



Promoting research universities in which undergraduate
education is an activity of primary concern

Dominique Foray
OECD/CERI

Enhancing human resources for European research
International Seminar
Brussels, 24 March, 2003

On a fundamental conceptual flaw behind innovation policy

- Most programs try to stimulate the demand for scientists and engineers in the private sector
- To succeed, they depend on a positive supply response that the educational system seems incapable of providing

Source: Paul Romer, *Should the government subsidize supply or demand in the market for scientists and engineers?*, NBER WP 7723, 2000

On a fundamental conceptual flaw (cont.)

- Even a well-designed and generous program (like a program of R&D grants) will fail to induce more innovation and faster growth if the educational system does not provide sufficient supply
 - If the supply of scientists and engineers is more or less fixed (0 supply elasticity), then the increase in demand of S & E, induced by a demand side policy, will translate into a proportional increase in wages for S & E with no increase in the inputs that are devoted to R&D.

Source: Paul Romer (ibid.)

Policy Goals

- Increase the fraction of S&E young researchers working in the business sector
- Promote *research universities* in which *undergraduate education* is an activity of primary concern
- Redress the imbalance between public subsidies for the demand and supply of S&E available to work in the private sector

First goal: Increase the fraction of S&E young researchers....

- S&E disciplines versus other disciplines: Higher education should not shift bright students away from technical careers that create economic spillovers benefits to society and towards careers without such spillovers benefits
Source: Paul Romer (ibid.)
- Academic versus industry career: 50% only of European researchers work in the business sector (compared with 83% of American researchers)

Increase the fraction of S&E young researchers....

- The lack of industrial researchers is due to « a pincers' effect » between:
 - Young researchers who aspire to academic freedom, fundamental and long term research, and are willing to accept substantial wage reductions to meet their aspirations
 - Young scientists who want to work in the business sector but know that R&D is not the best route towards top management positions (compared with marketing for instance)
- Most university professors are preoccupied with cloning themselves and not preparing students for career in the business sector

Second goal: Promote *research universities* in which *undergraduate education* is an activity of primary concern

- They are the main source of power in the knowledge economy. They have two basic products: Knowledge and talents
- Higher education in S & E is a joint product with research
 - Many advanced undergraduates and graduate students learn by working in faculty laboratories
 - We obscure this relationship by emphasising the tension between research and learning (at the pragmatic level)
 - Yes it is clear that the functions of research and higher education in S&E are intimately related



Promote *research universities* in which..

- Allocation of resources principle: research universities versus research institutes (national laboratories)
 - The idea of research institute sounds very attractive, particularly (but not only) in small countries that see them as a vehicle to achieve a critical mass
 - But it breaks the intimate relation between research and higher education and will only provide a fraction of the total amount of positive externalities that research universities are able to provide
 - Research universities should attract (by far) the largest fraction of public funding for R&D



Promote *research universities* in which..

- The place of teaching

- Undergraduate education must be an activity of primary concern
- Encourage pedagogical innovations in the undergraduate and graduate training programs in S&E: new programs in use-inspired basic research (chemical engineering, bioinformatics)
- In many universities the balance may have shifted too far towards research
- Global competition and ICTs should stimulate the quest for excellence in education and training



Promote *research universities* in which..

- University-industry relations as a tool for higher education in S&E
 - Learning to be a researcher in corporate environment
 - Becoming familiar with another view of “what is the optimal quality of invention” (cost-effectiveness, time to market, reliability)
 - Learning knowledge management



Promote *research universities* in which..

- Commercialisation of research: risks

- Conflicts of interests
- When knowledge has been patented, the “legal” base of fair use exception for educational purpose is weakening
 - see the case “*Madey v. Duke University*”
 - Fair use does not apply to any research that furthers the institutional objectives of educating and enlightening students - because this is the “core business” of a University

Third goal - Redress the imbalance between public subsidies for the demand and supply..

- It will take new funding from the public sector to promote higher education in research universities
- The last goal sets a rough benchmark that policymakers might use to set expectations for how much funding might be allocated on a permanent basis towards these goals.

Source: Paul Romer (ibid.)