiny. On the one hand, direct policy measures – such as the resort to R&D tax credits - need careful policy assessment in order to detect their “additionality” and exclude the risk of crowding-out effects (Santarelli and Vivarelli, 2002). For a recent survey of results in this area, see Ientile and Mairesse (2009). On the other hand, indirect policy measures – such as institutional support to private venture capital, or to a public form of venture capital (Bonaccorsi and Montaina, 2012) - should control for their actual role in enabling the development of already innovative companies (“coach function”), rather than in picking-up companies that only have the potential to become so (“scout function”) (Bottazzi and Da Rin, 2003). Similar considerations suggest support to stock exchanges dedicated to high-tech companies (the so called “New Markets”, *à la* NASDAQ), although the specific characteristics of national stock-exchanges should be further investigated (Posner, 2009).

The 9 papers on Topic 2 that will be presented at the Conference will make an important contribution to fulfilling the need for further results and discussion on the issue of public policy towards the financing of innovation.

The first block of papers casts new light on the antecedents and the effects of those policy measures that are currently most commonly adopted to overcome firm financial constraints on innovation, that is, R&D subsidies and R&D tax credits. On the one hand, the array of firm-specific characteristics that impact on the firm’s propensity to apply for an intervention and on the policy maker’s decision to allocate one, is revisited by placing new attention on the technological content of the innovation projects and on the techno-economic experience of the proponents (Annex [10], [11]). On the other hand, the “additionality” that the policy schemes are intended to have is assessed by introducing important elements of originality in each of its three dimensions (Annex [12], [13], [14], [15]), that is: input-additionality, by newly addressing the cross-effects that subsidies to Research (Development) have on the firm’s investments in Development (Research); behavioural additionality, by differentiating the firm’s behaviours that are affected by single rather than mixed (e.g. R&D tax credits and R&D subsidies) policy interventions; output additionality, by disentangling the conditions under which tax credits can actually generate performance enhancements in addition to short-run R&D additionality. All in all, a “fresh crop” of policy assessment results is presented, from which the risk of crowding-out effects for public policy intervention appears absent, while its additional impact is conditional on a number of firm characteristics.

A second block of studies on the topic brings new empirical evidence on a set of “financing facilitators” that have been increasing in use in European countries and whose further development crucially depends on the evaluation of a number of issues that they aim to address (Annex [16], [17], [18]). In particular, a focus is placed on the following: 1) the actual returns to venture capital (and alternative investment markets) and on its dependence on the national institutional set-up that supports it; 2) the appropriate balance between private and public venture capital, and the opportunities for the latter to co-finance the market entrance of new technology based firms; and 3) the viability of crowdfunding platforms and its relationship with the success of the sponsored innovation projects. In these important and other respects, Europe is found to show peculiarities that all the papers discuss extensively.

3. EU innovation policy agenda to support innovation financing – What evidence is needed?

Enhancing access to finance for innovative companies is one of the priority actions of the EU research and innovation policy agenda (Innovation Union), set in the context of the *Europe 2020 strategy* for growth and jobs. The interplay of specific economic characteristics – such as, higher shares of small and medium size firms and of medium/low-tech sectors - and institutional conditions - like bank-based financial systems and low-capitalised stock exchanges – makes the funding gap for innovative projects in Europe particularly acute. High-tech start-ups and young innovative SMEs are particularly financially constrained, and this has been identified as a major barrier impeding their growth.

In this context, the European Commission has proposed to include in the next generation of enterprise and innovation support programmes (COSME and Horizon 2020, which will run from 2014 to 2020), a number of equity and debt financial instruments (see Box 1). In addition a new Regulation on European Venture Capital Funds was adopted in April 2013⁵. The regulation sets out a new “European Venture Capital Fund” label and includes new measures to allow venture capitalists to market their funds across the EU and grow while using a single set of rules. Every fund using the label will have to prove that a high percentage of investments (70% of the capital received from investors) are spent on supporting young and innovative companies. By introducing a single rulebook, venture capital funds will have the potential to attract more capital commitments and become bigger⁶.

Box 1 Innovation Union progress to enhance access to finance for innovators

The Programme for the Competitiveness of Enterprises and SMEs (COSME) and Horizon 2020 will jointly support an equity and a debt financial instrument from 2014 onwards. On the equity side, both programmes will jointly make seed, early-stage and growth-stage investments in support of a seamless, EU-wide venture capital scheme. Horizon 2020 will focus on the early stage and COSME on the growth stage. On the debt side, both programmes will provide loans, guarantees and counter-guarantees.

With the aim to increase lending to research- and innovation-driven SMEs, the Risk-Sharing Instrument (RSI) was launched as part of the RSFF in early 2012 in the form of a guarantee scheme to encourage banks to provide more loans to innovative SMEs and small midcaps.

In 2013, the European Investment Bank will start channelling an additional €10-15 billion to innovation and skills via a new Growth & Employment facility, thus generating up to €65 billion of additional investment.

Source: European Commission (2013a)

These measures seeking better access to finance for innovative companies will be accompanied by overall reinforced EU support to the innovation efforts of companies during the period 2014-2020, with a particular emphasis on support to SMEs. Main funding will come from Horizon 2020 and from an increasing portion of regional structural funds devoted to supporting business research and innovation investments, as part of the overall objective of EU cohesion policy to contribute to smart growth. Examples of some specific measures and instruments which especially address SMEs are included in Box 2.

These proposals to reinforce EU financial support to business innovative activities have been set against a broader framework aiming at improving the long-term financing conditions of governments and businesses of all sizes⁷. One objective would be to diversify financing sources for long-term investments in Europe, which historically depend too much on the

⁵ Regulation (EU) N° 345/2013 of the European Parliament and of the Council of 17 April 2013.

⁶ Description taken from the Europa webpage:

http://ec.europa.eu/internal_market/investment/venture_capital/index_en.htm

⁷ Green Paper on the long-term financing of the European economy:

http://ec.europa.eu/internal_market/finances/financing-growth/long-term/index_en.htm

banking system. This will include higher shares of direct capital market financing (bond finance) and greater involvement of institutional investors (e.g. pension funds) or to other alternatives. In the area of innovation financing, the development and professionalization of the business angel community and the monitoring and encouragement of crowd funding are two examples of alternatives being discussed, particularly in relation to innovative SMEs.

Box 2 Examples of EU instruments to support the financing of business research and innovation, in particular in SMEs

Creative Europe. A programme dedicated to the cultural and creative sectors which ends in 2013. In its Communication, the Commission proposes a significant increase in the budget for the period 2014-2020, devoted to the cultural and creative sectors, including SMEs. For more details, see <http://ec.europa.eu/culture/creative-europe/>

ICT Vouchers scheme. A small credit line dedicated to micro and SMEs to help them innovate their existing business through ICT uptake. This scheme will be promoted for all regions in the 2014-2020 programming period but pilot schemes addressed to financing SMEs innovation were already using left over structural funds in 2013. For more details, see <http://www.errin.eu/content/ict-vouchers-1-opportunities-regions-interested-ict>

European regional development funds (ERDF). It encompasses the "Strengthening research, technological development and innovation" as the first of the 11 thematic objectives to deliver EU 2020; the third of these eleven objectives is "Enhancing the competitiveness of small and medium-sized enterprises" For more details, see http://www.eurekanetwork.org/c/document_library/get_file?uuid=980e0cab-34bf-44fd-813e-faa98ae18ec7&groupId=10137

EUROSTARS. It is a joint programme between EUREKA and the European Commission and the first European funding and support programme to be specifically dedicated to research-performing SMEs. For more details, see <http://www.eurekanetwork.org/activities/eurostars>

Enterprise Europe Network. A European Network for SMEs which provides fully integrated services in 3 main areas: a) Information, specialised advice, feedback, Business support (cooperation between enterprises) internationalisation services b) Innovation and Transnational Technology (as well as knowledge) Transfer services; c) Services to support the participation of SMEs in FP7. For more details, see <http://een.ec.europa.eu/>

The Technology Transfer Financial Facility. It is a new equity based financial instrument currently under analysis at the European Commission. It aims to provide support for the validation of research results with a potential industrial and/or commercial impact and to the creation and development of high-tech start-up companies. For more details, see <http://ec.europa.eu/dgs/jrc/downloads/events/20130411-universities/20130411-jrc-universities-caratti.pdf>

Source: European Commission (2013b)

This policy attention has been accompanied by equally substantial research attention. The FINNOV project on "Finance, Innovation & Growth", financed by the 7th European Research Framework Programme, is the most representative example in this respect (<http://www.finnov-fp7.eu/project-summary>). Another promising initiative is the SIMPATIC project on "Social Impact Policy Analysis of Technological Innovation Challenges" (<http://simpatic.eu/>), which aims at providing evidence on the impact of certain support measures to business innovation (among others). This project started at the end of 2012 and is also financed by the 7th European Research Framework Programme.

However, the question of how to support the financing of R&D and innovation for corporate growth in Europe is far from being solved. Policymakers increasingly call for assessments of policy measures undertaken to support business R&D and innovation. In a context of fiscal consolidation and competing policy priorities, governments need to increase the efficiency of their policy interventions. A recent report (European Commission, 2013c) has been published, trying to draw lessons from a decade of innovation policy (1999-2011) in EU Member States. Evidence taken from available evaluations of individual policy measures and from an exploratory analysis of the link between funding allocated to business innovation and evolution of the indicator "SMEs introducing product or process innovations" suggest that

market oriented support measures (such as tax incentives or support to venture capital) are more effective than direct grants⁸. The issue of access to finance for company growth in Europe, in the context of the policy objective of increasing the share of high-growth innovative companies, was also examined in March 2013, during a Mutual Learning Seminar organised by the European Research Area Committee (ERAC)⁹.

As described in Chapter 2 of this note, the papers that will be presented during the CONCORDi-2013 aim at improving the knowledge on the drivers and barriers for innovation financing for company growth and contributing to the empirical evidence available on the impacts of certain policy interventions addressing the financing innovation gap. Some of the main research and policy questions to be discussed during Conference are presented in the next concluding chapter.

4. Open research and policy questions for CONCORDi-2013

Drawing on the papers that will be presented at the Conference [see in the Annex the text-based highlights of the papers] and those that will be displayed as posters, as well as the presentations of the key-note speakers and the discussion they will stimulate, CONCORDi-2013 aims to address a number of open research questions and policy issues. Some of the many possible questions are proposed in the following paragraphs.

4.1 Research questions

Financial sources, constraints and firms' growth strategies

- How important are financial constraints to innovation when compared within non-financial barriers?
- Which step of the innovation life-cycle is most affected by financial constraints?
- How could firms attenuate the problems (such as asymmetric information and moral hazard) which lead to financial constraints to innovation?
- To what extent do their financial constraints to innovation impact on firms' economic performance (e.g. growth and competitiveness)?

Public policies, policy means and financing facilitators

- Which firm-specific characteristics determine firms' choice to apply for a given policy scheme (e.g. R&D subsidy or R&D tax credits) in order to attenuate their financial constraints?
- Do SMEs and large enterprises differ in their financial sources/constraints for investing in R&D and innovation? Do they have different policy needs in this respect?
- Do policy instruments to address firms' financial constraints actually "add" something to their previous innovation investments, behaviours and outcomes?

⁸ Lessons from a Decade of Innovation Policy – What can be learnt from the INNO Policy TrendChart and the Innovation Union Scoreboard. European Commission, Directorate-General for Enterprise and Industry, June 2013.

⁹ The ERAC Committee is a strategic policy advisory body whose main mission is to provide timely strategic input to the Council, the Commission and the Member States on any research and innovation issue relevant to the development of the ERA. Details of the March 2013 Mutual learning Seminar are available at: <http://www.consilium.europa.eu/policies/era/erac/erac-mutual-learning-seminars-2013>

- To what extent could policy interventions support the development and use of non-banking based financing facilitators (e.g. venture capital and crowdsourcing)?

4.2 Policy issues

EU framework conditions *favoring the financing of risky corporate R&D and innovation activities*

- What are the most prominent framework conditions to address?
- Is EU policy addressing them with adequate instruments and speed?

EU funding sources *supporting R&I in enterprises*

- What are the new/foreseen EU funding sources?
- Is there room for possible synergies between EU funding sources (e.g. those addressed to support R&I investments in SMEs)?
- Is there a recipe for the best mix of general-purpose policy with targeted policy measures to address market imperfections in financing firms' R&I?

EU policy-making support, policy evaluation and experimentation

- What specific science-based analysis would be most urgent to support EU policy-makers?
- Should future policy measures to ease access to investment in R&I be tested before launch (e.g. the ICT Vouchers Scheme pilot initiative)? Should these measures be systematically monitored and evaluated to ensure efficiency and effectiveness?

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Annex I – Text-based highlights of the accepted papers

TOPIC 1: FINANCIAL SOURCES, CONSTRAINTS AND FIRMS' GROWTH STRATEGIES

[1] “THE LONG GOOD-BYE: A LONGITUDINAL ANALYSIS OF BARRIERS TO INNOVATION”, by Coad, A., Pellegrino, G. and Savona, M.

“[...] To our knowledge, none of the empirical contributions on barriers to innovation has so far disentangled the hampering effect of different barriers on each phase of the innovation cycle. This work aims at contributing to this recent stream of literature by empirically assessing the relevance of different kinds of hindrances that a firm can encounter during the innovation cycle, and their indirectly effect on the firm’s economic performance. [...]”

[2] “IS MONEY ALL? FINANCING VERSUS KNOWLEDGE AND DEMAND CONSTRAINTS TO INNOVATION”, by Pellgrino, G. and Savona, M.

“[...] This paper builds on the empirical evidence [...], and extend it by assessing the impact of ‘revealed’ barriers on the translation of innovative input into actual innovative output. [...] we carefully distinguish between financial and non-financial obstacles and, we provide evidence on whether other systemic types of obstacles such as those related to access to knowledge, market structure, demand or regulations, have a similar or more important deterring effect than finance in limiting firms’ ability to translate innovation activities into new outputs. [...]”

[3] “DYNAMIC FINANCIAL CONSTRAINTS AND INNOVATION: EVIDENCE FROM THE UK INNOVATION SURVEY PANEL”, by Lahr, H. and Mina, A.

“[...] The paper’s aim is to advance our understanding of firms’ innovation-financing behaviours by modelling comprehensively and simultaneously different dimensions of innovation, including inputs and outputs. Our novel strategy is to treat financial constraints and innovation as a simultaneous dynamic system while accounting for firm-specific effects. [...]”

[4] “CORPORATE SCIENCE, INNOVATION AND FIRM VALUE”, by Simeth, M. and Cincera, M.

“[...] scientific research is costly and subject to considerable uncertainty with respect to the outcomes, and the disclosure may lead to spillover effects that decrease the ability of firms to generate returns of their R&D investments. The disclosure process itself may create opportunity costs that arise from the knowledge codification process. Since profit-oriented companies do not contribute to “Open Science” for the sake of its own, the natural question arises if scientific disclosure is a beneficial strategy in terms of raising the market value of the firm, which in turn will bring more financial resources and reduce potential liquidity constraints to finance its current and future R&D projects. [...]”

[5] “PATENTS AS QUALITY SIGNALS? THE IMPLICATIONS FOR FINANCING CONSTRAINTS ON R&D”, by Czarnitzki, D., Hall, B.H. and Hottenrott, H.

“[...] The results show that patents, especially the number of recent patent applications, indeed attenuate financing constraints for small firms where information asymmetries may be particularly high and collateral value is low. Larger firms are not only less subject to financing constraints, but also do not seem to benefit from a patent quality signal. [...]”

[6] "HOW TO FINANCE INNOVATION PERSISTENTLY? A PANEL DATA STUDY ON EXPORTING FIRMS IN SWEDEN", by Lööf, H. and Nabavi, P.

"[...] The study tests the relationship between equity financing, innovation and economic fluctuations for exporting firms by adopting the pecking order approach behind investment-cash flow sensitivity analyses [...] results indicate that low equity firms are highly sensitive to variation in cash-flow in their innovation efforts, while high-equity firms typically are persistent in their innovation efforts across the business cycle. [...]"

[7] "THE INVESTMENT-UNCERTAINTY RELATIONSHIP: DIFFERENCES BETWEEN INTANGIBLE AND PHYSICAL INVESTMENTS", by Bontempi, M. E.

"[...] The paper analyses the investment-uncertainty relationship taking distinguished physical capital on one side, and intangible capital on the other side. [...]: What is the relationship between product market uncertainty, financial constraints, ownership structure, and different types on investment (buildings, machinery, software, R&D)? What explain discrepancies between planned and realized investments? Our results confirm that R&D investment (or, at a broader level, investment in intangible assets) is more affected by financial constraints and by uncertainty about expected sales of firms' products than investment in physical capital. ... [...]"

[8] "R&D INVESTMENTS, FINANCIAL CONSTRAINTS AND EXPORT", by Altomonte, C., Mancusi, M.L. and Vezzulli, A.

"[...] We find that the main determinant of both the decision to export and to undertake R&D projects is represented by the level of financial health of the firm [...]. Furthermore we find that the main determinant of financial health is productivity, which is consistent with the theoretical claim stating that credit suppliers are able to rule out of the market less efficient firms. We also find evidence in favor of a possible beneficial effect of the joint investment in R&D and export on financial health and we also assess that when firms are credit constrained these two activities are likely to become substitute instead of complementary goods. [...]"

[9] "INNOVATION POLICY, HIGH-TECH INVESTMENT, AND ECONOMIC GROWTH", by Brown, J.R. and Martisson, G.

" [...] to evaluate the causal connections between financial development and economic growth, we estimate the differential impact that country-level rules and policies have across sectors that vary in their innovative intensity and importance for technological progress. [...] We find that rules and policies improving financial disclosure and lowering the cost of external finance are especially important for innovative investment in high-technology, high-R&D sectors. Strong intellectual property protection is also associated with more R&D in high-technology sectors. The use of tax credits to lower the user cost of R&D, on the other hand, generally has a stronger impact on R&D in low-technology, low-R&D sectors. [...]"

TOPIC 2: PUBLIC POLICIES, POLICY MEANS AND FINANCING FACILITATORS

[10] “R&D SUBSIDY ALLOCATION – WHAT’S THE ROLE OF FIRM SIZE?”, by Tanayama, T. and Asikainen, A.L.

“[...] The results indicate that the technological content of a project proposal is an important determinant of the subsidy decisions for both SMEs and large firms. Subsidies are allocated to technologically more challenging, riskier and novel innovation projects. If one is willing to accept that on average technological challenge, risk and novelty of a project reflect the level of uncertainty and the potential for knowledge spillovers, then these results find some basis in the economic rationales justifying R&D subsidies. [...]”

[11] “IMPACT ASSESSMENT OF R&D SUBSIDIES IN SPAIN: SOME PRELIMINARY RESULTS”, by Huergo, E.

“[...] this paper aims to analyze the determinants of Spanish firms’ participation in the public system of low-interest credits for R&D. We [...] distinguish[...] between the stage of

application and the determinants of the subsidy rate by the public agency, [...] The study of the determinants of participation is a first step in quantifying its effect business R&D expenditures. In addition, the methodology employed for the analysis will allow for international comparisons. [...]”

[12] “IMPACT OF R&D TAX INCENTIVES: EVIDENCE FROM UK MICRO BERD DATA”, by Guceri, I.

“[...] This paper attempts to quantify [...]... How useful are tax incentives in stimulating R&D investments? How much additional R&D did the UK tax incentive scheme generate? Do firms purposely delay their R&D spending after the announcement of a tax incentive scheme until its introduction, causing evaluation studies to over-estimate the results?...[...].. In all cases where sectors are controlled for, we find a significant differential effect of the tax incentive around 31-33% in comparison to the counterfactual scenario ...[...].. the total R&D spending in the size band of interest for this study (100-399 employees) in 2003 by the manufacturing sector was about £1.2 billion [...]. We can claim that 71% of this was done by the enterprises in the treatment group (250-399 employees). If the lower estimate of 31% increase applied to all manufacturing firms with 250-399 employees, then the additional R&D generated for this size group was about £200 million in 2003 prices which remains substantially lower than the cost of the scheme for this group of firms. [...]..”

[13] “NEW TECHNOLOGY-BASED FIRMS IN EUROPE: MARKET PENETRATION, PUBLIC VENTURE CAPITAL AND TIMING OF INVESTMENT”, by Grilli, L. and Murtinu, S.

“[...] Our results are consistent across the methods and indicate that overall the impact of PUVCS (government-managed venture capital) is negligible, while the effect associated to PRVCS (privately-managed venture capital) is positive, statistically significant and economically relevant. Furthermore, PRVC backing is more beneficial if it occurs in the early stages of a portfolio company’s life. More interestingly, the impact of PUVCS is still not statistically significant (even though positive) when PUVCS target very young NTBFs. The only notable exception for recovering a positive role for the public actor is when PUVCS co-finance with PRVCS. [...]”

[14] “THE BEARABLE LIGHTNESS OF CROWDFUNDING: INTERNATIONAL EVIDENCES FROM HIGH-TECH PROJECTS”, by Dolci, J. and Gianfrate, G.

"[...] Crowdfunding represents a potentially disruptive change in the way new ventures are funded. [...] This study aims at understanding the main drivers of success or failure in the funding of a project on a crowdfunding platform. The distinction between the success and failure is related to the achievement of the target funding requested and does not depend on the real success of the project itself. Moreover given that a project is successful, we investigate the main factors that lead to over-funding, the amount by which a successful project overcomes the actual target requested. [...]"

[15] "DIRECT AND CROSS-SCHEME EFFECTS IN R AND D SUBSIDY PROGRAMS: THEORY AND EVIDENCE", by Hottenrott, H., Lopes-Bento, C. and Veugelers, R.

"[...] firms that receive public support for their 'R' activities have a higher input additionally (as measured by net research investment, net research intensity and R&D employment) than firms that receive support for 'D' activities (in terms of net development investment, net development intensity and R&D employment). We further find that the cross-scheme effects seem to occur from 'R' subsidies to 'D', but not from 'D' subsidies to 'R'. In other words, while public support for research activities positively reflects on development investment, the same is not true for support received for development activities. These findings further depend on firm size distribution, in line with our theoretical model. [...]"

[16] "DIFFERENTIATING BEHAVIOURAL ADDITIONALITY EFFECTS OF R&D TAX CREDITS", by Teirlinck, P., Neicu, D. and Kelchtermans, S.

"[...] The paper sheds new light on behavioural additionally effects of tax credits and the policy mix interaction between R&D tax credits and R&D subsidies. It addresses three gaps in the current literature. First, it provides new insights in behavioural additionally effects of tax credits. Second, it provides evidence that these effects are differentiated according to general and R&D related characteristics at firm level. And third, it investigates the interaction between R&D tax credits and R&D subsidies. Therefore, the main contribution is providing empirical evidence of behavioural additionally and additionally related to R&D employment of volume-based R&D tax credits, evidence that has so far been rather scarce [...]"

[17] "THE IMPACT OF THE RESEARCH TAX CREDIT ON R&D AND INNOVATION: EVIDENCE FROM FRENCH FIRMS", by Bozio, A., Irac, D. and Pysz, L.

"[...] our study suggests that the impact of the research tax credit on R&D output is rather low. One could argue that innovation and patenting take time so that it is not surprising not to find any impact of tax credit schemes on innovation in the short term. However, these results also suggest that tax credit schemes tend to support R&D investments with relatively low returns. It might therefore be necessary to redesign these tax incentives by introducing, as it has just been decided in France, some tax credit specifically targeted towards innovation activities in order to ensure that tax credit schemes contribute to foster R&D but also innovation at the firm-level. [...]"

[18] "R&D SUBSIDIES TO SMALL YOUNG COMPANIES: SHOULD THE INDEPENDENT AND HIGH-TECH ONES BE FAVORED IN THE GRANTING PROCESS?", by Czarnitzki, D. and Delanote, J.

"[...] we compare the effect of innovation subsidies on independent high-tech small young firms (NTBFs), independent low-tech small young firms (LTBFs) and their group counterparts. [...] this study reveals that full crowding-out with regard to public funding can be rejected for all firm types studied. In addition, this study assesses the difference in treatment effects of the different firm types in a regression framework. The results reveal that a focus on independent firms is only efficient if the target group is restricted to high-tech firms. [...]"

Annex II – Programme of CONCORDi-2013



European Commission

Joint Research Centre - Institute for Prospective Technological Studies

4th European Conference on Corporate R&D and Innovation: "Financing R&D and innovation for corporate growth in the EU: Strategies, drivers and barriers" (CONCORDi-2013)

European Commission, JRC-IPTS – Calle Inca Garcilaso No. 3, 41092 Seville (Spain)

26 – 27 September 2013

PROGRAMME

| |
|------------------------------------|
| Thursday, 26 September 2013 |
|------------------------------------|

OPENING PLENARY SESSION

8h30 – 9h00 Registrations

9h00 – 9h15 Welcome – **John Bensted -Smith** (Director, European Commission - JRC-IPTS)

9h15 – 9h45 Keynote speech – **Mariana Mazzucato** (University of Sussex, United Kingdom)

9h45 – 10h15 Keynote speech – **Alexander Popov** (European Central Bank, EU)

10h15 – 10h45 Open discussion

10h45-11h15 Coffee break

11h15 – 13h00 **PARALLEL SESSIONS (I)**

TOPIC 1 - FINANCIAL SOURCES, CONSTRAINTS AND FIRMS' GROWTH STRATEGIES

CHAIRPERSON: Uwe Cantner (Friedrich Schiller University Jena, Germany)

DISCUSSANT: Werner Hölzl (Austrian Institute of Economic Research, Austria)

RAPPORTEUR: Ari Hyytinen (University of Jyväskylä, Finland)

► THE LONG GOOD-BYE: A LONGITUDINAL ANALYSIS OF BARRIERS TO INNOVATION

Alex Coad, Gabriele Pellegrino and Maria Savona (University of Sussex, United Kingdom; University of Barcelona, Spain; Catholic University of Milan/Piacenza, Italy)

► CORPORATE SCIENCE, INNOVATION AND FIRM VALUE

Markus Simeth and Michele Cincera (École Polytechnique Fédérale de Lausanne, Switzerland; Université Libre de Bruxelles, Belgium)

► **INVESTMENT-UNCERTAINTY RELATIONSHIP: DIFFERENCES BETWEEN INTANGIBLE AND PHYSICAL CAPITAL**

Maria Elena Bontempi (University of Bologna, Italy)

TOPIC 2 - PUBLIC POLICIES, POLICY MEANS AND FINANCING FACILITATORS

CHAIRPERSON: Sandro Montresor (European Commission)

DISCUSSANT: Saul Lach (The Hebrew University, Israel)

RAPPORTEUR: Gustav Martinsson (Swedish House of Finance, Sweden)

► **DIRECT AND CROSS-SCHEME EFFECTS IN R AND D SUBSIDY PROGRAMS: THEORY AND EVIDENCE**

Hanna Hottenrott, Cindy Lopes-Bento and Reinhilde Veugelers (Catholic University of Leuven, Belgium; Centre for European Economic Research, Germany; Bruegel, Belgium)

► **R&D SUBSIDIES TO SMALL YOUNG COMPANIES: SHOULD THE INDEPENDENT AND HIGH-TECH ONES BE FAVOURED IN THE GRANTING PROCESS?**

Dirk Czarnitzki and Julie Delanote (Catholic University of Leuven, Belgium; Centre for European Economic Research, Germany)

► **R&D SUBSIDY ALLOCATION – WHAT’S THE ROLE OF FIRM SIZE?**

Tanja Tanayama and Anna-Leena Asikainen (European Investment Bank; Public Research Centre Henri Tudor, Luxembourg)

13h00-14h00 Lunch

14h00 – 15h45 **PARALLEL SESSIONS (II)**

TOPIC 1 - FINANCIAL SOURCES, CONSTRAINTS AND FIRMS' GROWTH STRATEGIES

CHAIRPERSON: Bronwyn H. Hall (University of California at Berkeley, US)

DISCUSSANT: Kristian R. Miltersen (Copenhagen Business School, Denmark)

RAPPORTEUR: Michele Cincera (Université Libre de Bruxelles, Belgium)

► **NO MONEY, NO HONEY? FINANCIAL VERSUS KNOWLEDGE AND DEMAND CONSTRAINTS TO INNOVATION**

Gabriele Pellegrino, Maria Savona (University of Barcelona, Spain; Catholic University of Milan/Piacenza, Italy)

► **DYNAMIC FINANCIAL CONSTRAINTS AND INNOVATION: EVIDENCE FROM THE UK INNOVATION SURVEY PANEL**

Henry Lahr and Andrea Mina (University of Cambridge, United Kingdom)

► **HOW TO FINANCE INNOVATION PERSISTENTLY? A PANEL DATA STUDY ON EXPORTING FIRMS IN SWEDEN**

Hans Lööf and Pardis Nabavi (Royal Institute of Technology, Sweden)

TOPIC 2 - PUBLIC POLICIES, POLICY MEANS AND FINANCING FACILITATORS

CHAIRPERSON: Debora Revoltella (European Investment Bank, EU)

DISCUSSANT: Otto Toivanen (Catholic University of Leuven, Belgium)

RAPPORTEUR: Marianne Guille (Université Panthéon-Assas, France)

► **DIFFERENTIATING BEHAVIOURAL ADDITIONALITY EFFECTS OF R&D TAX CREDITS**

Peter Teirlinck, Daniel Neicu and Stijn Kelchtermans (Hogeschool-Universiteit Brussel, Belgium)

► **THE IMPACT OF THE RESEARCH TAX CREDIT ON R&D AND INNOVATION: EVIDENCE FROM FRENCH FIRMS**

Antoine Bozio, Delphine Irac and Loriane Py (Paris School of Economics, France)

► **IMPACT ASSESSMENT OF R&D SUBSIDIES IN SPAIN: SOME PRELIMINARY RESULTS**

Elena Huergo (University Complutense of Madrid, Spain)

15h45-16h15 Coffee break

16h15 – 18h00 **PARALLEL SESSIONS (III)**

TOPIC 1 - FINANCIAL SOURCES, CONSTRAINTS AND FIRMS' GROWTH STRATEGIES

CHAIRPERSON: Marco Vivarelli (Catholic University of Milan/Piacenza, Italy)

DISCUSSANT: Pierre Mohnen (University of Maastricht, The Netherlands)

RAPPORTEUR: Pietro Moncada-Paternò-Castello (European Commission, EU)

► **FINANCIAL DISCLOSURE, TAX POLICY AND INNOVATION**

James R. Brown and Gustav Martinsson (Iowa State University, US; Institute for Financial Research, Sweden)

► **PATENTS AS QUALITY SIGNALS? THE IMPLICATIONS FOR FINANCING CONSTRAINTS ON R&D**

Dirk Czarnitzki, Bronwyn H. Hall and Hanna Hottenrott (Catholic University of Leuven, Belgium; University of California at Berkeley, US; Catholic University of Leuven, Belgium)

► **R&D INVESTMENTS, FINANCIAL CONSTRAINTS AND EXPORT**

Carlo Altomonte, Maria Luisa Mancusi and Andrea Vezzulli (Bocconi University, Italy; Catholic University of Milan, Italy; Technical University of Lisbon, Portugal)

TOPIC 2 - PUBLIC POLICIES, POLICY MEANS AND FINANCING FACILITATORS

CHAIRPERSON: Reinhilde Veugelers (Catholic University Leuven, Belgium)

DISCUSSANT: Valerie Revest (University Lumière Lyon II, France)

RAPPORTEUR: Daniele Archibugi (Italian National Research Council, Italy)

► **NEW TECHNOLOGY-BASED FIRMS IN EUROPE: MARKET PENETRATION, PUBLIC VENTURE CAPITAL AND TIMING OF INVESTMENT**

Luca Grilli and Samuele Murtinu (Polytechnic University of Milan, Italy)

► **IMPACT OF R&D TAX INCENTIVES: EVIDENCE FROM UK MICRO BERD DATA**

Irem Guceri (St. Peter's College - University of Oxford, United Kingdom)

► **THE BEARABLE LIGHTNESS OF CROWDFUNDING: INTERNATIONAL EVIDENCES FROM HIGH-TECH PROJECTS**

Alessandro Cordova (Bocconi University, Italy), Johanna Dolci and Gianfranco Gianfrate (CMC Capital, Ireland; Bocconi University, Italy)

18h00 END OF THE FIRST DAY

Friday, 27 September 2013

CLOSING PLENARY SESSION

9h00-9h10 **OPENING OF THE SECOND DAY**

John BENSTED -SMITH (Director, European Commission - JRC-IPTS)

9h10 -9h45 **SUMMARY OF THE SCIENTIFIC OUTPUT OF THE CONFERENCE**

- **Ari HYYTINEN** (University of Jyväskylä – FI) - Rapporteur of Conference's topic 1: Financial sources, constraints and firms' growth strategies
- **Daniele ARCHIBUGI** (Italian National Research Council – IT) - Rapporteur of Conference's topic 2: Public policies, policy means and financing facilitators

9h45-10h30 **ROUND TABLE DISCUSSION – BY MEMBERS OF THE SCIENTIFIC COMMITTEE**

Chair: **Pietro MONCADA-PATERNÒ-CASTELLO** (European Commission - EU)

- **Michele CINCERA** (Université Libre de Bruxelles – BE)
- **Marianne GUILLE** (Université Panthéon-Assas – FR)
- **Bronwyn H. HALL** (University of California at Berkeley – US)
- **Gustav MARTINSSON** (Swedish House of Finance – SE)
- **Debora REVOLTELLA** (European Investment Bank - EU)
- **Reinhilde VEUGELERS** (Catholic University Leuven - BE)

10h30-11h00 Coffee break

11h00-12h30 **ROUND TABLE DISCUSSION BY EUROPEAN COMMISSION'S POLICY STAKEHOLDERS**

Chair: **Xabier GOENAGA** (Head of Knowledge for Growth Unit, European Commission – JRC-IPTS)

- **Vladimir BILEK** (Financing of Innovation, Competitiveness and Employment Policies Unit - Directorate General for Economic and Financial Affairs)
- **Bonifacio GARCIA PORRAS** (Head of Innovation Policy for Growth Unit - Directorate General for Enterprise and Industry)
- **Gaetan NICODEME** (Head of Economic Aspects of Taxation Unit - Directorate General for Taxation and Customs Union)
- **Viorel PECA** (Head of Innovation Unit - Directorate General for Communications Networks, Content & Technology)
- **Bernd REICHERT** (Head of Research and SMEs Unit - Directorate General for Research and Innovation)

12h30-13h00 **CONCLUSIONS**

Lena J. TSIPOURI (Chair, European Commissioner's Geoghegan-Quinn's "High Level Economic Policy Expert Group Innovation for Growth – i4g")

John BENSTED -SMITH (Director, European Commission - JRC-IPTS).

13h00 END OF THE CONFERENCE

POSTERS

| Author(s) | Title of the Poster | Affiliation |
|--|--|---|
| Giovanni Cerulli, Roberto Gabriele and Bianca Potì | The Role of Firm R&D Effort and Collaborations as Mediating Drivers of Innovation Policy Effectiveness | Ceris-CNR - University of Trento (IT) |
| Michele Cincera, Claudio Cozza, Alexander Tübke and Peter Voigt | Spending on R&D in times of a crisis: A reflection of business strategies | Université Libre de Bruxelles (B), Fondazione Formit (I), and European Commission |
| Michele Cincera , Julien Ravet , Reinhilde Veugelers | R&D, financing constraints of young and old innovation leaders in the EU and the US | Université Libre de Bruxelles, Katholieke Universiteit Leuven (BE) |
| Karel Haegeman and Mathieu Dossineau | Bridging the innovation gap: Private sector involvement in public-to-public R&D funding co-operation | European Commission, EU |
| Stijn Kelchtermans, Daniel Neicu and Peter Teirlinck | Thanks, but no thanks: companies' response to R&D tax credits | University of Leuven, and Hogeschool-Universiteit Brussel (BE) |
| Antoine Renucci | Bargaining with Venture Capitalists: When Should Entrepreneurs Show their Financial Muscle? | CREG, Université de Pau et des Pays de l'Adour (FR) |
| Filipe Silvaa and Carlos Carreira | Financial constraints: do they matter to R&D subsidy attribution? | University of Coimbra, Portugal (PT) |

Annex III – Members of Scientific and Steering Committees

SCIENTIFIC COMMITTEE

- Daniele Archibugi (Italian National Research Council – IT)
- Michele Cincera (Université Libre de Bruxelles – BE)
- Marianne Guille (Université Panthéon-Assas – FR)
- Bronwyn H. Hall (University of California at Berkeley – US)
- Ari Hyytinen (University of Jyväskylä – FI)
- Gustav Martinsson (Swedish House of Finance – SE)
- Pietro Moncada-Paternò-Castello (European Commission - EU)
- David C Mowery (University of California at Berkeley – US)
- Bruce C Petersen (Washington University in St Louis – US)
- Debora Revoltella (European Investment Bank - EU)
- Reinhilde Veugelers (Catholic University Leuven - BE)

STEERING COMMITTEE (European Commission, Joint Research Centre)

- Xabier Goenaga
- Fernando Hervás
- Pietro Moncada-Paternò-Castello, *Coordinator*
- Sandro Montresor
- Rosy Rueda
- Maria Del Sorbo
- Antonio Vezzani

European Commission

EUR 26138 – Joint Research Centre – Institute for Prospective Technological Studies

Title: 4th European Conference on Corporate R&D and Innovation: Financing R&D and Innovation for Corporate Growth in the EU (CONCORDi-2013)

Background Note

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Abstract

The document intends to summarise the state of the art related to the two topics of the CONCORDi-2013 Conference and presents the main research and policy questions to be addressed at the Conference. Section 1 introduces the issue and the paper's structure. Section 2 highlights both the current academic understanding and the extent to which the selected papers reinforce, challenge and/or bring additional value to the existing knowledge. Section 3 summarises the current policy agenda in Europe to support corporate financing of innovation. Section 4 proposes a number of scientific and policy relevant questions for the Conference.

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