Introduction

This thesis contains three interesting chapters on highly relevant topics in economics. All of them are extremely clearly written, especially in terms of technical explanations and mathematical results. The chapters, in particular Chapter 1, would benefit from a more concise writing and addition of explicit interpretation of the results in terms of economics and policy implications. The thesis deals with three topics that are not just variations on a common theme, but really separate problems. Thus, the author shows being able to go deeply into diverse problems. Chapter 1 presents a sophisticated analysis of growth and competition. It is competently executed, although it could be better focused on more relevant results and the model could be generalized. Chapter 2 is a thorough empirical analysis with interesting conclusions. Chapter 3 is short and promising, but maybe needs further elaboration as indicated in more detail below.

Comments on Chapter 1:
Knowledge Licensing in a Model of R&D-driven Endogenous Growth

Summary

This chapter considers the role of patent licensing. Knowledge developed in one firm can be valuable for other firms so that these other firms have a willingness to pay for the use of the knowledge. There is mutually beneficial trade if the innovating firm takes out a patent and licenses the patent to these other firms. While common in practice, patent licensing has not been often incorporated in R&D-based growth models. In these models, each innovation gives rise to a single new product or a cost reduction in a single existing firm. Indirectly, innovations affect innovation in other firms through knowledge spillovers, i.e. knowledge transfer/imitation without market transaction. This way of modeling implies that innovators are not rewarded for the fact that their inventions affect subsequent R&D. The thesis chapter maintains the assumption from standard R&D-driven growth models that innovations in one firm are valuable for R&D activities of other firms, but considers what happens if the innovator is compensated for the knowledge flows. In the model this is formalized as payments to the inventor in the benchmark case S.1. Two alternative cases are presented for comparison, case S.2 with knowledge flows without compensation to the inventors, stemming from the fact that the buyers (licensees) have all the bargaining power; and case S.3 in which the exchange of knowledge between high-tech firms is banned (page 12).

The key question in the chapter is how evaluate how different types of competitive pressure can matter for innovation in high-tech industries (cited from the abstract of the thesis, page ii). More generally, the chapter investigates the role of licensing for the rate of aggregate growth and entry of new firms. The results of the chapter are
as follows. First, with licensing, firms innovate more than without licensing. This is an incentive effect: under licensing firms get paid for their contribution to other firms' R&D process, so innovation pays off more. Second, there is less entry of new firms under licensing. This is because the fixed cost of running a firm is bigger in equilibrium as compared to the case that firms do not need to pay for their knowledge inputs into R&D.

**General Assessment**

The analysis in the chapter is clear and well structured. Many cases are studied: three cases of knowledge exchange, two entry regimes, two competition regimes, the social optimum versus the market and the decentralized economy; various appendices supplement the main text. This makes the analysis comprehensive and thorough. Yet, the chapter seems to focus excessively on technical issues (in particular on the equilibrium that emerges in each of the model variants), with relatively little attention to the mechanisms behind the results and even less attention to the lessons we can draw from the analysis. I list a couple of important issues that would need to be addressed during the defense and before submission to a journal.

**Interpretation of the cases**

The interpretation of cases S1-3 should be sharpened. Case S.1 is the main case and I consider this as the benchmark case. Case S.2 is already described as being unrealistic [see page 11, last line: may not be realistic]. Why then have the case in the analysis? You should explain what the analytical merits are to distinguish this case. I would say that this case in principle allows you to contrast transfers with payments to transfers without payments, so it allows you to analyze the role of monetizing the spillovers. The third case S.3 is not very clear to me. Why analyze this case? Is it an analytical device to isolate the effect of the number of firms on the size of the spillovers? The presentation of this case is also confusing. I would first present the unnumbered equation that you present on page 12 and then derive equation (1.16). I would prefer the interpretation you do not prefer (more on this below). You favor the interpretation that there is no knowledge exchange, but then I do not see how there can be spillovers and I would expect that $\alpha$ always takes the value of 1.

I have sharpened the interpretation of the cases when there is knowledge licensing (S.1), there are knowledge spillovers (S.2) and there is no exchange of knowledge (S.3).

- I have added more elaborate explanation why I keep inter-firm spillovers term in S.2 case. More specifically, in the first paragraph of the description of S.2 case, page 11, I have added the following sentences:
  "I assume also that the researchers do not fully internalize the use of the current knowledge available in the firm and have external benefits from it. This assumption is merely for technical convenience. It allows to focus on the effect of market structure of the high-tech industry on innovation through competitive pressure. In particular, under this assumption all firms have the same external returns, no matter what is the size of their knowledge relative to the stock of knowledge of all firms. Further, this assumption allows to maintain symmetry between this
and previous setups. (Appendix E.3 relaxes this assumption and offers the main properties of the model.)

- I have added \( u_{i,j} \) in the specification for R&D process of the case when there are knowledge spillovers (S.2) to show explicitly how S.2 relates to S.1 [equation (1.14)]. This allows to explicitly show how the cases when there is an exchange of knowledge (S.1-2) nest the case when there is no exchange of knowledge (S.3).

- I have deleted the following sentence in the last paragraph of description of the case when there are knowledge spillovers (S.2), page 11 in the previous draft of the text:
  "Meanwhile, the existence of lawsuits can indicate that the market structure of knowledge/patents where buyers have a right to make a 'take it or leave it' offer may not be realistic."

- In order to explain why I keep \( \alpha \in (0,1) \) I have added in the opening paragraph of the case when there is no exchange of knowledge (S.3) on page 12 the following sentence:
  "Moreover, to maintain symmetry between this and previous setups I assume that in the process of generation of new knowledge the researchers do not fully internalize the use of knowledge available in the firm and have external benefits from it."

- I have deleted the unnumbered equation (on page 12 of the previous draft of the text) and accompanying discussion about algebraic equivalence of specifications.

- I have rewritten the explanation for S.3 case in the following manner:
  "It is clear that (1.12) and (1.13) reduce to (1.15) in case when there is no exchange of knowledge among high-tech firms [i.e., (1.12) and (1.15) are equivalent if \( u_{i,j} = 0 \) for \( \forall i \neq j \) and limiting case \( \alpha = 0 \); (1.13) and (1.15) are equivalent if \( u_{i,j} = 0 \) for \( \forall i \neq j \).] Therefore, the comparison between results for knowledge accumulation processes (1.12), (1.13), and (1.15) can highlight the effect of knowledge exchange among high-tech firms. Further, the knowledge accumulation process (1.15) might be interpreted as if the exchange of knowledge among high-tech firms is banned (e.g., because of antitrust concerns) or it is made very costly."

- I have added a footnote to equation (1.29):
  "Clearly, such a result holds in cases when either \( u_{j,i} = 0 \) or \( p_{u_{j,i}} \lambda_j = +\infty \) for \( \forall i \neq j \)."

I analyze S.1-2 cases since these represent two different setting for the market of knowledge or two different types of intellectual property rights systems.

- In S.1 case, in the market for knowledge the licensors have the bargaining power in the sense that they have the right to make a 'take it or leave it' offer.

- In S.2 case, the licensees have the bargaining power.
I consider S.3 case since it allows to highlight the effect of knowledge exchange among high-tech firms. This case might be also interpreted as an alternative property rights system where the exchange of knowledge is banned (e.g., because of antitrust concerns).

I maintain assumptions that the market for knowledge is perfect and licensors have no trade-offs associated with licensing knowledge. Clearly, therefore, in S.1 case the licensing fee is equal to licensees’ marginal valuation, in S.2 case it is equal to zero (as discussed on page 12), and in S.3 case it can be thought to be infinite. Admittedly, these are polar cases. Nevertheless, their analysis helps to sharpen the inference.

Modeling and generalization

I think you capture at least two important aspects of knowledge exchange. First, the question is to which degree knowledge exchange can be organized through markets. You take two extremes: all knowledge exchange goes through markets in S.1 and none in cases S.2 and S.3.

This is a matter of interpretation as discussed in the description of the case when there are knowledge spillovers (S.2), page 11:

- S.2 case can be thought to represent a situation when in the market for knowledge licensees have the bargaining power.

Second, the question is to which degree the variety of knowledge sources matters. You take two extreme forms: variety matters in cases S1 and S2, variety does not matter in case S3.

This classification reveals two things: you leave out one case and you take extremes that can be avoided.

The case you leave out is the case in which variety does not matter, but there is a market for licensed patents. I guess in equilibrium there is no need for licensing in this case, since each firm is indifferent between the knowledge from other firms and its own knowledge (where the former has a price and the second not). However, this is again equivalent to the case with $\alpha = 1$.

The generalization is straightforward and insightful. First, the degree to which variety matters is a matter of the elasticity of substitution, to be denoted by $\eta$, which you now fix at $1/(1 - \alpha)$. The general case is given by:

$$\dot{\lambda}_i = \xi \left( \sum_{j=1}^{N} \left[ \lambda_j^{\frac{\alpha}{\alpha-1}} \right] \right)^{\frac{\alpha-1}{\alpha}} \lambda_i^{1-\alpha} L_i. \tag{2.1}$$

Second, the degree to which knowledge exchange goes through markets can be generalized by assuming that some fraction of knowledge from firm $j$ can be imitated without compensation, while the remainder can only be obtained if paid for. Alternatively, and perhaps more interesting and realistic, but maybe observational equivalent, is to assume a Nash bargain between licensor and licensee. While you have assumed that all the bargaining power rests with the licensor in case S1 and with the licensee
in case S2, the generalization would be to straightforwardly assign both parties some bargaining power.

The generalizations turn your variables \( I^N \) and \( I^1 \) (defined on page 16) into continuous variables. More importantly, however, they allow for a clearer interpretation of these variables. Even if you do not want to generalize, you may want to consider to call \( I^N \) the "variety parameter" and to call \( I^1 \) the "monetization parameter" or "Nash bargaining power parameter" (or a less ugly term that captures the idea); with appropriate explanation this allows for a clearer interpretation of your results in terms of the mechanisms.

You can now give a sharper interpretation of your result: first, a higher variety effect in R&D makes knowledge exchange more desirable and makes a ban on knowledge exchange more costly. Second, more bargaining power for licensees makes R&D cheaper and makes entry easier so that more firms enter the market.

Maybe the generalization gives new results. Notice that in the model taste for variety plays a role at two places: in knowledge creation (your contribution; measured by \( \alpha \eta/(\eta - 1) \) in the formulation above, which boils down to 1 in your case S1-2 and to 0 in S3) and in production (through the usual love of variety inherent in the Dixit Stiglitz formulation; in your model it is measured by \( (\sigma + \mu)/(\epsilon - 1) \)). One would expect that it is important to know the relative strength of the two effects.

- In order to stress that with the specification adopted in the main text variety matters in R&D I have reshaped the last paragraph on page 9 of the previous (as well as current) draft of thesis:
  "In this knowledge accumulation process because of summation the productivity of researchers increases linearly with knowledge licensed from an additional high-tech firm. This means that the variety of knowledge matters in this setup. Such a formulation can be justified if there are significant complementarities among the knowledge of high-tech firms."

- I have added Appendix E.6 where I offer the main properties of the model for various generalizations of R&D process. I discuss there how linearity in \( N \) matters in the current setup: It exactly cancels the negative effect of higher number of firms on the amount of labor that can be employed in R&D. Departures from linearity introduce additional term that depends on \( N \) in front of \( L \) in equations for growth rates and labor force allocations. If this term is declining to zero as \( N \) increases then the inference from S.1-2 cases becomes similar to S.3 case. If it is not declining, or declines to a positive value, then still innovation in the high-tech industry increases with \( N \). As a special case, I also show that indeed if I multiply (1.13) by 1/\( N \) then in equilibrium with licensing the results are similar to S.3 case but with \( \alpha = 0 \). Nevertheless, such a setup is not consistent with the interpretation adopted in the text.

- I have added footnote 11 on page 10:
  "Appendix E.2 and Appendix E.6 offer generalizations of the R&D process employed in this paper. Appendix E.2 incorporates knowledge spillovers and depreciation in this process. Meanwhile, Appendix E.6 offers the main properties of
the model for more general CES formulation of this process where the degree of complementarity varies.

• In the main text I discuss how linearity in \( N \) of R&D process (or the variety) matters for the results regarding the behavior of \( g_\lambda \) and labor force allocations on page 24 (page 23 in the previous draft of the text). On this page I have replaced footnote 23 in the previous draft of the text (20 in the current draft of the text) with:

"One way to relax this assumption is to multiply (1.12) and (1.13) by a function \( F(N) \). Appendix E.6 offers the main properties of such a generalization of the model and sufficient conditions to have \( g_\lambda \) increasing in \( N \)."

• In the main text I further discuss how linearity in \( N \) of R&D process matters for the results in case when there is cost-free entry on page 34. Linearity is one of the reasons why in case of cost-free entry allocations and growth rates do not depend on toughness and intensity of competition.

• In line with the suggestion to add explanations in footnote 21 (footnote 24 in the previous draft of the text), I have added a sentence to the footnote:

"The later assumption would imply that the benefits from availability of complementary knowledge are less than \( N \)."

• Appendix E.2 discusses the second proposed generalization. Here I have added that indeed the spillovers in case when there is knowledge licensing can be thought to represent the bargaining power of licensees, page 59:

"In this setup \( 1 - \alpha_1 - \alpha_2 \) can be thought to represent the bargaining power of licensees."

• I have added interpretations for \( I_{S,1-2}^N \) and \( I_{S,2-3}^1 \) on page 17:

  – "Parameter \( I_{S,1-2}^N \) shows the extent that the availability of complementary knowledge can improve the R&D process in cases when there is an exchange of knowledge compared to the case when there is no exchange of knowledge. In this sense, therefore, it shows the benefits from exchange of knowledge/the costs of banning exchange of knowledge."

  – "This parameter (\( I_{S,2-3}^1 \)) indicates the magnitude of not appropriated returns on R&D and in that context it can be called a monetization indicator."

The proposed generalization \(^2^4\) can be indeed insightful particularly for the analysis of strategic interactions between participants in the knowledge market. However, for simplicity and in order not to add further distortions in the model, I assume that the market for knowledge is perfect (I discuss possible departures from this assumption in Appendix E.4 and possible complications in footnote 12 and in the second paragraph on page 16.) In this respect, such a generalization can be considered in future research.
Relevance of the analysis for policy and understanding the real world

What do we really learn from the analysis? In the real world, some patent licensing agreements might be strategic. This is not covered in the model. The model would be useful to address the question if it is good to stimulate patent licensing. In a first best world, it would be welfare deteriorating to ban the exchange of knowledge. Also, creating a market in which innovators get rewarded for the contribution they make to other firms (monetization) can be expected to be good. However, in a second best world, the conclusion may be different. You are analyzing a relevant second-best world: firms have market power and there are spillovers (also in production through parameter $\mu$). So the obvious question not directly addressed in the paper is whether (when, why) welfare improves if licensing is changed. It is also relevant to take into account (move to the main text from appendix E.4) that suppliers of patents have monopoly power, which introduces another distortion that is relevant. In the first best, the price of knowledge (sum of all licensee fees collected plus value of patent in own firm) should equal the Lindahl price.

In a newly added Appendix E.8 I analyze whether welfare in decentralized equilibrium is higher in case when there is knowledge licensing (S.1) compared to the case when there are knowledge spillovers (S.2). It turns out that analytical derivations to answer this question are not straightforward. Numerical results show that in case when there is no entry (Entry Regime 1) the answer for total welfare depends on model parameters in a non-trivial manner. Consumer welfare, however, is higher in case when there is knowledge licensing.

In case when there is cost-free entry (Entry Regime 2), whether total welfare (which is the same as consumer welfare here) is higher in S.1 case compared to S.2 case, again, depends on model parameters. The results further show that in case when $\alpha$ in the knowledge production function is close to zero then welfare is higher when there are knowledge spillovers compared to the case when there is knowledge licensing. This is seemingly surprising result and does not generalize for higher values of $\alpha$ (see Figure 1.2 on page 77).

I have added a brief discussion of this result in the opening paragraph of the section where I discuss policies leading to the first best outcomes, page 36: "As I show in Appendix E.8 this instrument alone cannot be sufficient, however. For example, in decentralized equilibrium for sufficiently low values of $\alpha$ welfare can be higher in case when there are knowledge spillovers (S.2) compared to the case when there is knowledge licensing (S.1)."

A more comprehensive analysis of this question can be the topic of a separate research project.

Comparison with existing literature

You can improve the remarks on the existing literature in footnotes 13 and 16. Please be more concrete on why your model is "similar" to other models. Your model some-
how nests existing models, so it is important to show how you generalize the literature and combine existing results. Your model is related to the issue of scale effects in growth models. In particular, you may want to compare your model of taste for variety in research (the fact that $N$ matters for the productivity of R&D) to the model by Peretto and Smulders (2002) in which this variety also plays a role, although with a different interpretation and a different modeling. There is also a literature on Lindahl prices and R&D-driven growth. See the papers by Chantrel et al. (2012) and Grimaud and Tournebaine (2006).

I have added remarks on the existing literature.

- In order to highlight the relation of the R&D specification adopted in the text with those used in the literature,
  - I have added on page 10:
    "In the context of knowledge spillovers between countries, Rivera-Batiz and Romer (1991) and Grossman and Helpman (1995) also assume an additive structure for knowledge in the R&D process. They assume that in a country knowledge builds on the sum of the knowledge of all countries. Smulders and van de Klundert (1995) and Peretto (1996) have an additive structure in the context of knowledge spillovers among firms in an industry. In their setups, however, the degree of complementarity can vary. Meanwhile, Peretto (1998a) and Peretto (1998b) have an additive structure in the context of knowledge spillovers among firms, although, they fade away the complementarity weighting each firm’s contribution to spillovers by its market share. In this context, the major difference of R&D process (1.12) from the R&D processes used in these papers is the Cobb-Douglas combination of the knowledge of different firms. Such a modelling assumption is particularly relevant in the context of licensing since it allows to have well behaved demand functions. Further, such a formulation of R&D process leads to simple and analytically tractable inference. It ensures that there exists a balanced growth path and allows to focus on the effect of market structure of the high-tech industry on innovation in that industry through competitive pressure."
  - I have replaced footnote 16 of the previous draft of the text with footnote 14:
    "van de Klundert and Smulders (1997) have a similar formulation for the knowledge accumulation process. Peretto (1998a) and Peretto (1998b) also have a similar knowledge accumulation process, though these papers assume that $\alpha = 1$. This implies that knowledge in R&D process is a pure externality."

- On page 10 I have added footnote 10 where I discuss the scale effects: "This R&D process leads to scale effects. Jones (1995) argues against scale effects, and many papers following that argument present frameworks which eliminate these effects (e.g., Young, 1998, Peretto and Smulders, 2002). This paper maintains the current framework for its analytical simplicity. Although, some of the results regarding growth rates will not generalize in "second generation" growth models such as Jones (1995), they can generalize in "third generation" models such as Young (1998) where labor allocations matter."
• In the introduction on page 5 I have added a discussion regarding related studies which derive Lindahl prices in growth models:

"In this paper, the value of the knowledge/patent of a firm is the sum of license fees that the firm collects and its benefit from using the knowledge in production of its good and in R&D. This is the Lindahl value of the knowledge, although in this context knowledge is not a purely public good since it is excludable. To that extent, this paper is related to a number of papers which derive the Lindahl price of knowledge in an R&D-driven growth framework (e.g., Grimaud and Tournemaine, 2006, Chantrel et al., 2012). Methodologically, this paper is most closely related to Chantrel et al. (2012). Given their focus, the authors in a similar growth framework model firms that do not have their own knowledge and need to purchase it for production and R&D from "public domain." Moreover, firms engage in in-house R&D in order to sell their R&D output in the "public domain." These proceeds are the sole motives for performing R&D."

Comments on Chapter 2:
The Impact of Telecommunication Technologies on Competition in Services and Goods Markets: Empirical Evidence

Summary

This chapter finds evidence for an increase in competition from the introduction of information and communication technologies (ICT) in sectors that rely relatively heavily on ICT inputs. The preferred interpretation of the authors is that ICT lowers the cost of entry.

This chapter employs a detailed dataset and carried out various robustness checks. The results look convincing to me. Since I cannot claim expertise on this specific topic, I have no further comments on this chapter.

I have changed the name of this chapter. It currently reads as "How Telecommunication Technologies Affect Product Market Competition: Empirical Evidence".

Comments on Chapter 3:
Specific and General Human Capital in an Endogenous Growth Model

Summary

This chapter first classifies human capital as either "specific" (i.e. useful in a limited number of sectors) or "general" (i.e. useful in a large number of sectors). Then the chapter presents the time-series for the Czech Republic of the share of specific human capital in total human capital and finds that this share declines over time. In Germany the same downward trend is visible. Finally a growth model is presented in which two types of human capital can be accumulated, specific and general capital. The former is used both in education and production while the latter is only used in the production of the single final good. There is one externality in the model: the accumulation of
specific capital generates higher total factor productivity in production (TFP) and this is only partly internalized by the agents who have to decide on how much human capital to accumulate. The balanced growth equilibrium is characterized by a constant share of specific capital in total capital. In order to generate a decreasing trend for this share, as was visible in the data for the Czech Republic and Germany, the chapter proposes a gradual rise in the spillover parameter \(1 - \gamma_3\), which reflects the degree to which agents ignore the effect of specific human capital accumulation on TFP.

General assessment of the chapter

The chapter aims to answer a relevant policy question (viz. "Should we invest more in specific human capital?"). It starts from relevant empirical observations and the useful concept of human capital specificity. However, the link between the model analysis and the policy analysis is not convincing.

The model has transitional dynamics (since the ratio of the two human capital stocks needs time to adjust), but these dynamics are not analyzed. Consider the following case: \(\gamma_3 = 1\) so that there is no externality and the ratio \(H_s/H_g\) starts above its associated steady state value. Then over time the share of specific human capital falls over time, like in the data, and this is the optimal time path since there is no externality. The conclusion for this case would be that the trend found in the data is consistent with the optimal path in the model.

The chapter takes an alternative route and concludes that the decline in the data should be seen as a shifting balanced growth path resulting from a parameter shift. There are a few problems with this route.

First, typically we want models to endogenously generate certain trends in variables without relying on exogenous parameters shifts. If you want to rely on a parameter shift, one should have very direct evidence that the parameter did change. I find the link between the internalization parameter and the decentralization in the education system a bit too indirect. It more or less assumes (rather than derives) the conclusion regarding the suboptimality of the observed trend: when there is less internalization of a positive external effect, welfare must deteriorate.

Second, the downward trend in the specific-human-capital share can be explained by a gradual change in another parameter. E.g. if \(\delta\) would fall over time, the model could probably still match the trend in the data, and then it would be a good sign that the Czech republic invests less in specific human capital.

Third, as a technical note, if a parameter changes gradually over time, the whole optimization problem changes and the optimality conditions should take into account this time-dependence of the parameter; a balanced growth path is no longer the outcome and the solutions presented in the chapter are strictly speaking no longer the rational-expectations equilibrium.

I do not want to claim that there is no likely relationship between the internalization parameter and the decentralization in education. However, your data on Germany makes the explanation less likely as well. Both for the Czech Republic and for Germany, there is this downward trend. Was there also in both countries decentralization in education decisions?

Another problem with the model is that it assumes that specific human capital generates positive spillovers. You need to review the evidence. For example Chapters 11 and 13 in Aghion and Howitt (2009) argue exactly the other way around: they claim
that generic skills are better for innovation.

This chapter primarily aims to propose a new way how to horizontally differentiate across skill types in order to analyze the impact of human capital composition on aggregate economic performance. More specifically, it defines general and specific types of human capital. It uses Czech labor survey data in order to summarize the facts regarding the employment and education level of the two types of human capital for the Czech economy.

The Czech data suggest that the share of specific human capital has been steadily declining since the mid-90s. To provide an explanation for this trend in the Czech data and illustrate how it can matter for long-run growth and welfare, the chapter builds up an endogenous growth model.

Indeed, the model has transition dynamics and there can be explanations for the negative trend other than the one emphasized in the previous draft of the text. In particular, the downward trend in the share of specific human capital share can be seemingly plausibly explained by a gradual increase of the efficiency of education process of general human capital ($\delta$, however, is a variable).

- I have analyzed the transition dynamics of the model and offer the results in the text on pages 123 and 134 and in Appendix T.2.

- I have added a paragraph in the introduction section (page 123) which offers additional potentially plausible explanations for the negative trend:
  "This framework offers other potentially plausible explanations for the falling share of specific human capital as observed in the Czech Republic. For example, it suggests that such a pattern can hold if the efficiency of the education process of general human capital increases relative to the efficiency of the education process of specific human capital. This explanation can be reasonable to the extent that technical change implied by the introduction of IT could have increased the efficiency of education process in the education field Computing, relative to other fields. Meanwhile, more than 90% of graduates of this field have general human capital according to our classification and data for the Czech Republic. It further suggests that such a pattern can hold in case when the centralized economy involved frictions and over accumulated specific human capital (e.g., due to political objectives). Clearly, if these were complete explanations, the falling share would not necessarily involve welfare costs."

- I have dropped footnotes 5 and 5 of the previous draft of the text and added footnote 5:
  "The observed trend can be also the net output of a number of different factors apart from those that we highlight in our stylized model, like structural change or regulatory barriers."

- I have dropped the following paragraph of the previous draft of the text (page 128):
  "The comparative statics that affect, for instance, the ratio of human capitals can be interpreted as unexpected shocks to the economy which induce it to adjust to new balanced growth path with different human capital portfolio. It is worth noting that depending on the stocks of human capitals $H_s$ and $H_g$ and on the magnitude
of the shocks during this transition the economy can stop accumulating one of the types of human capital."

- I have added three paragraphs in the results section (pages 133-134):
  
  - "According to Table 3.1, another seemingly reasonable explanation for the decline in the share of specific human capital $\frac{H_s}{H_s+H_g}$ can be the increase in the efficiency of education process of general human capital $\lambda_g$ for a given $\lambda_s$. Such an explanation is plausible to the extent that the introduction and use of information and communication technologies have increased the productivity of the education process in the field Computing relative to other fields. Meanwhile, our data suggest that almost all graduates of this field have general human capital."
  
  - "These comparative statics can be interpreted as unexpected shocks to the economy which induce it to adjust to new balanced growth path with different human capital portfolio. It is worth noting that, depending on the stocks of human capitals $H_s$ and $H_g$ and on the magnitude of the shocks, during this transition the economy can stop accumulating one of the types of human capital."
  
  - "In this respect, if the economy starts with a share of specific human capital higher than the balanced growth path value then during the transition the share of specific human capital declines. This can be another explanation for the observed trend in the data for the Czech Republic. Such an explanation can be plausible in case when the centralized economy involved frictions and over-accumulated specific human capital (Appendix T.2 analyses transition dynamics.)"

- In Table 3.1 I have added comparative statics with respect to $\lambda_s$ when $\lambda_s \equiv \lambda_g$.

In the current model R&D is performed in "academia" and it can be interpreted as basic/applied R&D. According to the data (Table 3.8 and Table 3.9) the majority of labor force have specific human capital in academia. Indeed, general human capital and in particular the skills of physical, mathematical, and engineering science professionals can also be productive in R&D, and especially so in industrial sector. The first type of R&D process seems to be not inappropriate for the Czech Republic at least in the 90s. Moreover, currently there seems to be no direct evidence showing which of these types of human capital contributes more to innovation. [Aghion and Howitt (2009) discuss the relevance of skills developed in college and research university for R&D. This is rather vertical differentiation of skills then horizontal.]

This model is an attempt to offer possible explanations behind the gradual decline in the share of specific human capital as observed in the Czech Republic and show its possible welfare consequences in a parsimonious setup. Indeed, however, a more elaborate model can stand closer to the data and provide more explanations for this trend.
Conclusion

In sum, no doubt Chapters 1 and 2 are ready for defense. Chapter 2 is less convincing to me and would benefit from either clarification of the analysis (in case I misunderstood it), or a major revision of the analysis.
References


