

Would increased European budgetary expenditure upon research contribute to, or alleviate its current economic woes?

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In economic terms, research is a use of resources to create new knowledge (*Black et al., 2009*). Within the framework set aside by Arrow, the production transmission costs of knowledge are considerably lower than the necessary production costs, whilst consumption has non-rivalry characteristics on the demand side (*Arrow, 1962*). Therefore, knowledge can be modelled as a quasi-public good, inherently justifying some form of public provision. However, the optimal level of provision is unclear. In a simple economic framework, increased EU funding towards European research is justified if the benefits of the action exceed the costs. Simplified cost benefit analysis may conceal the complexity of the issue. Increased EU expenditure upon research has to be financed inevitably by taxation which represents a public to private transfer which could well be questionable within an economic framework. The influential and infamous Lisbon treaty has the broad aims of making the EU the most competitive and dynamic knowledge based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion (*El-Agraa, 2011*). One thing is for sure, that with its rigorous labour regulations, the EU is certainly unable to compete on price. Therefore, increased research funding would be an important part of industrial competitive policy. Further, it is arguable that in this dire economic period, increased EU research expenditure may provide the impetus to growth and European cohesion and be complementary to a tighter fiscal union which Merkel has suggested following the sovereign debt crisis (*The Economist, 2011*). However, it could also be deemed unsatisfactory and potentially destabilising in a time where austerity of public finances is paramount to the short run survival of the Eurozone. This essay aims to assess the relative merits and drawbacks regarding European research funding within the context of these issues.

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The link between technological change and economic growth according to economists is extremely important. Driven by the profit motive, industrial innovation and research is modelled by Solow as having increasing returns to scale as there are large fixed costs and will only invest if patents are available to appropriate new knowledge (*El-Agraa, 2011*). Public provision of patents in collaboration with the funding of precompetitive research in this model creates the conditions for ideas to develop and implemented which lead to economic growth. Empirically, European aggregate Research and Development (R&D) intensity which is a measure of Gross Expenditures on R&D as a percentage of gross value added has been estimated at 1.86%, in comparison to figures of 2.73%, 3.04% and 2.39% for the USA, Japan and South Korea respectively (*OECD, 2009*). Further, with Asian R&D investment considered to be rising in spite of the dire economic outlook, the EU could well be considered to be losing ground in its aim to becoming the most competitive and dynamic knowledge based economy in the world. In addition, evidence suggests that countries which carry out technological research acquire a comparative advantage in the form of human capital endowments which persist and lead to new things on a dynamic level. Consequentially, there is a compelling case for an increased contribution to European research in order to avoid being left behind by the high technology Asian Economies.

Further increases in EU research spending would likely be allocated in strengthening the position of the European Research area (ERA). The development of ERA is based upon the idea that European Research is severely fragmented along national and institutional barriers in a variety ways. Firstly, on national and regional levels within the EU research funding is largely uncoordinated leading to dispersion of resources, excessive duplications and in general an inefficient allocation of research and innovation in a collective Europe (ERA, 2010). Thus, within this context given that the increased funding improves this coordination issue we would expect to see EU taking a leading technological role with the ensuing economic growth benefits, as well as improving the fiscal position of many national budgets as public resources are utilised in a closer to Pareto optimal manner. Secondly, researcher's career opportunities are reduced by legal and practical barriers which limit possibilities to move between institutions, sectors and countries. Furthermore, businesses have observed difficulties in cooperating with research institutions especially across borders (ERA, 2010). Therefore, increased funding resolving these issues will further permit the founding integrative principles of the European project to come to a more realistic fruition. Thirdly, it is clear that due to the interdependent nature of the European debt crisis policies with a true European perspective and transnational coherence such as EU wide research policy reforms are more likely to be effective in reassuring markets in the short term, as well as boosting long run competitiveness.

Despite the potential benefits of further European research, it would be arguably hypocritical and perhaps even damaging to increase public expenditure in a period where sovereign debt is close to spiralling out of control. Especially, as the time lag between public investment in research and the economic growth benefits can be considerably high in cases (OECD, 2009). Therefore, a more macro-prudent option could be to delay increased expenditures in the short run in order to stabilise budgetary issues by following austerity measures. However, such a view could be deemed short sighted as there appears to be a positive correlation between counter cyclical public research expenditure and quicker recoveries – which would boost budget positions in the medium term. In overcoming its deep economic crisis during the first half of the 1990's, Finland cut most of its public expenditures whilst increasing R & D expenditures which put the Finnish economy on a more knowledge intensive and healthy growth path following its crisis (OECD, 2009). South Korea utilised the Asian financial crisis to develop a technology based SME (small to medium sized enterprises) sector using a coordinated mix of policy with considerable long term effects as SME contribution to total business R & D increased from 12% to 24% in the period from 1997 – 2007 (OECD, 2009). Although there are many other factors which contributed to these policy successes, they represent the interesting caveat that good crisis management can help shape new exciting and innovative economic environments. In the case of the US economy – data suggests that US academic research strength contributes to an increasing share of research performed in the USA issued by EU firms. This is plausibly indicative of the US's much larger scale public funding of research (Pavitt, 2000). Into the very long run, further public allocation to research is likely to allow science to be more responsive to economic needs and to provide solutions to potentially severe issues such as ageing populations and Climate change. On the whole, the optimal policy choice significantly depends on balancing dealing with the severity of the short run fiscal problem and on creating a long run global leading knowledge economy.

An important issue surrounding the efficacy of increased public funding of research, is that of whether the public sector is more efficient in some cases in funding research or whether markets were left to their own devices would provide similar results. On a purely theoretical level, referring to the intuitions of Ricardian equivalence, increased public sector expenditure on research financed by borrowing instantly adjusts the investment behaviour of firms in R & D as not only do they rationally expect raised taxes in the future to finance the investment, but they expect R & D results which they can appropriate resulting from the public expenditure (Dornbusch et al., 2008). Therefore, if the extreme assumptions of this model were to hold we would see negligible effect in increased public provision. However, despite the interesting theoretical conjecture of this model there are perhaps more realistic methods to understand this issue further.

The occurrence of research externalities supports the case for some form of government supply of research. The increased stock of knowledge resulting from investment in research has wide ranging spill over effects (*Carrillo et al., 2006*). Not only do the academic institutions gain, but so does society on the whole by having a greater understanding of the world. Such greater understanding can benefit firms by providing new marketable products as well as providing other perhaps more intangible benefits to institutions and agents. Due to the far reaching positives from research with results which are sometimes difficult to quantify (*Georghiou et al., 1993*) there is a highly compelling case for government intervention to provide basic research to create the conditions for the spill over effects to contribute towards a flourishing developed economy.

Government failure being the public equivalent of market failure occurs when government intervention contributes to a less efficient allocation of resources (*Black et al., 2009*). This concept is an important consideration within the context of assessing the case for further public European research funding. Government intervention invokes the operation of political and bureaucratic processes. In the case of public research funding, it is unclear whether the governments have sufficient information supply in order to make the right decisions (*El-Agraa, 2011*). Therefore, it is very important to consider the type of research funded and the procedures used as inefficient political allocations will eventually be trumped by economic forces. In general, the EU follows a respectable and robust principle of promoting only pre competitive R & D. However, there are further public choice based concerns. The political process may be captured by influential institutions (*Laffont, 1996*). Researchers could achieve the ability to perform their 'pet' projects as opposed to socially optimal research (*El-Agraa, 2011*). Evidence suggesting a positive correlation between research expenditure and researcher's incomes (*Goolsbee, 1998*) are implicative of institutional rent seeking and display evidence of the reality of public choice issues. Furthermore, it is plausible to suggest that there is an endemic friction between the long run results derived from research policy and the short term electoral cycle which drives politics. Thus, policy makers may not make the far sighted choices which may be required. This being the case, policy which improves the position of the politically independent European research area seems especially desirable in terms of making long run, sustainable resource allocation.

Despite, the issues with government provision there are also some potential concerns surrounding private funding structures. There is evidence that especially in competitive funding based structures a lack of public funds in academic institutions find themselves in an asymmetric bargaining position with industry – leading them to undertake routine short term contractual tasks which may not be a socially optimal outcome (*Geuna, 2001*). Furthermore, private funding could

decrease incentives for path breaking radical new research which would be deemed more risky and less efficient in terms of investment decision making models (*Geuna, 2001*). The compensation incentive structures invoked by private companies to researchers have also been observed to have an impact upon behaviour, as rewards can be disproportional relative to the amount of funding provided from different groups. Therefore, research may be directed towards perhaps more competitive based research. In addition, these competitive funding structures can lead to resources being unevenly distributed with a distorted and biased evaluation of true scientific capabilities of institutions, which is sub-optimal from a scientific output perspective (*Geuna, 2001*). Thus, there is a case for public assistance in connecting the marginalised periphery groups with the core in order to improve efficiency.

On the whole, evidence from the US indicates that the pluralism in funding sources increases variety and likelihood of research being supported (Pavitt, 2000). Therefore, there is a consensus that funding for research should come from both private and public sources. However, the optimal level of public provision is unclear. On one hand, in considering that in the US $\frac{3}{4}$ of patents were estimated to be resulting from publicly funded academically prestigious universities and related institutions (*Narin et al., 1997*) and that publicly funded collaborations between industry and firms tend to have significant returns, the case for further public investment could be deemed quite strong (Pavitt, 2000). On the other hand, in a time of economic malaise for the EU there may be better options for growth in the short run, especially in considering the paradox that the EU performs better than the US in research than in application and its main difficulties stem from a deficiency in entrepreneurial supply (Pavitt, 2000). However, in the long run the EU will rebound in a more effective and sustainable fashion if funds are invested in the European Research Area to allow more cohesive and developed socio-economic conditions.

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