

(In)determinacy, bargaining and R&D policies in an endogenous technological changing environment

E-economics

This paper investigates the impact of R&D-supporting public policies in an expanding-variety growth model when bargaining occurs between final and intermediate goods producers. The author shows that depending on the bargaining power of the two types of firms, dynamic equilibrium indeterminacy may arise under some parametric conditions, and the impact of government policies depends on which equilibrium the economy finds itself in. In the last paragraphs of the paper, the author claims such contrasted effects of R&D policies can provide an explanation for some stylized facts regarding the share of R&D being carried out by public institutions.

Both the question of indeterminacy in R&D-driven models of endogenous growth, as well as the inclusion in those models of microeconomic foundations such as bargaining games are interesting venues to investigate. However, I have concerns regarding the current version of the paper, mostly pertaining to (1) the way the paper is currently written, (2) the exposition of the results in terms of economic intuitions, and (3) the clear exposition of the paper's contribution.

(1) First and foremost, the paper is far from meeting the required standards in terms of grammar, syntax and sentence construction. A great number of sentences lack any verb, or are only vaguely comprehensible, even in the paragraphs which expose and comment the main results of the paper (as an example, p.14, third sentence of the main paragraph: "Besides, to satisfied Eq. (45) the more firm's R&D activity v has or the less R& subsidy policy s has, the more possibility indeterminacy occurs.") In its current version, the paper is painful to read, and needs to be extensively re-written.

Also, the exposition of the model could be significantly improved (as well as simplified). The author unnecessarily splits the exposition of the overall level of production Y and the overall level of consumption C : the presentation could be shortened and would gain in clarity by merging the two. More importantly, the presentation of the R&D sector is peculiar and unnecessarily confusing, considering the standards in the literature. The author presents a "profit" function of the R&D sector, and uses a "price" p_A to describe the value of a blueprint. However, the standard presentation in the literature is the one appearing in footnote 6, i.e. the value of a blueprint is equal to the actualized flow of profits generated by the sale of the good that can be produced using this blueprint. p_A is hence not a price, but the value of an innovation: the presentation should be modified accordingly (speaking of a price since there is no firm to set such a price is confusing). My guess (as I comment in point 2) is that

the intuition regarding the results of the model hinges around the free entry condition (27), and how the bargaining process modifies this standard free entry condition present in the canonical Romer model; the author hence needs to emphasize and make very clear the presentation of this key equilibrium condition.

(2) Second, the paper needs to be clearer regarding the economic intuitions pertaining to its mathematical results.

(a) The author states the parametric conditions yielding indeterminacy, but does not comment the economic implication of such conditions. Why is it the fact that indeterminacy hinges around the extent of bargaining power accruing to the final goods producers?

(b) The intuitions regarding the presented comparative statics (impact of a variation in the bargaining power θ , impact of variations in R&D subsidy s or in the share of R&D being carried out by the government v) need to be extended and improved: right now, the author merely comments the impact of the different parameter variations on the intermediate firm's profits and hence on labor demand L_x . However, the intuitions pertaining to variations in the rate of growth in R&D-driven growth models are usually commented in the light of variations in the expected profits and incurred costs pertaining to a particular blueprint. Here, intermediate goods are the ones that are being invented, and yet lower profits of the intermediate good producers in the high-balanced growth path yield a higher investment in R&D and a higher rate of growth: why is this the case? My guess would be that it pertains to the way the bargaining process impacts the way expected profits of an innovation are being computed, but right now it is not clearly explained.

(3) The contribution of the paper needs to be more clearly stated. As the author mentions in the first section, the introduction of a bargaining game between intermediate and final good producers in a R&D growth model has already been investigated by Wang et al (2010). The contribution of this paper hence seems to be the introduction of government intervention, and the investigation of the impact of R&D subsidies on the rate of growth in this very particular dynamic framework. The author claims that the contrasted predictions of government intervention resulting from indeterminacy are economically interesting because they can explain some stylized facts, namely (1) an observed decrease in the share of government research since the mid-1970s, and (2) a higher share of overall R&D being carried out by public institutions in small countries. However, (a) this justification only appears at the very end of the paper and is not commented in the introduction; (b) more importantly, it is not clear at all why the results of the model provide an explanation for those facts (provided I have understood them well - the author speaks of "smaller R&D nations", but needs to be more precise about what he means by that). If this is indeed the main contribution of the paper, the author needs to state so clearly in the introduction, and needs to elaborate much more on why those facts can be accounted for by a model such as the one presented in this paper. Also, since indeterminacy (and hence the main predictions of the model) arises because of the introduction of a bargaining mechanism, an empirical justification of such a mechanism would make the author's point even more convincing.

Further small remarks:

- The authors claim they are using a Grossman and Helpman (1991) model, but such a claim is confusing: the model the authors use is much more often referred to as the "expanding-variety" growth model, or Romer lab-equipment model. Grossman and Helpman have indeed provided a variant of such a model, but focusing on final product innovation; also, usually a Grossman and Helpman model rather refers to a quality-ladder type of model.
- The introduction could be significantly shortened, since a lot of references are not directly relevant for this paper.