

Is Anything Wrong with Higher Education in Latvia?

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Abstract

This paper argues that the answer is yes. It builds its case on the basis of two findings. First, using a Survey of Innovative Businesses in Latvia (SIBiL), it finds that higher education received after the 1990 is not as effective as Soviet education in promoting innovativeness, as measured by both firm-level product innovations and patent applications. Second, it shows that, as measured by the number of English language articles in ISI Web of Science database, Latvian scientists seriously underperform, as compared to their colleagues in Sweden, Finland, Estonia, and Lithuania, especially in the field of social sciences. Based on these findings, this paper argues for sweeping reforms to the system of higher education in Latvia, focusing on subjecting the faculty of Latvian universities to the test of international peer review process. This requires measures to strengthen the role of English language and a reform of public financing of the system of higher education in Latvia.

Keywords: higher education, innovations, SCI publications, Latvia

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Introduction

This question may strike many, especially those in the higher education sector, as odd. After all, is it not true that, by some nominal measures, Latvians are some of the most educated people in the world?¹ Is it not true that, in spite of shrinking population, the number of students has increased almost threefold since 1990, from 46 thousands to an estimated 125 thousands in 2010? Is it not true there is much competition in the market for higher education, with 34 higher education establishments, of which 15 are private? It is hard to disagree that, in nominal terms, Latvia's numerous universities churn out huge and ever increasing numbers of graduates. And yet, higher education has serious problems, some of which are well known.

First, it is well known that large numbers of students combine studies with work and are absent from classes. Daunis Auers, Toms Rostoks, and Kenneth Smith (2007), the only researchers who systematically studied this phenomenon in Latvia, found that 44 percent of undergraduate students in their overall sample were working, with 23 percent working in full time jobs. They also found that working had the effect of lowering average grades, class attendance, and independent study time. It is hard to explain this phenomenon solely with students' need to earn their living.

The second well known fact is that Latvian academia is rapidly aging. In 2003, a World Bank report on higher education in Latvia wrote that "the average age of professors is 56 years and the number of them older than 60 years is rapidly growing; 33% of professors are older than 60 and the average age of newly appointed professors is 55 years." (World Bank, 2003, p.20). In 2007, the majority (54%) of scientists in higher educational establishments were more than 55 years old. The share of scientists aged 65 years old or more in universities was 25%, in universities' research institutes – 35%. Only 7 percent of scientists were less than 36 years old (Ministry of Education and Science, 2009). Clearly, university graduates are not overly enthusiastic about academic careers.

¹ According to the Ministry of Education and Science, there are 545 students per 10000 inhabitants in Latvia, which is one of the highest indicators in the world.

Third, plenty of anecdotal evidence suggests that situation with higher education is not as rosy, as suggested by nominal statistics. In private discussions many people, employees and employers alike, all too often voice their disappointment with and disdain for the higher education that they have received. This paper will add two more pieces of evidence and argue that this strongly suggests that something is, indeed, wrong with the higher education in Latvia. The fourth piece of evidence comes from the Survey of Innovative Businesses in Latvia (SIBiL), a unique initiative of the TeliaSonera Institute at the Stockholm School of Economics in Riga, which aims to investigate the determinants of innovative activities of small firms in Latvia. SIBiL evidence casts doubt on the continuing ability of higher education to contribute to innovativeness of Latvian firms, and, thus, be a determinant of economic growth. The fifth piece of evidence comes from a comparative analysis of citations data in sciences and social sciences. I will show that, as measured by the number of English language publications in international academic journals, Latvian scientists seriously underperform, especially in the social sciences. This bodes ill for the quality of teaching, which is likely to be strongly correlated with the quality of research. I should stress, however, that the aim of this paper is to stimulate discussion of the future of higher education in Latvia and, therefore, much of this work is highly provocative on purpose.

This paper is organized as follows. The second section presents the results of analysis of the effects of higher education on firm level innovativeness using SIBiL data. The third section presents evidence on publications in international academic journals, using data from the widely acclaimed ISI Web of Knowledge database. The fourth section outlines policy recommendations for reforming higher education in Latvia. The last section concludes.

Does Higher Education Stimulate Innovations? Evidence from SIBiL

Many public discussions of Latvia's economic development end up with a conclusion that there is a pressing need to produce greater value added. This rhetoric is largely tautological, of course. A country's GDP is roughly a sum of value added of all industries, so saying "we need higher value added" is another way of saying that we need higher GDP. And yet, one useful aspect of this rhetoric is on focusing thoughts on what is crucial for economic growth. A firm can produce greater value added by being more efficient or by offering better, higher quality goods and services that are more valued by the customers. The latter aspect is what is known as "product

innovations” and this is what many scholars regard as a key to economic growth. In what follows I will use evidence from a new dataset to shed light on how entrepreneurs’ education affects product innovations of their businesses in Latvia.

The Survey of Innovative Businesses in Latvia (SIBiL) is a novel micro-level dataset covering a wide range of innovative activities of 1251 small Latvian firms in 2007-2008. The sampling design of SIBiL is very similar to EuroStat’s Community Innovation Survey (CIS), the main instrument for measuring firm-level innovations in the European Union. The questionnaire and the sampling method of SIBiL are nearly identical to those of the CIS. However, SIBiL has a number of important advantages. First, SIBiL complements CIS by focusing on small firms with less than 50 employees. In contrast, the CIS does not cover firms with less than 10 employees. Second, SIBiL is conducted using face-to-face interviews with owners and managers of the companies, which is a more reliable method compared with the mailed questionnaires used by CIS. All the interviews were conducted by *Latvian Facts*, a professional survey firm. Third, SIBiL has a substantially larger questionnaire, covering the areas of access to and the use of external financing, business strategy, and background of the owners, such as their human capital and prior professional experience. Fourth, SIBiL specifically focuses on sectors that EuroStat classifies as high-technology manufacturing and knowledge intensive services. According to NACE Revision 1, these are manufacture of aerospace transport (35.3), computers (30), electronics and communications (32), pharmaceuticals (24.4), scientific instruments (33), post and telecommunications (64), computer and related activities (72), and research and development (73). About 35% of the firms in the sample operate in these sectors. Fifth, the survey data are merged with the financial and ownership data from the Business Registry. The survey was conducted in 2007-2008 by *Latvian Facts*, a premier market research firm, using face-to-face interviews. The response rate was quite high among the firms that were contacted – on average, 86%.

A unique aspect of SIBiL, as compared with similar datasets (e.g. Community Innovation Survey) is the data on personal background of its three largest owners, including the level and field of education. In what follows I draw heavily on the work of Dombrovsky (2009) to shed light on relationship between the level of educational attainment of largest owner and the firm’s

innovativeness, as measured by product innovations and patent applications in the last three years of operation.

First, SIBiL shows that entrepreneurs operating small knowledge-intensive businesses in Latvia are aging. An average business owner in SIBiL sample is 47 years old. Compared with nationally representative Global Entrepreneurship Monitor (GEM) survey data, an average SIBiL entrepreneur is at least four years older than an average business owner in Latvia.² This is bad news because SIBiL sample is biased to firms operating in manufacturing and knowledge-intensive industries. Furthermore, within SIBiL sample, owners of firms in manufacturing and hi-tech manufacturing are substantially older. Thus, average age of largest owners of manufacturing firms is 48 years, whereas average age of owners of non-manufacturing firms is about 46 years. Average age of owners of hi-tech manufacturing firms is 50 years. Average age of business owners in “research and development” and “manufacturing of scientific instruments” is 52 and 51 years, respectively. This finding is worrying because it suggests that younger entrepreneurs are less likely to start business ventures in knowledge-intensive areas. Since the state of today’s small firms is a good predictor of what the future large firms will be, one is tempted to conclude that the prospects for knowledge-based economy in Latvia are not bright.

Second, Dombrovsky (2009) uses SIBiL data to show strong correlation between the level of educational attainment and the two measures of innovations: product innovations and patent applications.³ Business owners with higher level of educational attainment are more likely to introduce product innovations and apply for patents. There are a number of reasons why better education should help innovations. Education provides technical competence and mastery of currently available analytical tools to the entrepreneurs. Thus, education is likely to make entrepreneurs more innovative by increasing their level of human capital and their technological creativity. On the other hand, education also makes it easier to ‘absorb’ new knowledge, that is, to adapt and imitate from more successful producers locally and around the globe.

² The benchmark here is the Global Entrepreneurship Monitor (GEM) 2007 data, which estimate average age of business owner at 41 years old. However, GEM only surveys individuals who are no more than 64 years old. Implementing the same restriction for SIBiL sample yields average age of 45 years, implying a difference of four years. It should be noted, however, that the sample of business owners in GEM is rather small – 108 observations in 2007. Average age for business owners from the GEM 2008 sample is 37 years. This suggests that the difference between population mean age of business owners in Latvia and population mean age for business owners in the sectors surveyed in SIBiL might be substantially larger.

³ In this paper product innovations are defined broadly, as new or significantly improved products that are new to the firm.

However, the effect of education on innovativeness is not uniform across the SIBiL sample. To show this, I split the SIBiL sample into two groups: (i) businesses, whose largest owner is 36 years old or older; and (ii) businesses whose largest owner is less than 36 years old. The latter group is composed of individuals who were about 17 years old in 1990 and, therefore, could only receive their higher education after the restoration of independence and the sweeping changes to the system of higher education took place. Table 1 shows that there is little difference in the level of educational attainment for 814 Soviet-educated business owners and 175 post-independence-educated owners. A greater proportion of younger owners has bachelor's or master's degree (77%), as compared with older owners (69%). However, most business owners with postgraduate degrees are older than 36 years old. There is only one business owner in the SIBiL sample who is less than 36 years old and has a postgraduate degree.

Table 1: Educational attainment (% of total in each age group)

	36 years old or more (N=814)	less than 36 years old (N=175)
Vocational secondary or less	21.4	17.7
Secondary general or less	4.4	4.6
Bachelor's degree	54.7	50.9
Master's degree	14.4	26.3
Postgraduate degree	5.2	0.6

Source: SIBiL, author's calculations

The question is whether owner's educational attainment matters for innovative behavior. Table 2 focuses on the effects of education on product innovations that are new to the firm. Column (1) in Table 2 reports the share of businesses with product innovations within each educational group for owners who are 36 years old or more. Note that the share of firms with product innovations increases with educational attainment of the owner. Only 45.4 percent of businesses whose largest owner has vocational secondary education (or less) report product innovations, as compared with 61.5% for owners with a master's degree. Thus, an owner with a master's degree is 16.1 percentage points more likely to introduce a product innovation, than an owner with a secondary vocational degree. Column (3) reports the same statistics for firms with largest owners

who are less than 36 years old. Strikingly, higher levels younger owners' education is associated with *smaller* increases in the likelihood of innovations, as compared with the results in column (1). For example, an owner with a master's degree is only 7.4 percentage points more likely to innovate, as compared with an owner with a secondary vocational degree. Furthermore, the share of innovative businesses among owners with master's degrees is actually smaller, as compared with owners with bachelor's degrees. These simple summary statistics suggest that correlation between the level of educational attainment and product innovations is substantially weaker for younger owners, as compared with owners who received their higher education before 1990.

Table 2: Product innovations and educational attainment

	36 years old or more (N=814)		less than 36 years old (N=175)	
	(1)	(2)	(3)	(4)
Vocational secondary or less	0.454	-	0.516	-
Secondary general or less	0.416	-0.032	0.875	0.239
Bachelor's degree	0.521	0.056	0.607	0.245**
Master's degree	0.615	0.150**	0.590	0.055
Postgraduate degree	0.667	0.107	n/a	n/a

Source: SIBiL, author's calculations

Notes: *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Of course, drawing far-reaching conclusions from these simple statistics might be premature. Correlation does not imply causality and it is possible that the effect of education on innovations is confounded by other factors, which are correlated with both owner's education and affect innovativeness. These confounding influences need to be controlled using multiple regression analysis. Thus, to produce cleaner estimates of the effect of education I also estimate probit regressions for two different sub-samples of owners. The control variables are similar to what is commonly used in the studies of innovations (see, for example, Criscuolo, Haskel, and Slaughter, 2005). These are the size of the firm as measured by the number of employees and its squared term, age of the firm, number of employees (log), dummies for performing research and development (occasionally or on continuous basis), dummy for being an exporter, dummy for having foreign owners, and a dummy for being part of a multinational firm.⁴

Column (2) in Table 2 reports coefficient estimates for the effects of education from a regression of product innovation dummy on variables of interest and a set of control variables using a subsample of older owners.⁵ Owners with secondary vocational education are used as an omitted group. Coefficient estimates should be interpreted as changes in the probability of having product innovations *relative* to the omitted group.⁶ For example, a coefficient estimate of 0.107

⁴ See Dombrovsky (2009) for more details.

⁵ Coefficient estimates for control variables are not reported.

⁶ I report the effects on dependent variable from a discrete change in explanatory dummy variable from 0 to 1.

in the last row of column (2) implies that an owner with a postgraduate degree is 10.7 percentage points more likely to introduce a product innovation, compared with an owner with secondary vocational degree, and *controlling* for other factor. This is a fairly substantial effect, given that about 52.8 percent of SIBiL firms report product innovations. The number of stars denotes statistical significance of that coefficient estimate. Absence of stars implies that sample evidence is not enough to reject the hypothesis that the true effect of education is zero. In turn, three stars stand for statistical significance at 1% level, which, by statistical convention, represents the highest level of confidence that the effect is non-zero. Most importantly, the estimates reported in Column (2) are ‘clean’ from the confounding influences of controlling variables.

Turning to estimates reported in Column (2) it should be noted that the effects of higher education are estimated rather consistently for owners who are 36 years old or more. Higher levels of education tend to have consistently larger effects on product innovations. The effects of having a bachelor degree and postgraduate degree are not statistically significant because of high correlation with the control variables. Owners with bachelor degrees tend have large businesses and larger pools of owners. Owners with postgraduate degrees tend to undertake R&D activities. Since both having larger business and undertaking R&D activities positively affects innovations, statistical insignificance of the estimated coefficient reflect insufficient evidence to ruler out these alternative explanations. However, the strongest effect is that of having a master’s degree, which increases the likelihood of product innovation by 15 percentage points, controlling for other factors.

Next, Column (4) in Table 2 reports the estimated effects of education for business owners who are less than 36 years old.⁷ The effect of having a bachelor’s degree relative to holding a secondary vocational degree is substantially higher compared to the Soviet-educated owners. However, a striking finding is that, whereas owners with bachelor degrees are more likely to innovate relative to owners with vocational degrees, owners with master’s degrees are *not* more likely to innovate relative to those with vocational degrees. This implies that younger owners with master’s degrees are *less* likely to innovate than owners with bachelor degrees. In other

⁷ The effect of having a postgraduate degree could not be estimated because there is only one owner with such a degree who is less than 36 years old.

words, this analysis shows that having more of post-Soviet higher education results in *less* innovativeness.

Further, the above findings are subjected to a closer scrutiny by using a more traditional and narrower measure of innovativeness – patent applications. Table 3 reports similar statistics but using patent applications as a dependent variable. Columns (1) and (3) show simple shares of patent applications among owners who are 36 years or older and those who are less than 36 years old, respectively. Note that higher levels of Soviet education are associated with higher shares of patent applications. 21.4 percent of older business owners with postgraduate application have patent applications, as compared with only 2.3 percent among older owners with vocational secondary education. However, this is not the case with the education of younger business owners. The highest share of patent applications is among younger owners with secondary general education (possibly university dropouts), and the lowest share is among owners with a master’s degree. Thus, also with regard to patent applications, higher levels of educational attainment are associated with more patent applications for owners who were educated in Soviet times, but not for those who received higher education after 1990.

Table 3: Patent applications and educational attainment

	36 years old or more (N=814)		less than 36 years old (N=175)	
	(1)	(2)	(3)	(4)
Vocational secondary or less	0.023	-	0.065	-
Secondary general or less	0.028	0.032	0.125	0.297*
Bachelor’s degree	0.052	0.044*	0.067	0.050*
Master’s degree	0.120	0.120**	0.044	0.037
Postgraduate degree	0.214	0.190***	n/a	n/a

Source: SIBiL, author’s calculations

Notes: *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Columns (2) and (4) in Table 3 show estimates of the effects of higher education on patent applications from probit regressions using a comprehensive set of control variables. Note that, in case of older owners, the effects of higher education are all positive, statistically significant, and consistent in a sense that more education implies a higher likelihood of patent applications. For example the estimate of the effect of postgraduate degree is 0.214, implying that an owner with

such a degree is 21.4 percentage points more likely to have a patent application, as compared with an owner who has a vocational secondary degree and controlling for other factors. Given that only 5.6 percent of all SIBiL businesses report patent applications, this is a very large effect. However, the picture is quite different when we examine the effects of education for younger entrepreneurs. Surprisingly, there is a very large effect from having a secondary general education (possibly a dropout from higher education), and a moderate effect from having a bachelor's degree. As in the case, with product innovations, entrepreneurs with a master's degree are not more likely (in statistical sense) to have patent applications, as compared with entrepreneurs with vocational secondary education and controlling for other factors.

Finally, it is possible to present the above results at a more aggregated level. One reason for doing so is the difficulty to disentangle Soviet higher education into bachelor's and master's degrees. Thus, I aggregate educational attainment into three broad groups: (i) secondary education or less; (ii) bachelor's or master's degree (higher education); and (iii) postgraduate degree. Table 4 presents estimation results from probit regressions using this more aggregated measure. Secondary education is used as an omitted group. The results deliver an even stronger message. For older owners, having higher education increases the likelihood of both product innovations and patent applications, compared with having secondary education and controlling for other factors. The estimated effects are statistically significant and economically large. For younger owners, having higher education does not have a statistically significant effect on either product innovations or patent applications, as compared with having secondary education.

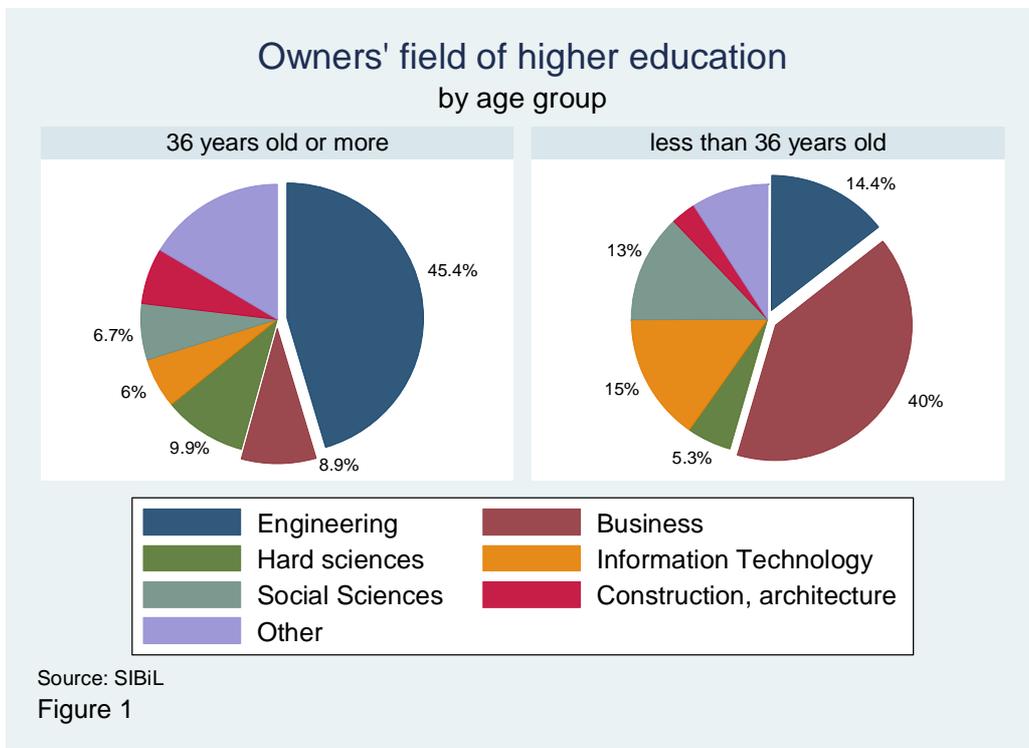
Table 4: Product innovations, patent applications, and (broader) educational attainment

	36 years old or more (N=814)		less than 36 years old (N=175)	
	Product innovation	Patent application	Product innovation	Patent application
Secondary or less	-	-	-	-
Bachelor's or master's degree	0.079*	0.039**	0.157	0.012
Postgraduate degree	0.112	0.169***	n/a	n/a

Source: SIBiL, author's calculations

Notes: *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

To sum up, the results of empirical analysis using SIBiL data point to a possible degradation in the quality of higher education that has taken place after the restoration of independence. The estimated effects of Soviet higher education on both product innovations and patent applications is positive, statistically significant, and consistent, even controlling for a large number of potential confounding influences. In contrast, the estimated effects of post-Soviet higher education are substantially smaller and less robust. The most striking finding is that younger owners with master’s degrees are less likely to innovate as compared with owners with bachelor’s degrees, as if more education destroyed human capital that is essential to innovativeness.



Before moving on, it is useful to examine differences in the fields of specialization for Soviet and post-Soviet educated business owners who received higher education. These differences are presented in Figure 1. Predictably, the largest share of older business owners (45.4%) received higher education in the area of engineering and technology, whereas the largest share of younger owners studied business and entrepreneurship. Relatively few younger business owners received education in engineering (14.4%) or in ‘hard sciences’ such as physics, chemistry, or natural sciences (5.3%). However, a larger share of younger owners (15%) has education in information

technology. Thus, it is hard to rule out an explanation that the change in educational orientation is what made educational achievement less relevant to innovativeness.⁸

How ‘good’ are the educators? Evidence from citations data

More incriminating evidence comes from the data on publications in international peer-reviewed journals. But first, I need to explain what the system of peer review is and why it is so important for the system of higher education. Efficiency considerations demand that there are some ways to assess the quality of professors and researchers and of what they do, i.e. teaching and research. This is a difficult task because of severe information asymmetries between a ‘knowledge worker’ (e.g. a researcher) and whoever is trying to undertake the evaluation. It takes many years of investment in human capital to produce an academic researcher with a PhD qualification in any given field, which implies that the pool of individuals capable of undertaking the assessment is quite small to begin with. Moreover, within each field of each discipline there are many possible venues of specialization and, especially with time, scientists accumulate substantially different sets of human capital, which makes it challenging even for their colleagues in the same discipline to understand and evaluate their work. In some sciences it is easier to assess scientists’ quality than in others. For example, both a doctor, who sees too many of his patients die, and an engineer, who sees too many of his buildings collapse, will find it hard to convince the public of their competence. In contrast, assessing scientists’ quality is extremely difficult in social sciences because there are few such objective criteria.⁹

Thus, assessing the quality of professors and researchers is extremely challenging, especially in the social sciences, and peer review has emerged as a principal solution to this problem. The essence of the peer review process is that academic journals only publish those articles that were ‘approved’ by anonymous referees (usually two or three) who are usually recognized scholars in the same field. In other words, the process of peer review seeks to evaluate a scientist’s work by matching it to an expert who is doing work in similar area and, therefore, is capable of

⁸ Relatively small sample size (for younger) entrepreneurs does not allow properly controlling for the field of specialization.

⁹ Social scientists cannot perform ‘controlled experiments’ and are usually not allowed to work with ‘patients’, i.e. large masses of people.

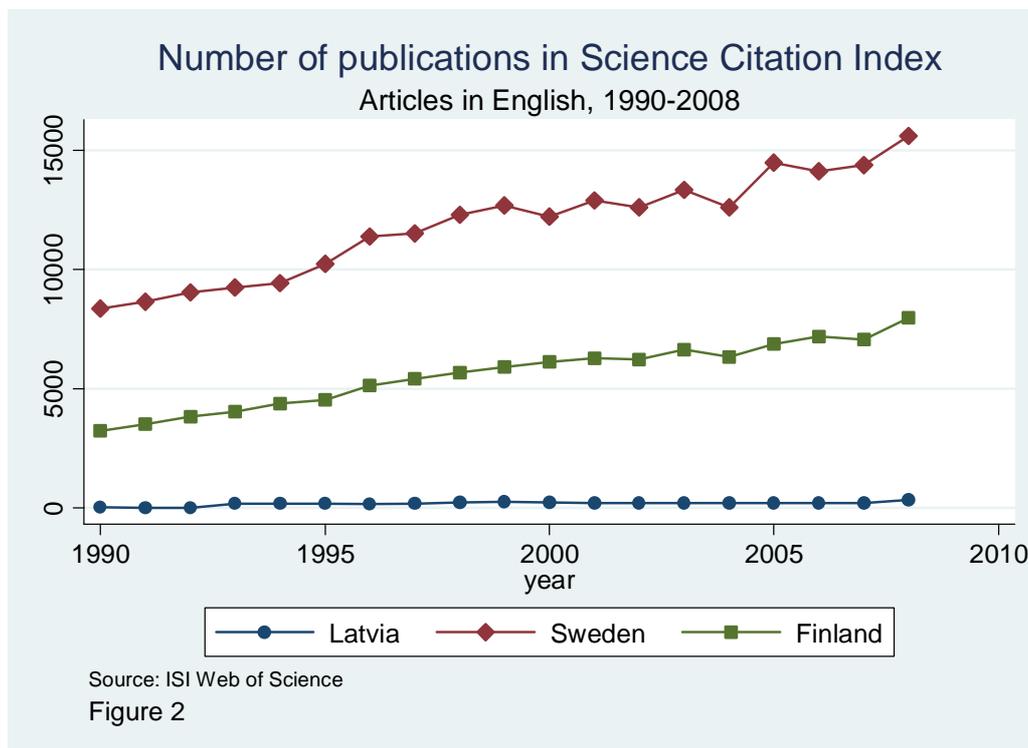
independently verifying the value of the research. Thus, the number of publications in internationally recognized and reputable peer-reviewed journals emerges as a relatively objective measure of a scientist's quality that can be used by university administrations, scientific foundations, government institutions and the public at large.

In what follows I present some data on how successful Latvian scholars are in producing publications in peer-reviewed journals. My purpose is to shed some light on the 'quality' of Latvian scientists which is likely to be correlated with their quality as teachers. I use Web of Science, the world's leading citation database. Specifically, I use Science Citation Index Expanded (SCI), which covers 7907 academic journals/conferences, and Social Sciences Citation Index (SSCI), which covers 2624 academic journals. SCI covers research in the 'hard sciences', such as biology, chemistry, engineering, mathematics, physics, whereas SSCI covers research in the social sciences, such as economics, law, management science, political science, etc. All author addresses are fully searchable, which makes it possible to retrieve the number of publications for each country from 1980 to present. I compute these statistics for articles in the English language both for the SCI and SSCI databases of the Web of Science.¹⁰ I look at the number of publications for Latvia, Estonia, Lithuania, Finland, and Sweden. These countries provide two distinct 'control groups'. Lithuania and Estonia have largely similar historical backgrounds and transition experience. Finland and Sweden are both developed economies, and are also Europe's top innovators (European Innovation Scoreboard, 2008). Also, Sweden and Finland have relatively small populations of roughly 9 and 5 million people, respectively, that are similar to those of the Baltic States.

Figure 2 presents the number of SCI publications for Latvia, Sweden, and Finland in 1990-2008.¹¹ Predictably, Latvian scientists are not as successful in publishing in the fields of science, as their colleagues in developed countries. And yet, the gap is striking. The total number of SCI publication for Sweden and Finland in the whole 1990-2008 period was 224,980 and 106,295, respectively. Total number of Latvian publications in the same period was a mere 3,369. Even adjusting for the difference in populations, the number of Latvian SCI publications is almost one twentieth of that in Sweden!

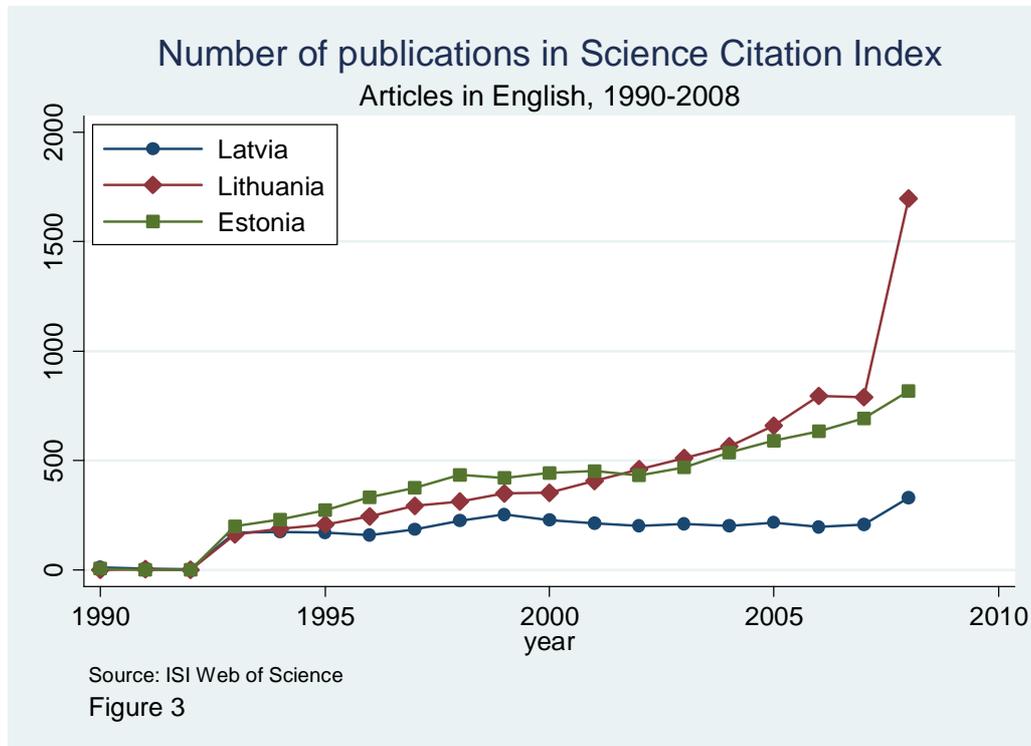
¹⁰ The reason for focusing on English language articles is that I am interested in articles in academic journals that were subject to the peer review in the world's academic market, which uses English.

¹¹ A variation of this figure with number of publications per million population is in the Appendix.



Naturally, that Sweden and Finland produce more SCI publications than Latvia is hardly a surprise, and can partly be interpreted as resulting from better financing of universities and greater proficiency in English language. Thus, Figure 3 compares Latvia's performance relative to a more similar control group – Estonia and Lithuania.¹² Strikingly, in spite of starting from roughly similar positions in the early 1990s, Estonia and Lithuania developed a substantial lead over Latvia, with the total number of SCI publications over the period being more than twice as high, as compared to Latvia. In 2008, Estonian scientists were producing nearly three times as many, and Lithuania scientists – more than five times (!) as many – SCI publications, than their colleagues in Latvia. Interestingly, compared with both Estonia and Lithuania, and also with Finland and Sweden, Latvian science showed inexplicable periods of stagnation – first, in 1993-1996, and then, also in 1999-2005, when Estonia and Lithuania continued to develop their leads.

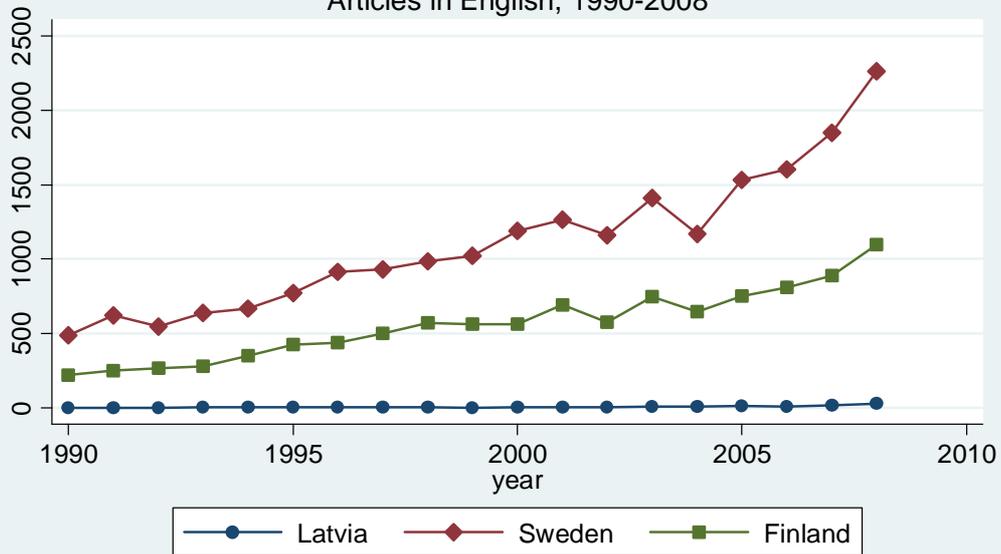
¹² A variation of this figure with number of publications per million population is in the Appendix.



Next, I turn to assessment of research in the social sciences, as captured by the number of SSCI publications. Figure 4 contrasts the number of SSCI English language publications for Latvia with that in Sweden and Finland. Again, the difference is striking. In the whole 1990-2008 period, Latvian social scientists published only 112 SSCI articles. In comparison, Sweden and Finland published 21,038 and 10,641 SSCI articles, respectively. Figure 5 compares Latvia with Estonia and Lithuania.¹³ In 1990-2008, Lithuanian social scientists appear to have published nearly four times as much, and Estonians - more than six times as much, than their Latvian colleagues. The gap appeared in the 1990s and has begun rapidly growing in the last years. It is tempting to conclude that in Latvia, producing SSCI publications is an exception, rather than the rule.

¹³ Variations of both figures 4 and 5 with number of publications per million populations are in the Appendix.

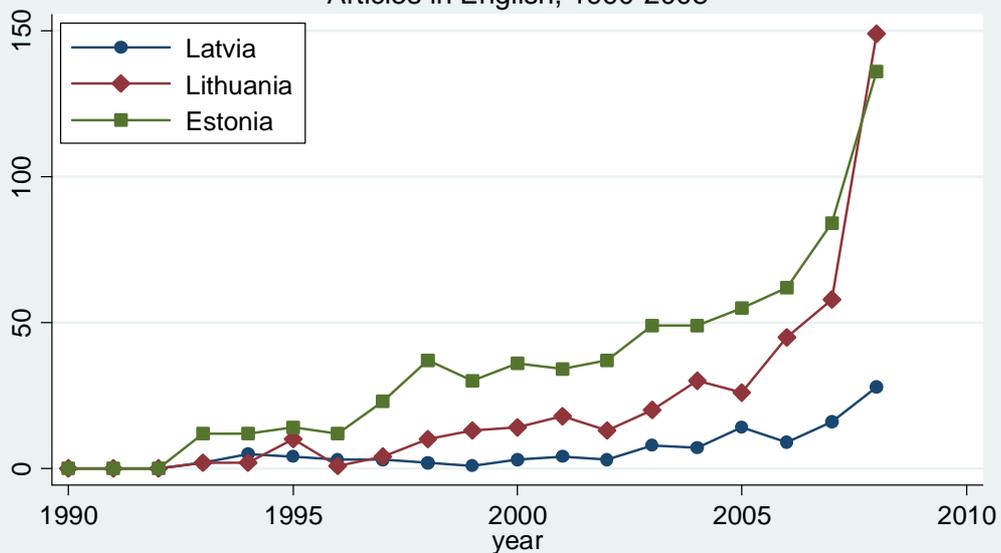
Number of publications in Social Science Citation Index
Articles in English, 1990-2008



Source: ISI Web of Science

Figure 4

Number of publications in Social Science Citation Index
Articles in English, 1990-2008



Source: ISI Web of Science

Figure 5

Also, it is informative to examine the number of SCI publications relative to the number of SSCI publications, as a rough indicator of the relative efficiency of researchers in the sciences. In 1990-2008, Sweden, Finland, and Estonia had about 10 science publications (SCI) per one social science (SSCI) publication. In contrast, the corresponding indicator for Latvia is about 30.¹⁴ In other words, Latvian scientists are three times more productive in producing international publications relative to Latvian social scientists, as compared with their peers in Sweden, Finland, and Estonia. Of course, the converse is also true: Latvian social scientists are three times more inferior relative to scientists, as compared with these other countries. It is somewhat ironic that nearly half of all graduates in Latvia are in the social sciences.

To be fair, Latvian scientists produce many publications. According to the Ministry of Education and Science statistics (2009), in 2007, Latvian scientists in higher educational establishments and scientific institutes produced a total of 5,764 publications. Of these, 1,327 were claimed to be “articles in SCP”. However, it must be noted that, using ISI Web of Knowledge search engine I could only find 209 English language articles from Latvia in the SCI database. Even using the broadest possible search criteria (all languages and all documents), I could only find 405 documents.¹⁵ I also observe discrepancy of similar magnitude for other years. Moreover, the difference is very large for some institutions. For example, Daugavpils University claims to have produced 112 SCI publications in 2007, whereas my search indicates there were only 8 documents from Daugavpils in that year.¹⁶

Measurement issues notwithstanding, the main problem is that non-SCI and non-English publications are unlikely to be subjected to a proper peer review process. Peer review process in small markets is unlikely to be effective because the number of potential referees is too small, which increases the likelihood of collusion. Thus, it is hard to ascertain the quality of publications that were not refereed at all, or those that were refereed using a small pool of scholars. Such non-transparency gives rise to incentives to boost resumes by producing

¹⁴ For Lithuania the ratio is 19.

¹⁵ I found it hard to explain the source of these discrepancies. According to a phone conversation with an official from the Ministry of Education and Science, data on the number of SCI publications are submitted by the universities and are not independently verified by the ministry.

¹⁶ Specifically, I searched for all publications with “Daugavpils” in author’s organization field.

'publications' of dubious quality. For example, a common practice to 'publish' in the social sciences (in Latvia) is to organize the so-called "international conferences", which are "internationalized" by inviting a speaker from Estonia or Lithuania. The proceedings are then recorded as "publications" in presenters' resumes.

Of course, the evidence presented above should be interpreted with caution. It might be tempting to conclude that Latvian scientists are intellectually less capable than their colleagues in Sweden, Finland, or even Estonia and Lithuania. However, such a conclusion does not follow from this data. Part of the gap might be explained by different incentive structures faced by the scientists in different countries. Whereas in many developed countries, the number of publications in international peer-reviewed journals determine a scientist's salary and career advancement, this is rarely the case in Latvia. Thus, at least part of the gap is likely to be explained by differences in the underlying incentives.

What needs to be done?

Summing up, the evidence presented in the previous sections suggests that something, indeed, is wrong with the higher education in Latvia. First, its ability to provide potential entrepreneurs with the human capital that facilitates innovativeness is questionable, as shown by the evidence from SIBiL. Given the importance of innovativeness to creating higher value added and, thus, economic growth, this raises the question as to whether the system of higher education in its present form is conducive to economic growth. Second, the faculty members of Latvia's numerous universities rarely publish in international peer-reviewed journals, especially scholars in social sciences. This casts doubt on the quality of research Latvian scientists claim to be producing and, possibly, also on the quality of their teaching, since teaching and research tend to be correlated. Third, we know that combining work and studies, and the resulting absenteeism of students, is a frequent phenomenon in Latvian universities. This raises the question whether what is offered in universities meets students' expectations. Fourth, it is well known that few university graduates show interest in pursuing careers in academia. These facts raise some serious questions about the efficacy system of higher education in Latvia.

My interpretation of the evidence is that, by and large, the system of higher education in Latvia fails to deliver quality education, especially in the area of social sciences, which is reflected in the shortage of innovations and, ultimately, in Latvia's economic prospects. Latvian universities need sweeping reform, if they are ever to become on par with the world's standards in higher education, and to successfully attract students in the future. Clearly, it is beyond the scope of this paper to produce a detailed outline of such a reform. This is a task for a much more comprehensive inquiry. However, the aim of this paper is to stimulate a discussion of this reform and to make some suggestions, based on the above evidence and my first-hand experience with higher education in Latvia, United States, and Europe.

I am convinced that any reform of the system of higher education must begin with the introduction of the peer review process as a principal means of evaluating a professor's achievement. As discussed earlier, evaluating a scientist's work is extremely challenging because of information asymmetries that are intrinsic in research. A principal solution that is employed in developed countries is application of the peer review process. Its essence is that potential research contributions are anonymously evaluated by scientists who work in the same field. Only contributions that receive approval of these anonymous referees are published in the journals. Thus, publications in peer-reviewed journals are used as an imperfect, but highly useful measure of a scientist's success. An important advantage of using the process of peer review is that it also serves as a useful proxy for the quality of teaching. The quality of research and teaching are usually correlated. Someone who is a productive and successful researcher is also a more knowledgeable teacher. Essentially, the corollary is that universities (and the public sector) should demand that their faculty also perform research, and start evaluating this research using number of publications in international peer-reviewed journals.

However, the system of peer review can only succeed if the pool of potential referees, who can anonymously evaluate each other's work, is sufficiently large. Given the complexity of today's science and enormous number of fields and subfields within each discipline, this means that Latvia is too small for the system of peer review to work effectively within this country only. There are two insurmountable problems. First, since there are rather few scientists in Latvia, the distance between fields of expertise and specialization of various scientists might be too large to permit efficient evaluation of each other's work. The second problem is that too few players

make anonymity impossible, which makes collusion very likely. In other words, if scientists effectively all know each other, there is a risk that they will come into tacit agreement to favorably evaluate each other's work, regardless of its quality. This is likely to be one of the reasons why the system of peer review works most effectively in large academic markets, such as in the United States. Hence, introduction of an effective system of peer review in Latvia dictates that its scientific community is fully integrated into the world's largest 'market' of peer review, which operates in English. In other words, researchers must publish in international journals in English language, thereby tapping into the world's pool of referees. This is not a radical demand. As shown above, researches in sciences already appear substantially more integrated into the international academic market, as compared with researchers in the social sciences.

To sum up the above discussion, the system of higher education (and research) needs to be evaluated on the basis of peer review, but it could only work in a sufficiently large academic market. Since the working language of the world's academia is English, an important corollary is that English must become *de facto* the second official language of both research and teaching in Latvia, at least at the level of graduate education. Teaching in English will help Latvian scientists publish in that language, which is a pre-requisite for the peer review system to work. This is not the only reason, however. First, good knowledge of English would make graduates of Latvian universities and, ultimately, their employers – Latvian businesses, more competitive in today's global markets. Second, it will increase the quality of education by enabling the use of world-class textbooks (in English) in classrooms. Third, it will increase attractiveness of Latvian higher education system to foreign students, which may help turning Latvian universities into exporters of higher education.

There are two more recommendations to modernize Latvian academy that will complement and reinforce positive effects from introducing the peer review process. My first recommendation concerns the need to encourage one year training in the doctoral programs of the top U.S. or Western European universities for Latvian PhD students, possibly subsidized by taxpayer money. There are several practical reasons for such an arrangement. Such graduate training would expose students to the standards of learning and research at top universities and work to creating personal contacts and future research networks with these competition. Most

importantly, however, this will discipline professors in Latvian universities by subjecting them to indirect competition with the faculty of the world's top schools, as the returning students will hold vastly different academic expectations. This is an expensive policy and it implies the need to seriously downsize the number of admitted PhD students, but it may offer a fast track to become closer to bridge the gap with the world's best universities.¹⁷ It should be noted that a similar program exists in Sweden and it is unlikely to be a mere coincidence that Sweden's universities are among the best in the world. The second, related, recommendation, is to help the universities attract visiting faculty from the world's top schools, who will do teaching and research in Latvian universities. This policy would reinforce and complement the positive effect from sending PhD students abroad. Naturally, both instruments necessitate the use of English language in graduate education.

Clearly, the proposal to strengthen the role of English in Latvia's higher education will cause substantial controversy. However, this is a price that needs to be paid for making Latvian higher education and science competitive in today's world. Besides, the proposal is not as radical as it may seem initially. English already is *the* language of serious academic research in any field. Most of the world's research in almost any discipline is done in English and it is hard to conceive a serious scholar who could get by without sufficient mastery of this language. As regards teaching, an important objection could be raised on the grounds that school graduates and university faculty do not have sufficient command of English for the study process to be effective. My proposal is to (i) introduce a dual-track system for undergraduate studies (bachelor's level), where programs would be offered in Latvian and English in parallel, and (ii) introduce master's (and doctoral) level studies predominantly in English. Thus, a smooth transition would be ensured. In fact, such a system operates in a number of European countries such as Sweden. Moreover, it is a widely shared impression that offers of master's programs in English are increasingly popular in European universities. For example, Estonian government's Action Plan for the implementation of the Lisbon Strategy (2008, p.78) plans to "support the establishment of international master's curricula in the period 2008 – 2011 to promote Estonian higher education, make it more attractive and competitive in the world and to *support provision of programs in English.*" (emphasis mine).

¹⁷ The cost of tuition in a top university combined with living expenses might be close to 50,000 USD for one year.

Also, it would be naïve to believe that the above proposals would be embraced by many in Latvian academic sector. In fact, I expect that a substantial number of Latvian scientists are likely to oppose introduction of the peer review process as measured by number of publications in English language academic journals. For example, Andris Sproģis, a professor at the University of Latvia, suggests much more fuzzy evaluation guidelines, writing that “a scientist, like an artist, is someone who cannot be evaluated using a single template... e.g. so many foreign publications, ... but needs to be evaluated taking into account a complex aura...”. He further writes that “...in science it should not be permitted that scientific work is evaluated by the language and place of its publication. In Latvia the scientific conferences and their published proceedings must be in Latvian language.” (The Humanities and Social Science Experts’ Commission of the Latvian Council of Science, 2009, p. 8).¹⁸ It is tempting to conclude that, according to Professor Sproģis, only chosen academics (like himself) should be allowed to evaluate what Latvian scientists do. Naturally, the exclusive use of Latvian language will make it impossible for anyone from outside Latvia to have an idea of what Latvian scientists do, let alone evaluate this.

Thus, there are powerful vested interests in Latvia’s academic sector, which would have much to lose from subjecting Latvian science to the international peer review process. These vested interests will form a powerful opposition to any effort to reform the system of higher education. Hence, the pressure for reform can only come from the government and from the civil society, by demanding that universities deliver better standards of quality for the taxpayer money. This calls for the following changes to the system of financing higher education. First and foremost, the system for financing higher education should be changed. The present system is primarily geared to paying for the so-called ‘budget places’, which are a form of industrial policy in higher education, with the government subsidizing certain professions. Financing of science is largely independent of any performance indicators and is delivered to ‘scientific institutes’ of universities, following an old tradition. The reform of the financing system should take two dimensions. First, an exogenously determined research budget should be allocated based on success in producing publications in internationally recognized peer-reviewed academic journals and the success in attracting European level research grants. Second, allocation of subsidies for

¹⁸ Precise referencing is difficult because exactly the same passage appears in the 2008 publication of the Social Science Experts’ Commission.

'budget places' should depend on the program full time faculty's success in publishing in internationally recognized peer-reviewed journals. In other words, a university with a more publishing full-time faculty in a relevant program of study would be entitled to a greater subsidy as compared to a university with a less publishing faculty. This would push universities to change their internal motivation systems to stimulate their faculty to produce research that would comply with world's standards. I should emphasize that this reform need not increase the total amount of financing for higher education, merely change the criteria by which universities receive public subsidies. Second, the government should offer additional financing contingent on introducing credible master's programs in English, and possibly provide matching grants linked to universities' success in attracting foreign students. The aim of this policy should be to motivate the universities to introduce working master's level programs in English. Third, the government may provide targeted grants for training of PhD students abroad and for attracting visiting faculty from the world's top schools.

Conclusion

This discussion paper presents two pieces of evidence that raise questions about the efficacy of higher education in Latvia. First, the results from analysis of firm level SIBiL data suggest that higher education received after the 1990 is not as effective as Soviet education in promoting innovativeness, as measured by both product innovations and patent applications. Second, it shows that, as measured by the number of English language articles in ISI Web of Science database, Latvian scientists seriously underperform, especially in the field of social sciences. To the extent that the quality of research is correlated with the quality of teaching, this raises serious questions about the effectiveness of study programs in social sciences, which are responsible for producing most graduates.

The major policy recommendation is that the faculty of Latvian universities must be subjected to the test of the peer review process, whereby one of the main measures of scientists' quality would be the number of publications in international peer-reviewed journals. Since peer review process can only be effective in large markets, which operate in English, this implies the need to strengthen the role of English language in higher education. This can be done by introducing English language programs of study, especially at the graduate level. Given the likelihood of

organized opposition from the vested interests in the academic sector, this paper calls for a sweeping reform to the system of financing of higher education. The reform should make financing contingent on the full-time faculty's success in publishing in international peer-reviewed journals. Implementing these reforms would introduce much needed motivation for universities to invest in the quality of their educational programs.

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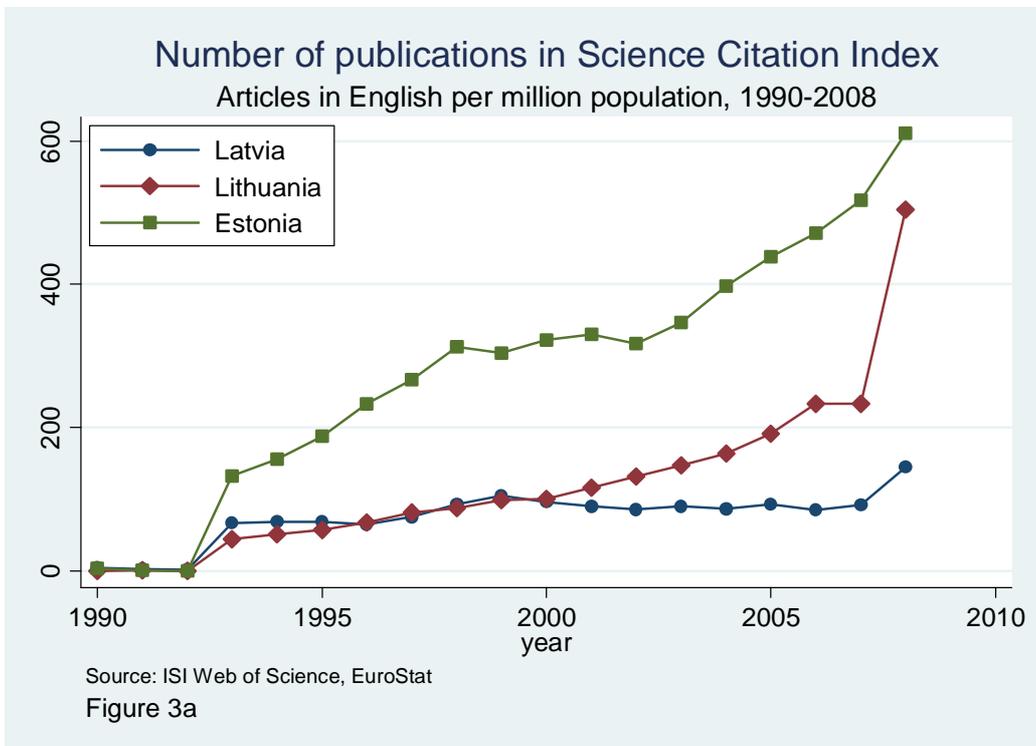
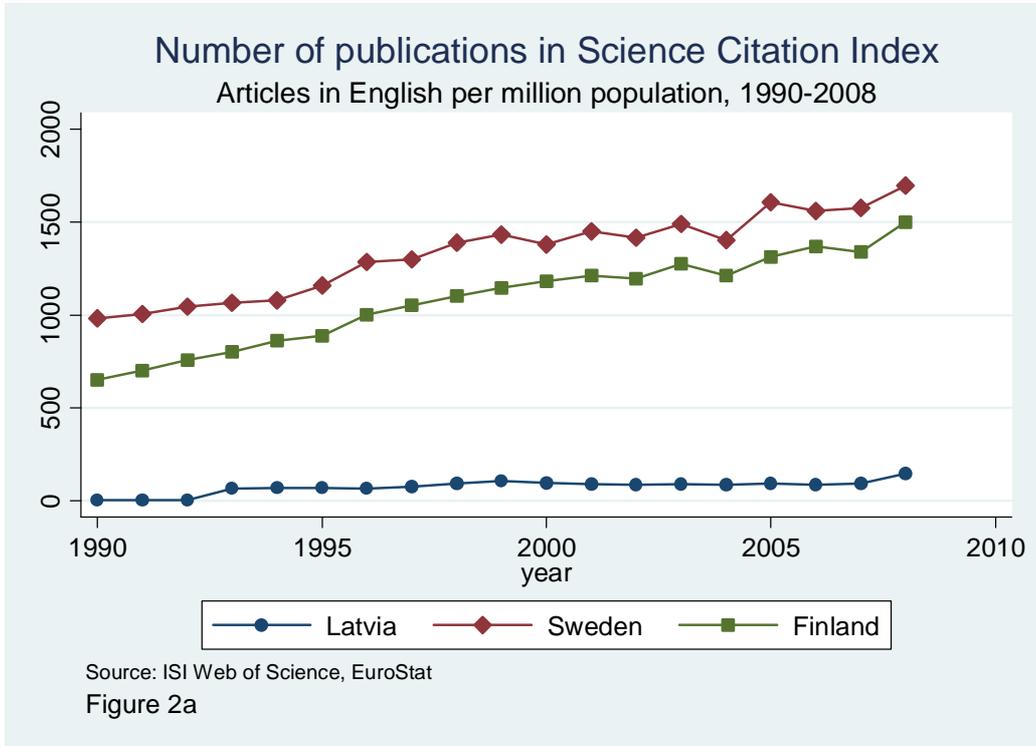
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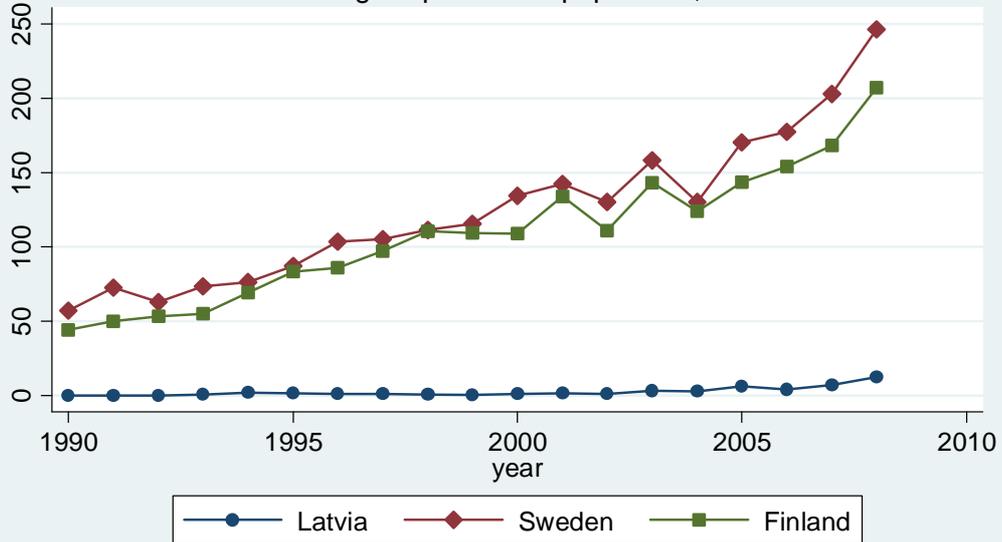
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Appendix



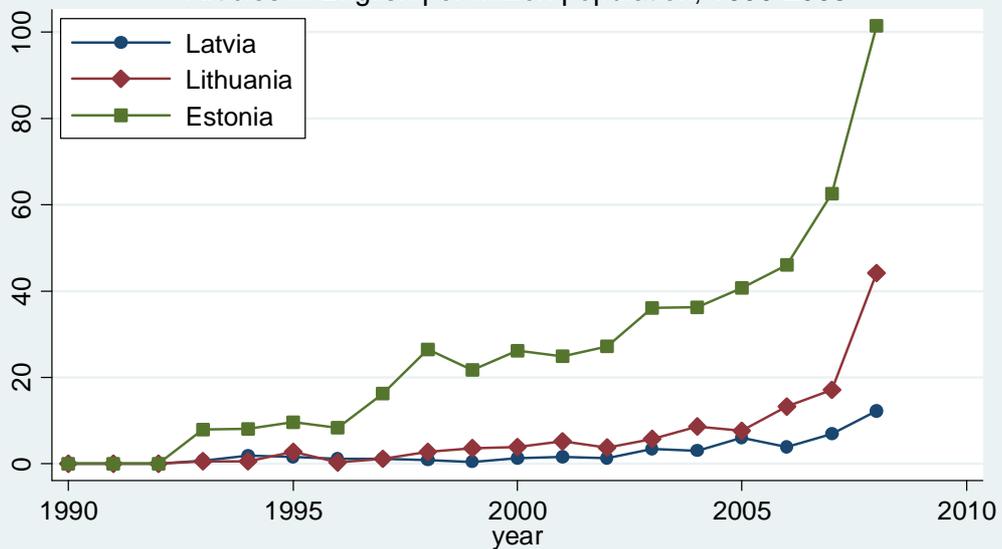
Number of publications in Social Science Citation Index
Articles in English per million population, 1990-2008



Source: ISI Web of Science, EuroStat

Figure 4a

Number of publications in Social Science Citation Index
Articles in English per million population, 1990-2008



Source: ISI Web of Science, EuroStat

Figure 5a