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Paths of Baltic States public research funding 1989–2010: Between institutional heritage and internationalisation

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Abstract

This article analyses the changes in public research funding policy in three Baltic States (Estonia, Latvia, and Lithuania) between 1989 and 2010. The article concentrates on competitive research funding. Although all three Baltic States had similar starting points, as all left the Soviet science system upon the restoration of their independence in 1991 and joined the European Union in 2004, they all developed differently. Drawing on the works of historical neo-institutionalism authors, the article analyses the articulation between change and continuity in small countries that are highly receptive to internationalisation. By analysing the resources of groups of reform actors, the article argues that instead of viewing internationalisation as an external pressure that organises policies on a uniform worldwide basis, theorising it as an endogenous factor of change allows us to better understand divergent policy trajectories in studied countries.

Key words: Estonia; Latvia; Lithuania; public research funding; internationalisation; Central and Eastern Europe.

1. Introduction

This article analyses the public research policy in the three Baltic States, namely Estonia, Latvia, and Lithuania, between 1989 and 2010. Together with other Central and Eastern European (CEE) countries, these three countries have moved from a command to a market economic system and from an autocratic to a democratic political system. Regarding public research funding, these countries have undergone various reforms and now lean towards the competitive[1] funding principle. The collapse of the Soviet Union and European Union (EU) accession are considered to have played significant roles in actualising these developments (Radosevic and Lepori 2009; Suurna and Kattel 2010; Varblane et al. 2007). According to Rodosevic and Lepori (2009: 661–2), prominent consequences of Europeanisation include decentralisation of the decision-making system and agencification, the diversity and flexibility of funding sources, an increase in competition-based funding, and the promotion of excellent research performers. Despite the similar development trends in post-communist countries, local idiosyncrasies prevailed. This is mostly explained through external factors, such as the underlying political economy or socioeconomic legacies (Karo 2011; Radosevic and Lepori 2009); the personalities of the reformers and their individual beliefs; or pre-existing power relations (Jablecka and Lepori 2009; Lepori et al. 2009). Nevertheless, a systematic analysis of the subject matter is scarce.

Against this background, Estonia, Latvia, and Lithuania are eligible for comparative study. They share distinct resemblances. All were independent nation-states before the Second World War and were subsequently incorporated into the Soviet Union until 1991, by which time they had all regained independence. All three states became members of the EU in 2004. All are geographically small countries with a small population (1.3, 1.9, and 2.9 million for Estonia, Latvia, and Lithuania, respectively). Due to their small size and politically strategic location, international influence is deemed to be an important factor useful in explaining their policy developments in sectors such as education and higher education (HE) (Dobbins and Leišyte 2013; Toots 2009). Hence, Baltic States' policies could be seen particularly sensitive to isomorphic change via the application of EU models (Mayer et al. 1997).

Furthermore, the research performances of the three Baltics States differ (Allik 2008). For example, at the beginning of the 1990s, Estonian, Latvian, and Lithuanian scientists had published around 270 articles in the WoS journals; by 2009, they had published 2,184, 542, and 1,441 articles, respectively. Between 1999 and 2009, the average number of citations per paper for articles issued by Estonian, Latvian, and Lithuanian authors were 8.64, 6.38, and 4.81, respectively (Zavadskas et al. 2011), while, in 2010, the percentage of publications co-authored with their peers from other countries was 46 per cent for Estonia, 33 per cent for Latvia,

and 38 per cent for Lithuania (SRG 2017). What is the rationale behind these different outcomes in countries that faced similar policy challenges and external influences? This is an important question to be asked when basing deductions on a widely discussed presupposition that argues that the implementation of funding and evaluation mechanisms fosters research competitiveness and determines national research output and quality (Besselaar et al. 2012; Geuna and Martin 2003; Liefner 2003). What are the factors of success that lead one country of the three—Estonia—to surpass the others? How does this case study help us to understand in a more general sense the aspects that permit a country's developing research systems to grow and thrive at the level of worldwide competitive research systems?

Authors working on institutional developments have addressed similar questions using a historical perspective (Hall and Taylor 1996). Drawing from this literature, the analysis in this article is structured as follows. (1) The first section presents an overview of the analytical framework. The hypothesis is determined based on the analysis of reform actors and tackles the impact of internationalisation, conceiving of it as an endogenous factor of institutional change. (2) The second section provides a general overview of Estonian, Latvian, and Lithuanian public research funding by bringing out the differences in the existing institutional trajectories in all three countries between 1989 and 2010. (3) The third section analyses these differences from the perspective of reform actors, their resources and the coalitions they have built over the examined period, and (4) we discuss subsequently the neoinstitutional approach in the context of this study and the possibilities to complement it to better understand the impact of international contexts.

2. Analytical framework

2.1. Internationalisation as an exogenous pressure of change in historical neo-institutionalism literature

To explain institutional change and continuity, historical neo-institutionalism authors have examined State apparatus, conceptualising it as a complex of institutions. This can take the shape of a formal bureaucratic structure and an ideology or an apparatus produced by informal custom (Evans et al. 1985; Immergut 1992). Whether institutions are seen as formal or informal with rules and norms, they are essential to policies because they shape participants in their decision-making, their strategic behaviour, and, ultimately, their political preferences (Steinmo 2008). To better understand the various policy outcomes in different countries, this framework can help explain why certain policy directions are taken while others are discarded. For example, one of the key concepts, termed 'path dependence', suggests that when a commitment to an institution is established and resources are devoted to it, it will produce 'increasing returns' and, over time, it will become increasingly costly to choose a different path (Pierson 2000). Alternatively, changes might occur through exogenous shocks or 'critical junctures', a point at which certain events and decisions lead to the development of an institutional path (Collier and Collier 1991). Hence, for historical neo-institutionalism authors, the external context can only have an impact on national institutional arrangements through major ruptures or changes in an institutional environment.

This vision is articulated with works from the sociological institutionalism stream of literature, which conceptualises internationalism as an automatic process that is imposed on nation-states through external pressure. As the institution's role is to provide moral or cognitive templates for interpretation and action (Dimaggio and Powell 1983; Mayer and Rowan 1977; Mayer et al. 1997), internationalisation is seen as a 'culture' imposed on nation-states whose identities, structure, and behaviour are shaped by 'world society' models promoted by international organisations (Meyer et al. 1997). Consequently, nation-states' policies are increasingly isomorphic as they organise and legitimise themselves in terms of universalistic world models. This can also be found in the research and HE fields (Mohrmana et al. 2008; Schofer and Meyer 2005). Therefore, although these two institutionalisms (historical institutionalism and sociological institutionalism) hold different rationales for explaining institutional continuity and change within national contexts (Hall and Taylor 1997), when it comes to internationalisation—which is the particular interest of our study—they converge, as both conceptualising it as an exogenous factor of change.

In recent years, institutionalist scholars have increasingly started to revise the work of their predecessors. While 'classical' historical institutionalism authors mostly concentrated on explaining abrupt changes and long periods of stability, recent historical (neo-)institutionalism authors have claimed that these analytical categories are not sufficient to enable a proper understanding of institutional change dynamics. They show that organisational forms often prove to be incredibly resilient and resistant when faced with significant historical disruptions. For example, authors have pointed out that after the collapse of the Soviet Union, institutional innovators were not confronted with an institutional vacuum but had to work with existing institutions by bypassing them and crafting new ones (Campbell 1997; Stark and Bruszt 1998).

Hence, instead of contradicting continuity and rupture, they adopt a power-distributional view of institutions that emphasises ongoing struggles within but also over prevailing institutional arrangements. This shifts the debate towards examining changes that occur under the surface, which instead, fittingly, possesses an endogenous character (Streek and Thelen 2005;Thelen 1999, 2003; Thelen and Mahoney 2010; Thelen and Steinmo 1992). According to Mahoney and Thelen (2010) elements such as the overarching political context (with its strong or weak veto possibilities) and the properties of the institutions hold a key understanding to how change can be accomplished. The latter are subject to varying interpretations and levels of enforcement and, therefore, exhibit ambiguities that provide space that interested agents can exploit in their effort to alter them (ibid.). Conversely, by building on explanatory factors, such as national policy context and institutional characteristics, the approach conceals the different external, international impacts on policy developments. At the same time, by emphasising power-relations and hence the role of change actors, the approach provides a good basis for circumventing this issue. To this end, we propose that the analysis should concentrate on the different resources employed by actors to accomplish changes.

2.2. Actors and resources of change: conceptualising internationalisation as a factor of endogenous change

One of the criticisms that institutionalism has received is that it affords minor attention to agency in explaining institutional change. Sociological institutionalism works can be seen as deterministic, with the unidirectional depiction of the transfer of norms and values from the organisational field to an organisational structure. However, recent neo-institutionalism authors have investigated how institutions and contexts shape change agents and not vice versa (Mahoney and Thelen 2010). To find a solution, some authors have

combined the organisational fields' framework and neoinstitutionalism literature with elements of structuration theory to analyse the interplay between the field and the organisation in terms of behavioural 'scripts' (Barley and Tolbert 1997). Others have proposed introducing concepts such as institutional 'entrepreneurship' (DiMaggio 1988) or 'social skill' (Fligstein 2001) to describe the role of particularly motivated actors in institutional change. To explain the impact of these actors, they highlight actors' resources, such as legitimacy, reputation, client relationships, or their ability to induce cooperation amongst others.

Nevertheless, there is a good reason to believe that contexts that are highly receptive to internationalisation bring other resources that actors can accumulate and use for engendering changes in organisational structures. For example, the literature of policy learning discusses how actors, through social learning, deliberately or inadvertently attempt to adjust the goals or techniques of policies (from other countries) in response to past experience and new information (Hall 1993; Rose 1991) and how this contributes to policy changes (Scholten and Weible 2017). Hence, in this article, we suggest considering a larger spectrum of different resources that actors can rely on in ensuring changes. Although various resources could be outlined, such as law, personnel, money, information, organisation, consensus, time, infrastructure, political support, or force (Knoepfel et al. 2007: 63–89), in this article we particularly concentrate on analysing 'knowledge resources' and more particularly knowledge resources acquired through different international experiences.

Information or 'knowledge resource' is one of the foundations of actors' intervention capacity. This cognitive resource consists of information acquired from technical, social, economic, and political data to actualise the resolution of collective problems (ibid.). For example, it is noted that when faced with the need to reorganise the scientific system at the end of the 1980s and beginning of the 1990s, knowledge of different Western European countries' scientific systems was scarce and unequally distributed amongst reform actors (Jablecka and Lepori 2009). Hence, for this article, the introduction of competitive elements in the public funding system within the post-communist context could be highly relevant to reform actors' personal trajectories and the experiences acquired from different international environments.

In sum, our hypothesis is as follows: to better understand the Baltic States' divergent policy trajectories, internationalisation should be conceptualised as an endogenous factor of change, instead of perceiving it as an exogenous factor, as is theorised by historical institutionalism authors. At the same time, these divergent trajectories should be analysed through the historical neo-institutionalism analysis framework that concentrates on factors such as the 'political context' and the 'properties of institutions' as outlined above. On the one side, actors' knowledge resources gathered from different international contexts influence their intervention capacities in political processes and hence allow them to shape the institutional paths in given national contexts. On the other side, political and institutional contexts offer opportunities for change actors to use their resources to enact these changes. Therefore, both the knowledge resources that actors have gathered from international environments and the motivation for their utilisation in national contexts need to be analysed in the context of the historical neo-institutionalism framework.

Our analysis below will focus on: (1) identifying the moments of changes from the periods of stability in each national cases and (2) determining the resources that actors used to carry out national reforms.

3. Institutional view on the development of Baltic States' research funding policy

3.1. Differences regarding time of emergence and in the competitive funding models in Baltic States' public research policies between 1989 and 2010

Amid the political turmoil, the former Soviet Union republics' research funding systems were disconnected from the all-Union apparatus and developed proper local settings. A specific feature of Research and Development (R&D) financing during the Soviet era was that up to half of the total R&D input emanated from all-Union or republican ministries, the framework of state programmes, and military contracts (Etzkowitz 1996; Kristapsons et al. 2003: 89). Research funds from the state budget were distributed either by the Academy of Sciences (AS) or by the ministries. While this kind of arrangement was relatively stable for institutes, the whole system was subordinated to political directives and central planning. These stable sources of funding dried up as a result of the political and economic changes of the early 1990s.

An accompanying characteristic of the restoration of independence was that during the first years of transition, the primary sources of R&D investments were explicitly public funds (Berg-Andersson 1997; Kristapsons et al. 2003: 89). Since then, the plurality of funding sources and budgets increased in all Baltic States. However, in 2010, according to EU statistics, after the economic crisis had negatively affected the Baltics States' recent economic growth, government spending for research[2] was predominant in Estonia and Lithuania, but not in Latvia (Table 1).

Latvian government funding is particularly low due to the fact that during the economic crisis, the total government funding for science was reduced by 60 per cent. At the same time, the funding was reduced by 20 per cent in Lithuania, although it remained relatively stable in Estonia (considering the absolute amount of public research funding allocated by the science ministries). This reduction in national public R&D budgets due to fiscal austerity measures was compensated for—notably in Latvia and Lithuania—by the substantial use of EU Structural Funds (SF), which had the effect of creating a dependency on foreign funding for research system development. In 2010, public funding for research (allocated from within the science ministry remit, excluding SF funding) reached EUR 73 million in Estonia, EUR 47 million in Lithuania and EUR 17.2 million in Latvia.

Under these cirumstances, the principal difference between Baltic States' public research funding is the share of funding allocated through competitive instruments in the funding system. To measure the competitiveness of the funding system, most often a difference is made between two flows of funding—institutional and project-based. Institutional funding can be either competitive or not (see e.g. Lepori et al. 2009: 674). Accordingly, the existing literature shows that, in 2011, in Estonia, 73 per cent of funding went to competition-based grants and the rest for scientific institution's basic funding, with the latter also holding highly competitive characteristics (ERC 2017). In Latvia, the share of competition-based grants reached 70 per cent in 2010 (Applica et al. 2016), while, in same year in Lithuania, it remained at around 40 per cent of the state budget for research (ESF 2014).

Hence, despite the similar starting points, all three countries ended up with different shares of funding instruments. Notably, in a trend that is similar to the 'US system', Estonia and Latvia rely mostly on project-based funding instruments while Lithuanian's public funding is built on a combination of core and project funding as is

Table 1. Total intramural R&D expenditure (GERD) by source of funds (percentage of gross domestic product and million euros) in 2010.

	Government	Business	Abroad
Estonia	0.70 (102.8)	0.69 (101.5)	0.18 (26.6)
Latvia	0.16 (28.6)	0.24 (42.2)	0.20 (36.3)
Lithuania	0.36 (101.1)	0.25 (71.1)	0.16 (43.76)

Source: Eurostat, European Commission.

typical of the 'continental European funding systems' (Lepori et al. 2007). Nevertheless, these figures tend to conceal the variations between national and international dimensions of competitiveness. The latter can be introduced and examined through supplementary mechanisms, such as international evaluations and peer-review or examining researchers' publications in international databases: in short, using mechanisms that link local decision making in the matter of funding allocation with evidence of foreign expertise. Accordingly, the introduction of criteria favouring international competitiveness in funding allocation were introduced progressively between 1994 and 1997 in Estonia, since 2005 in Latvia and in 2009 in Lithuania (Table 2). The following three sections provide an overview of the general development of public research funding in the three Baltic States.

3.2. Estonia: change before EU accession

The principal changes in Estonian public research funding policy occurred gradually in the first half of the 1990s. In 1990, the Estonian Science Foundation (EstSF) was established as a public research funding agency to administer funding allocations. The EstSF earmarked most of its funding through a 'vertical integration' mode (Lepori et al. 2009: 670–1), meaning that resources were allocated through intermediary instances, such as universities, ministries, and the AS, and from there redistributed to research institutions. With the adoption of the first Research Act in 1994, which in a manner similar to the other Baltic States, transformed the Estonian AS into an association of the scholarly elite (Kristapsons and Millers 1995; Kristapsons et al. 2003: 46–55), the EstSF started to allocate resources directly to research performing institutions for their main activities, (called 'targeted' funding) while infrastructure costs were allocated by the owner of the research institution.

Next to the institutional type of funding, the project funding share increased from 5 per cent of total allocated funding in 1991 to 32 per cent in 1996. In 1994, it was established that all projects had to be written in English and project proposals with a cost of more than EUR 6,391 had to be peer-reviewed by foreign researchers. Of the 1,185 submitted proposals in 1996, the EstSF funded 844 with total of EUR 3.7 million (Martinson 2015). Competition was enforced with the adoption of the OECD Frascati Manual for updating the organisation of disciplinary fields. Nonetheless, the funding allocation structure stayed largely dispersed between different institutions through financing the whole range of scientific sub-branches.

In 1997, the adoption of the second Research and Development Act began the diversification of funding sources and enhanced competitiveness within the system. As part of the reforms, a portion of the EstSF budget, notably the 'targeted funding', was reallocated to the Minister's newly created advisory council, the Council of Scientific Competence (CSC). The CSC began by allocating funding based on research themes instead of institutions and, at least formally, abandoned fixed budgetary quotas between different disciplines. Competitiveness was also strengthened through international peer-review and by linking CSC funding with the evaluation of research institutions, which was carried out every seven years from 1994 onwards. As such, the former EstSF funding system was transformed from an institutional to a project-based funding approach; as a result, apportionment of almost all research funding became competitive and peer-review based and, accordingly, allocated to research groups via research projects (Masso and Ukrainski 2008: 11; Raudla et al. 2015).

Towards the end of the 1990s and during the 2000s, the research funding system was diversified and the competitive mechanisms were strengthened (e.g. funded disciplinary fields were reduced to the four main areas). In 1999, the new funding mechanisms were also aimed at national programs to encourage the development of and support activities in the Estonian language, literature, and folklore. In 2005, institutional funding to enable institutions to realise their various strategic development goals was launched. However, the budget for this remained scarce (increasing from EUR 7.12 million in 2005 to EUR 7.2 million in 2010: in addition EUR 2.7 million was allocated for infrastructure expenses) and, according to a foreign assessment (carried out by Technopolis Group), favoured the development of former research areas at the expense of novel ones, as funds were allocated based on research quality and efficiency (50 per cent for publications and patents; 40 per cent for grants and contracts; and 10 per cent for defended PhD thesis).

The total financial support obtained from the EU's SF for R&D between 2007 and 2013 was put at EUR 604.4 million (20.1 per cent of the total SF assistance). These funds were used to finance infrastructural development, develop tertiary educational standards, finance mobility, etc. However, besides the EU subsidies meant for the Centres of Excellence Program, research had no direct financing (Karo 2010). In 2007, the government initiated national technology programs by approving a new R&D and innovation strategy (Knowledge-based Estonia II), with the actual R&D project competition beginning in 2011.

In sum, the introduction of internationally competitive funding principles in Estonia took place gradually between 1994 and 1997, together with the change in funding allocation from an institutional to a project basis. The proportion of allocation was slightly modified during the 2000s with the introduction of new funding mechanisms and baseline funding, which nevertheless kept internationally competitive characteristics in its design.

3.3. Latvia: change since EU accession

In Latvia, the reform process resulted in the decentralisation and introduction of the funding system with an almost fully (97 per cent) competition-based funding system in 1991 (Kristapsons and Tjunina 1995). Consecutively, the newly-established Latvian Science Council (LvSC), which was formed as a democratic collegial institution with members elected by the scientific community, took over the roles of Academy in research funding and policy advisory. The transformation of the Academy into an association of the scholarly elite was completed in 1992 with the adoption of the Law on Scientific Activity (Kristapsons and Millers 1995).

In the mid-1990s, the LvSC introduced two project-based funding instruments: the basic and applied projects funding instrument and one for joint research programmes. The LvSC also became responsible for grants' evaluation for 'market-oriented research grants', with this measure being introduced by the Ministry of

Table 2. Introduction of competitive elements in Baltics research funding policy organisation between 1989 and 2010.

Estonia	Latvia	Lithuania
1990—independent funding organisation EstSF; project-based funding instrument; English language project applications. 1994—demolishing former top-down institutional funding system; foreign peer-review for bigger EstSF grants. 1997—all funding declared in law meritocratic or based on institutional evaluation; introduction of CSC funding; CSC funding linked to institutional evaluation; foreign peer-review for CSC funding; abolition of predetermined disciplinary distribution for CSC funding. 2005—competitive settings for institutional funding. 2006—reduction of disciplinary areas in project funding settings. 1999—national programs. 2002—EU funding instruments. 2002—priority areas for research.	1990—independent funding organisation LvSC. 1991—demolishing former institutional funding system; project-based funding instrument 'basic and applied grants'. 1992—all funding declared in law meritocratic. 1993—project-based funding instrument 'market-oriented research grants'. 1995—project-based funding instrument 'joint research projects'; priority themes for joint research projects. 2002—EU funding instruments. 2005—institutional funding linked to institutional evaluation; competitive settings for institutional funding; priority themes for state research programs. 2006—a reduction of disciplinary areas in project funding settings. 2009—English language project applications; foreign peer review.	1993—independent funding organisation (LtSSSF); project-based funding instrument. 2000—first competitive elements in institutional funding. 2002—EU funding instruments. 2007—independent funding organisation (LtRC). 2009—all funding declared in law meritocratic or based on institutional evaluation. project-based funding instruments; Formal project evaluation criteria's; English language project applications; introduction of foreign peer-review system; institutional funding linked to institutional evaluation. 2010—reinforcing competitive elements in institutional funding.

Source: Author's compilation.

Education and Science. Nevertheless, no international peer-review system was established and no institutional evaluation was needed to apply for the funding. Moreover, thirteen branches of disciplines were eligible for funding and the limited budget was scattered among numerous projects. For example, out of approximately 1,000 'basic and applied projects' proposals in 1992, funding was approved for 830 (Rambaka 2012: 92). Support for doctoral studies and international cooperation was also introduced by the Ministry of Education and Science as well as small infrastructure payments allocated by the LvSC.

Since 2005, several incremental changes have been introduced to increase the competitiveness of the system and to strengthen the sustainability of research. Some of the changes, which were linked to the Law on Research Activity that was adopted in 2005, increased research funding and permitted the execution of previously agreed policies. For example, within the LvSC funding system, the numerous expert commissions were merged in 2006 and consolidated into six commissions; from 2009 onwards, international peer-review was gradually included in the project evaluation process; and since 2010, the number of funded projects has started to decrease. Moreover, the Ministry introduced an institutional funding instrument that was distributed using a formula based on scientific outputs, personnel costs, and office space running costs. For the first time, regular institutional evaluation was linked to the funding system, with institutions having their activities evaluated every 6 years (Kulikovskis et al. 2016). In addition, 'State research programs' were introduced. The purposes and tasks of these programmes were to be determined every 4 years by the ministries of the relevant sectors together with the LvSC and the Latvian AS. Since the implementation of this policy, the number of topics covered has grown from five to eight, covering a broad range of scientific branches.

During the EU accession process, the main issue in the research funding policy was the low level of research financing. Following the Barcelona European Council's objective, the Law on Research Activity set the percentage annual increase of financing for scientific activity at no less than 0.15 per cent of GDP per annum until the state-allocated financing for scientific activity reached at least 1 per cent of total GDP. However, this increase was not implemented, and the 1 per cent target was re-launched in 2009 by the Cabinet of Ministers, who adopted a strategic document at the same time. Additionally, the EU SF for science—for equipment and applied research projects—increased between 2004 and 2006, and during the crisis years (2008 onwards), the reduction in public funding was compensated for by a substantial use of EU SF. Latvia became the only EU country in which half of the investment came from external sources. The total state budget for science (within the remit of the science ministry) decreased from EUR 32.3 million in 2007 to EUR 17.2 million in 2010 (with LvSC funding dropping from EUR 9.9 million to EUR 4.7 million). At the same time, from 2007 to 2013, SF funds for R&D were put at EUR 612 million (15.5 per cent of the total EU's structural financial assistance in Latvia) and were earmarked to finance doctoral scholarships, investments in infrastructure, production equipment purchases or replacement, construction, purchases of other capital goods, and for creating new research groups and bringing back researchers from abroad. Moreover, the supervision of EU Structural and Investment Funds in Latvia was transferred to the State Education Development Agency in 2007.

Hence, although project-based funding was introduced abruptly in 1991, competition was kept at the national level. Criteria favouring international competitiveness have been incrementally reinforced since 2005 together with the introduction of baseline funding and later additional criteria for project-based funding.

3.4. Lithuania: change after EU accession

Compared to its counterparts, the Lithuanian AS was the earliest to be transformed into an association of the scholarly elite, with the

adoption of the Law on Science and Studies in 1991. In accordance with this law, Parliament became responsible for approving the allocation for universities and the research activities of research institutes. These allocations were calculated in proportion to the institutional budgets of the preceding year with the advice of the Lithuanian Science Council (LtSC), which was established in the same year. Later on, the relevant Ministry unit increased its influence as an advisor within the funding distribution system. Against this background, the project-based funding allocation method remained minor, at only around 4 per cent of the public research budget until a competitive funding system since 1993, allocated by the State Sciences and Study Foundation (LtSSSF).

Together with the adoption of the Law of Higher Education in 2000, complementary criteria were incrementally introduced to apportion state budget funds among universities and research institutions for R&D according to research results. These criteria consisted of the number of publications in international scientific journals, the participation in international research programmes, and research contracts with businesses or public organisations (Leisyte and Kizniene 2006). Between 2002 and 2008, the performance-based criteria were increasingly applied, with the proportion increasing from a few to 20 per cent of total funding, while institution representatives had, according to our interviews, opportunities to renegotiate their allocations.

In the 2000s, Lithuanian research benefitted immensely from EU resources. Between 2007 and 2013, 10 per cent of the total EU SF assistance (i.e. EUR 670 million) was earmarked for research, allowing a large number of new policy instruments and research programs such as non-research careers and research infrastructure. Importantly, the EU's support was used to develop research excellence centres and integrated 'science valleys' in selected areas (Paliokaitė 2015). The SF funding gained particular importance, as the national R&D budget decreased by half between 2007 (EUR 95.7 million) and 2010 (EUR 47 million).

Between 2007 and 2009, a substantial research funding policy reform was enacted with the adoption of the Law on HE and Research in 2009. This reform aimed to reinforce competition-based funding and the promotion of excellent research performers. To achieve this aim, 40 per cent of the 2010 budget for public HE and research institutions was connected to the results of the assessment of their R&D activities (Paliokaitė 2015: 12).

Moreover, by taking over the role of the LtSSSF, the LtSC was transformed into a research funding agency, the Lithuanian Research Council (LtRC), with the primary role to allocate project-based funding. In 2009, it began operation when funds for competitive funding were included in the state budget. In 2010, the bulk of the LtRC funding portfolio comprised two top-down funding schemes with pre-defined topics (national research programmes with a budget of EUR 4.5 million and a Lithuanian studies programme with a budget of EUR 1.4 million) and one bottom-up funding scheme (a researcher team project programme with a budget of EUR 2.7 million). In addition, the LtRC also allocated funding for several intergovernmental projects. In Lithuania, SF funding was used to directly support scientists through various LtRC programmes, with a total budget of EUR 3 million in 2010. Although in the first years the LtRC allocated grants remained small, and thus relatively easily accessible, all of these schemes were evaluated with the help of an international peer-review system (ESF 2014).

Hence, although the criteria favouring international competitiveness was introduced in the Lithuanian public funding system from the 2000s, substantive change only occurred with the reform of 2009.

4. Power-distributional view and analysis of actors' resources in Baltic funding policy developments

4.1. Investigating the role of reform actors and the political context in the Baltic States' research policy reforms

To better explain the moments of changes, we have closely examined the 'change actors' who were linked to the above-discussed funding policy reforms. Besides written empirical materials, such as the research policy documents and expert assessments in both English and Estonian, we carried out systematic research on their trajectories. More precisely we were particularly attentive to: (1) their international experience, including both longer exposures (more than 6 months) with foreign scientific systems (through studying, working, or co-operation with foreign scientists) or shorter exposure with a specific aim for learning from a foreign context; (2) the political and institutional context of their activity; and (3) their motivations for enacting reforms and hence the utilisation or implementation of their previously acquired resources.

These reform actors were identified through the examination of published research policy documents and overviews on each countries research policy development, as well as through memories and recollections gained through interviews that we conducted. We used the CVs of reform actors to examine their educational, professional, administrative, associative and political life trajectories, and the Web of Science (WoS) database, in the case of researchers, to better understand their personal publication history. Simultaneously, we conducted thirty-one interviews with Estonian, Latvian, and Lithuanian research administrators and directly-implied 'change actors'. These interviews were used to complete information about the funding systems, the involved actor coalitions, and to investigate the motivations for enacted changes. These interviews, which took place between October 2015 and February 2018, were recorded and transcribed and then analysed in parallel with written sources. Finally, even though the full account and trajectories of actors who participated in the reforms remain inaccessible, the obtained profiles were then operationalised by using the concept of 'resource' (Section 2.2 in this article).

In the next three sections, each of the three country-cases will be analysed in detail. At each significant moment of change, we have presented the systematic analysis concerning the most prominent groups of reform actors. Due to the synthetic nature of this article, at other change moments, we refer to interviews. This is relevant and appropriate due to the small size of the countries: sometimes the activity of one or two individuals has resulted in important policy changes and interviews are the best available sources of information. Nevertheless, in all of these cases, the information referred to has been compared to other available and relevant empirical data.

4.2. Estonia: weak political veto and high Western knowledge resources of reform actors

In Estonia, the programme for the public research system was mostly developed by the leaders of the scientific movement, the Union of Scientists (USC), which was formalised in 1989. The USC's main idea was to progressively implement a project-based research funding system (on the example of the US NSF), coordinated by a specific Foundation (EstSF). These ideas encountered resistance, mostly from the AS, which stood for keeping the Academy system and the creation of a state-level science council for research funding with the

Council of Ministers appointing its members. The establishment of the EstSF was finally achieved via the compromises between reformers—who were viewed as politically legitimate—and the AS, so that the AS could retain some importance as a 'roof-organisation' for the funding allocation system.

During the period political turmoil, the increasingly main power in Estonia was an electoral union, Pro-Patria (a body that was comprised of nationalist radicals and young dissidents, mostly drawn from the intellectual elite), which went on to win the first Parliamentary elections in 1992 against the former Popular Front government. During this time, the Academy system was questioned, as it was seen as representing the former communist political powers. Accordingly, a seventeen-member EstSF council consisting mostly of young individuals (a mean age of 50 compared to the AS board members who in 1982 had a mean age of 60) who had largely not held formerly important science administrative positions was created. The council consisted of two EstSF staff members, a representative each of the AS, the State Secretary, and the Minister of Education and Culture, representatives from the USC and three of the most prominent Estonian natural sciences universities, and finally the eight heads of EstSF expert commissions who elected by electoral colleges based on scientific institutions. While only six of these were members of the AS, most of them had joined the Academy at the end of the 1980s or the beginning of the 1990s during the period of political turmoil. Notably, out of eight expert commission leaders, only two came from AS institutes.

As most of the council members had already developed scientific profiles that were competitive not only in the USSR but beyond, the composition of the established EstSF offers additional explanations as to why the Estonian project-based system, contrary to the Latvian one, rapidly opened towards the international scientific sphere. Six members of the council held Soviet doctoral degrees, and eleven of them had already published in the WoS journals before 1994 (six of them having between ten and forty-four articles). More importantly, eleven of seventeen council members had foreign learning or professional experience prior to 1991 in Russia's biggest scientific centres (three individuals), in the US (four individuals), in Scandinavian countries (three individuals), or to some extent in other Western and CEE countries. Hence, from the very beginning, different Western countries were taken as exemplars for establishing the Estonian system for research funding allocation. For example, study visits to the US and Sweden were used to learn about the project-based system (how to design application forms, announce project contests, etc.). Further, the Royal Swedish AS was invited to carry out the first international science evaluation in Estonia. Hence, as explained by our interviewees, the main idea was 'not only to support research useful in Estonia but research that would also be internationally excellent'.

The trend was reinforced after the national political crisis in 1995 when the Ministry of Education and Culture underwent administrative changes regarding members of staff as well as research policy functions. Initiated by the Minister—who had also had been a former member of the council of the EstSF—in the words of our interviewees, 'only those who supported scientific competition in the international arena were recruited to the administration'. The subsequent changes in public funding (such as the establishment of the CSC and the diversification of funding instruments) took place under relatively stable political conditions, were initiated by Ministry staff, and were supported by recently renewed AS board members. At the same time, the strive for excellence was also initiated through a local context, as according to some of the interviewees, the project-based funding system was preferred by the administration in order to avoid giving too much power to university and faculty administrative members who could re-allocate it based on other principles than research quality. For example, if the formal institutional funding mechanism is introduced based on the recommendations of the Policy Research in Engineering Science and Technology in the UK, it includes highly competitive criteria.

Importantly, the Research and Development Act, developed in 1997 under the new Minister, redefined policy goals that could also better explain the maintaining of the level of R&D funding during the economic crisis. If until then, the role of scientific and technological creations were regarded as an essential aspect of Estonian 'cultural development', the 1997 Law deemed that they were a 'component of [the] Estonian economy'. This standpoint was subsequently supplemented and reinforced with successive strategic documents, termed 'Knowledge-based Estonia', that were drafted by the Ministry of Education and the Ministry of Economy. The first document (created in 2002) also agreed on the following key scientific fields: information technology, biomedicine, and materials technology, and these gave a basis for the utilisation of EU resources.

In sum, the change in the Estonian political situation provided an opportunity for groups of radical ideas to emerge. In this context, the main reformers had acquired knowledge resources from different international spheres to establish a funding system with criteria favouring international competitiveness. The furthering of Estonian public research funding policy development was assured with their arrival to administrative positions at the Ministry.

4.3. Latvia: weak political veto and low Western knowledge resources of reform actors

In Latvia, during the negotiations for a new research system, the primary initiative was taken by the by the USC that was formed in 1988 and became an example for the other Baltic States. In collaboration with the reform-minded part of the AS and the Board of Rectors of the Latvian HE institutions, these reform actors aimed to shatter the old administration of research management at the AS and break the former top-down political research funding system (Kristapsons et al. 2003: 40 cit: Grens 1995). Accordingly, their commonly proposed programme for the establishment of a new funding council aimed to allocate funding by democratic principles on one side and integrate a wide-scale project funding system for sifting out party appointed (and often immigrant) science workers from Latvian academic field on the other. Moreover, according to one former AS member, the general idea to move towards project-based funding and the establishment of a research council was taken from the Estonian example.

The analysis of the composition of the 1990 membership of the LvSC reflects the collaboration between these different groups. The twenty-six to twenty-eight member council consisted of a representative appointed by the Council of Ministers, the President of the Latvian AS, the chairman of the Council of Rectors of the University and the secretary of the Board of the USC. A further thirteen council members were elected by secret ballot from different branches of science and eleven members from leading science centres. These were mostly younger individuals (a mean age of 54) from exact science branches. Before their membership of the LvSC, most of them (16) had held intermediary positions between science administration and research, as the heads of laboratories, institutes, or departments. A majority of them (14) were members of the AS but, in most cases, the membership was achieved during the period of political turmoil.

This confirms our interview data, according to which members of the USC were invited to join the AS to override the older members' reluctance to enact changes in research.

Hence, during the period of Latvian political turmoil, the central confrontation over the new system emerged between scientists and the state administration. Although the latter proposed a research funding system distributed directly by sectoral ministries, the Council of Ministers supported the scientists' proposal and the establishment of the LvSC. At the same time, universities and research institutes were kept under the sectoral ministries governing their areas of operation. The strength of the USC programme could also be explained through scientists' increasing political resources, as several of them were linked with the *Latvijas Ceļš* party (co-founded by a group of the Latvian economic elite and former members of Popular Front), which won the first parliamentary elections against Popular Front in 1993. For example, in 1993, the initiator of the USC (whole was also a member of the LvSC) became the Minister of Education.

Moreover, the composition of the LvSC could also better explain the principles in research funding allocation that were established. Unlike the Estonian EstSF, only nine members of the LvSC had completed their studies or had professional activity in foreign countries. Of them, only four had recorded experience from Western countries (mostly in the US but also in Canada and the UK). Others had gained experience from Russian scientific centres (Moscow, Leningrad) and in Ukraine. Further, although at least thirteen of them had USSR doctoral degrees, only seven of them had published in WoS journals before 1990, and then only to a small extent (mostly one to three articles). According to our interviews, no concrete foreign model was used to establish the funding system. Although the LvSC consulted with the Danish Science Council, which assessed the local system in 1992, not all their suggestions were implemented, due to the unwillingness of the scientific community, especially in the areas related to international competitiveness.

Subsequent notable changes emerged only later under the newly appointed centre-right party appointed Minister of Education and Science, who stood for better funded and coordinated research policies (at the time, both the Minister and President of Latvia had a scientific background; the president was a scientist from the Latvian diaspora in Canada). By strengthening the Ministries' steering capacities, the changes pushed the decision-making system towards further decentralisation. For example, the 2005 law compelled the Ministry of Education and Science to draft the science and technology policy of the State and to submit the draft budget for research while the LvSC remained in an advisory role (Rambaka 2012: 108). International science criteria were integrated into the newly introduced basic funding formula and, later, in the LvSC funding criteria. Likewise, since 2009, projects financed by the LvSC and Ministry through State research programmes are monitored by the Study and Science Administration under the Ministry's supervision. Nevertheless, many of the changes (mostly implemented by the Ministry) have encountered, according to our interviewees, resistance from the scientific community, with this resistance commonly led by the LvSC and the AS.

As a whole, as in Estonia, Latvian political change provided the opportunity for groups of radical ideas to emerge. Nevertheless in Latvia, the strongest group that emerged in the research sector was united, mostly due to their common wish for 'cleansing' in the sector, while their knowledge resources were mostly related to the USSR research setting. Moreover, the further confrontation between the LvSC/AS and the Ministry can also better explain their insignificant influence in terms of the R&D budget during the economic crisis.

4.4. Lithuania: strong political veto and low Western knowledge resources of reform actors

As in other Baltic States, changes in the Lithuanian organisation of research policy were exerted by members of the USC, which was founded in 1989 by proponents of autonomy within the research system. Simultaneously, programmes were proposed by the AS with the aim to strengthen the Academy's functions and coordinate research activities in Lithuania, and by a working group of the Councils of Ministers with the aim to create a Science Foundation for research funding and a national science and technology council for state coordination of R&D. Concurrently, the USC proposition included the dissolution of the Academy system but remaining more moderate regarding the introduction of projects-based funding than that which was proposed by the Council of Ministers.

These processes took place in a Lithuanian political context that differed significantly from those of its northern counterparts. Notably, former Lithuanian Communist Party members won the first parliamentary elections in 1992 and replaced the anti-communist Popular Front *Sąjūdis* transitional government (Ramonainte 2006). Against this background, although the leader of the USC became responsible for the development of the first Law on Science and Studies, radical changes for favouring international criteria in funding allocation were refused, with stability in budget allocations preferred.

Moreover, the funding allocation became/continued to be at least partially influenced by political powers. For example, it is stated that the central funding decision-making power was granted to the Parliament, more precisely to its chief scientific adviser (the vice rector of Vilnius University), who chaired a board that was comprised of ten members drawn from the Lithuanian AS, the Rectors Conference, and the LtSC (Tillett and Lesser 1996). The leading administrative staff members of established organisations (such as the LtSSSF or the first department of science under the Government) had political membership, as did the former leader of the USC. In addition, if two-thirds of the LtSC (formed of thirty-six members) were elected by scientists, one-third was appointed by the Parliament. Hence, as was several times brought out by interviewees, influence 'remained in the hands of rectors and directors of institutes—they were key players in research; they could go to parliament, to the prime minister's office, to the president office'.

In addition, the dominant group of academicians (with a mean age of 57 years) at the LtSC had gained only slight foreign experience during the Soviet era and had constructed their careers mostly locally. A major part of this group (twenty-one individuals) had previously working as researchers (as a junior, senior, or chief researcher). At the same time, they did not include former long-standing members of the AS. All nine Academy (corresponding) members had gained their status in the second half of the 1980s. Although the group contained at least eleven individuals with USSR doctoral degrees and fifteen had already published at least one or two articles in the WoS journals before 1991, only seven of them had published between four and sixteen articles. Only five of them had previous studying or working experience in Western countries: mostly in the USA (three cases) but also in Germany (two cases), Swiss, France, Italy, and Finland. At the same time, seven of them had stayed in Russia (mostly in Moscow), with others in Hungarian, Czechoslovakian and Bulgarian universities and research institutes.

This setting could explain why, in the following years, the results from attempts to introduce stronger competitive funding systems remained modest. Even though the Government administration played a significant role in defining funding criteria in the mid-1990s, concerned parties viewed scientists from the LtSC and Rectors Conference as the primary opponents to a competitive-based funding method, despite various international assessments of the local science system (such as Norwegian Research Council in 1995, the World Bank in 2003, or the EC Scientific and Technical Research Committee (CREST) in 2006). Instead, the science administration opted for a robust in-house academic publication strategy where the strategy was to obtain as many local journals as possible and incorporated them into the global index databases and, through that, increased the global reach of research.

At the same time, another group of HE and research policy reform supporters surfaced in the 2000s, mostly from opposition parties, at the president's office, at the Ministry of Education and Science, and at the LtSC. They were a younger generation of scientists and administrators who had accrued knowledge sources about research systems, having worked in international environments such as within CEE and Scandinavian universities, the European Science Foundation (ESF), or other EU structures. Along with HE sector reforms (Dobbins and Leisyte 2013), they championed a more transparent and competitive research funding system and systematically advocated for the research funding systems followed by various EU countries.

These ideas could be partially implemented in 2008 when the conservative centre-right party, Homeland Union—Lithuanian Christian Democrats (partly grown out of the *Sąjūdis* movement), won the elections. Importantly, in terms of finding a new design for the system, the newly elected head of the LtSC visited Finnish, Norwegian, Swedish, German, Dutch, and other Council of Sciences to gain an overview of different systems. Parliament announced it would restructure the LtSC to become a research council, following the European Research Council grant models. These countries (above) that were selected as exemplars could also explain the Lithuanian path towards a 'continental European funding system', as in most of them project-funding reaches up to about 50 per cent of the total public funding budget (Steen 2012). At the same time, even if the reform contained changes in substantial policy goals and the introduction of new instruments, continuity with the former system persisted. For example, the LtRC remained closely linked to the Parliament.

Hence, the initial Lithuanian political situation was resistant to the emergence of radical ideas in the research sector. A prominent change towards international competitiveness in the national funding system occurred only later with political change and the emergence of a group of reformers who had acquired the relevant knowledge resources to implement reforms.

5. Discussion

5.1. Limits of historical neo-institutionalism in explaining the impact of internationalisation in the Baltics

For institutionalism authors, internationalisation as an external pressure should transform policy trajectories through isomorphism. Indeed, in all of the three countries, public research funding policy evolved from the hierarchical and planned model of Soviet research funding system to integrate competitive elements. Moreover, in each country, this change took place at different times and with different speeds (incrementally or via a particular reform) and led to different funding models. At the EU level and following the establishment of the European Research Area, member states were advised to raise their public research funding budgets and introduce measures such as competitive funding, international peer-review, and institutional assessments as the primary models for allocating public funds to research. But why was internationalisation unable to change the research funding allocation models in the three Baltic States in the same way and at the same time, as theorised by institutionalist authors?

The findings obtained conformed to the author's initial historical neo-institutionalist hypothesis regarding institutional change, which posited that no abrupt changes were recorded in the Baltics during the observation period. Fascinatingly, instead of rapid changes, different elements of transformation were introduced in all cases at differing intervals, which resulted in handmade solutions between the former and the new arrangements (Mahoney and Thelen 2010). Furthermore, neo-institutionalism authors would explain the divergent path taken by the Baltics using two key factors (political contexts and institutional characteristics), which allowed the emergence of particular change agents and types of change. Indeed, general similarities could be discerned in the evolution of the research policy institutional field in the Baltics. For example, in all countries, the USC formed a main part of the major coalitions that fought for the introduction of policy changes, by moving against planned policies and autonomous research policies. Further, in all of the countries, we analysed the later emergence of the State science administration that backed stronger national research steering. However, following the logic of historical neo-institutionalism authors, two questions arise that, according to our analysis, cannot be answered within the proposed analytical framework.

The political context varies in the three Baltic countries, a factor which could, together with the capacity of interpretation of institutional rules, affect the course of these reforms as theorised by historical neo-institutional authors. When national-minded Popular Front movements lost power in 1993 in all three countries, right-wing parties, which favoured competitive policy measures, took power in Estonia and Latvia, while in Lithuania a former-communist left-wing party won the elections. Hence, the weak possibility of a veto on liberal reforms in Estonia and Latvia could indeed explain the early reforms witnessed in Latvia and Estonia. Conversely, the Lithuanian left-wing parties blocked such reform ideas from taking shape in Lithuania. This result also reflects some other analysis regarding Baltic policy sectors—such as within environmental policy—where the change at the beginning of the 1990s in Estonia and Latvia was more substantial than that of Lithuania (Lazdinis et al. 2004).

Another variable used by historical neo-institutionalist authors to explain the emergence of change moments is the degree of interpretation of institutional rules. The period between the collapse of the Soviet Union and the restoration of independence was, indeed, a 'window of opportunity' for change agents in the Baltics to reinterpret the former institutional rules. The first legal acts explained that funding organisations were responsible for the arrangement of their funding allocation rules; thus, specific settings for funding were to be interpreted by scientists in the EstSF and the LvSC. Therefore, if the political veto power could indeed explain the differences between the Lithuanian reforms and those of its two northern neighbours, then how can we explain Estonian reformers' decision to move towards integrating criteria favouring international competitiveness in a project-based funding system while Latvian reformers did not introduce these criteria?

Besides, after the first changes that took place in public research funding systems at the beginning of the 1990s, further reforms only occurred in Latvia and Lithuania in 2005 and 2009 respectively. During this period, the Latvian government was led by (liberal) centre-right parties, while power in Lithuania switched between the pro-European centre-right to the liberal party, both of which ruled between 1996 and 2001, while social liberals led the Ministry of Education and Science between 2000 and 2003. The Lithuanian political context became more favourable to reforms in 2008 when conservatives replaced a left-wing government that had held power for several years. Thus, in both cases, the political context was favourable to reforms. If the Latvian reform, according to the historical neo-institutionalist authors approach, could be explained by political pressure coming from the EU (acting as a new political context), then the Lithuanian case opens up the following question: how can we explain Lithuanian change agents' motivation to undertake the substantial change in 2009 although political context would have allowed the change in the early 2000s? And although in Latvia the first changes were implemented in 2005, why had no substantial change occurred since?

As suggested by recent historical neo-institutional authors, besides external factors, such as the restoration of national independence or accession to the EU, endogenous factors (such as local political context and actors' ability to interpret institutional rules) play a crucial explanatory role in delineating the different change trajectories. However, the approach cannot explain the specific trajectories taken in each country concerning the models of research funding and the intensity of the implemented reforms. Relative to our hypothesis, these two above-posed questions made us focus on a more detailed analysis of reform actors' resources.

5.2. Divergent resources of change of the Baltic reform actors

The main argument is that besides factors such as the political context and actors' capacity to reinterpret institutional rules, institutional change in the Baltics' research funding policy also depends on reform actors' past trajectories and the knowledge resources accumulated through various international experiences.

Indeed, contrary to formal Soviet Union policies of keeping its borders closed to Western contacts, international contacts had an impact on science in the Baltics even during the Soviet era. Although the research community in the Baltic region was strongly linked to that of the Soviet Union, the region was less isolated from the Western world compared to other Soviet regions. Baltic researchers began to publish in international journals in the 1960s, a period accompanied by constant contact between local scientists and intellectuals in exile (Adamsone-Fiskovica et al. 2011: 228). Nevertheless, in many cases, these connections were limited for political reasons, as were the prospects of travelling to the West, a decision that was often connected to the KGB. As a result, to better understand each country's access to the West, each country's case should be analysed separately.

Analysis of change actors' resources could give us a better explanation as to why changes recorded in Estonia in the early 1990s were more substantial than those of Latvia. The 'window of opportunity' that was created by the collapse of the Soviet Union allowed change actors to push their reforms in all three countries. According to historical neo-institutionalist account, this possibility was opened due to the national political context and access to liberal ideas in policy design. At the same time, while analysing the Estonian and Latvian reform actors' resources, the former had, on account of their past professional experience, greater knowledge of the research systems of other countries, such as those of the US and Scandinavia. One of the reasons could be the relative openness afforded the researchers of the physics institute in Estonia by the AS administration and local party political elite during the Soviet era. Hence, at the beginning of the 1990s, Estonian reformers looked towards the US NSF to establish their funding council but for political reasons did not initially fully transform the system into a project-based system. At the same time, the Latvian reformers relied partially on the Estonian example and introduced a project-based system abruptly due to the national institutional environment. Nevertheless, contrary to the Estonians, they were not motivated to introduce criteria favouring international competitiveness in funding allocation.

A similar argument could also explain why Lithuanian reforms did not occur in the early 2000s, as was the case in Latvia, and were more extensive than that of Latvia when they did occur. The reform actors during the later Latvian and Lithuanian reforms were, however, slightly different. In the Latvian case, the post-2005 changes were mostly carried out by the administration. Conversely, in the Lithuanian case, the network of reform actors was broader and consisted of: former and current scientists, who held critical administrative positions; political actors, including the President; and government actors. Besides, while most of the reforms assumed by Latvian actors in 2005 were as a result of EU requirements, Lithuanian reformers actively mobilised change actors with foreign-experience from the scientific and political sphere to 'westernise' the local system. The late emergence of Lithuanian change actors could not only explain the rationale behind the stronger extent of the Lithuanian reform (establishment of new funding organisation, new funding instruments, and settings etc.) but also their motivation to undertake the reform only in 2009, albeit that the political context would have allowed it in the early 2000s.

Hence, in the early Estonian and later Lithuanian reforms, a network of foreign-experienced change actors aspired to produce substantial systemic changes and brought their acquired individual experiences to play by melding them together and adapting them to local institutional settings. In institutionalist terms of reasoning, such 'international policy learning' could be understood through actors' experiences in institutional fields different from the one being analysed. If institutional isomorphism relates to the capacity of organisations to absorb the 'myths' of the institutional field, and actors are available to interpret these myths, then the Baltic case shows that to fully understand national policy reforms, it is important to take the reform actors' previous experiences in other/foreign organisational and institutional contexts into account. This could explain why national institutional reproduction can differ in seemingly similar national contexts.

6. Conclusion

This article analysed the transformations in the public research funding of the Baltic States between 1989 and 2010. In each of the three countries, public research funding policy evolved from the hierarchical and planned model of the Soviet research funding system towards a research funding system that included competitive principles. The transformation in all three countries entailed the establishment of independent funding bodies, the introduction of project-based funding instruments, and the linking of institutional evaluation with research funding, as was taking place in Western European countries (Jongbloed and Lepori 2015; Geuna and Martin 2003; Whitley and Glaser 2007). The evolution in funding policy

also involved changes in funding criteria for all funding instruments, particularly in introducing criteria for international competitiveness. Nevertheless, these changes occurred at different times, took different forms, and were over differing durations in each of the three countries. Hence, the aim of this article was to understand the factors that influenced these differing policy changes in public research. For this, we drew on the works of recent historical neo-institutionalism authors and supplemented them with an analysis of change actors' knowledge resources acquired from different international contexts.

The higher level of Western international knowledge resources of Estonian reform actors compared to their Latvian counterparts at the beginning of the 1990s, coupled with the political and institutional context, could explain the Estonian reformers' decision to move towards integrating criteria favouring international competitiveness in a project-based funding system while Latvian reformers did not introduce these criteria. Similarily, a higher level of Western international knowledge resources of Lithuanian reformers comapred to their Latvian counterparts can explain Lithuanian change actors' motivation to undertake substantial changes in 2009 at the moment of national political change. At the same time, in Latvia, the changes were implemented incementally and in a top-down method following 2005 as there has not been the emergence of a strong group of reformers with relevant knowledge resources. Taking into consideration the variation in funding criteria, Estonia has developed the most competitive public research funding system of all the Baltics and some other studied CEE countries, such as the Czech Republic or Poland, since the 1990s (Lepori et al. 2009).

The results provide further understanding into the differentiated research performance in the CEE region. Even if there is no consensus about the gravity and the long-term impact of funding systems on research performance, it is widely considered that changes in resource allocation do have an impact on the level and type of activity that researchers and managers are willing to undertake (Besselaar et al. 2012; Geuna and Martin 2003; Liefner 2003;). Corroboratively, and in confirming previous analysis (Rambaka 2012), there is good reason to believe that despite both Estonian and Latvian funding systems being predominantly project-based systems, earlier changes in the Estonian system and its strong emphasis on favouring criteria of international competitiveness can explain the observed disparities between Estonian research performance and those of its southern counterparts.

The given analysis can also contribute to better understanding the more general transformation in CEE innovation policies. An item of significant importance during the studied period was the inability of the Baltic countries to make a clear shift away from an excellence-based R&D system towards a more private sector R&D specialisation or, subsequently, towards a socio-economically relevant public R&D system. This was despite these developments being strongly pushed by the EU. This kind of transformation is seen mostly as a particularly demanding exercise in the CEE, as corresponding policies—industrial, economic, research and higher-education—have previously been developed under the state's central guidance and governance and hence separated from each other over several decades (Karo et al. 2016; Karo and Lember 2016). Paradoxically, this lack of transformation may have been supported in part by the fact that many of the research investments were undertaken by relatively closed actor coalitions, which made it very difficult to make this shift happen. This demonstrates the ambivalent, if not limited, influence of the EU on national R&D policy-making.

Lastly, the given analysis can also contribute to a better understanding of long-term transformation in CEE policies. On the one side, researchers studying CEE countries have observed a plurality and diversity of paths that have been taken from the previous regimes to the different types of institutional settings now present in the various countries, instead of the expected simple 'transition' from one economic and political order to another (Stark and Bruszt 1998). On the other side, while the primary motive for the transformation of public research policies in the CEE region is considered to be the collapse of the Soviet Union and then subsequent EU membership, the Baltic cases expose the need to take multiple factors of change into account when explaining international impacts on local policy trajectories. Hence, integrating the factor agency in the form of a plurality of resources to institutional analysis will allow for a more nuanced understanding of national developments and the dimensions of reforms. In the Baltic case, policy examples and influences were drawn from multiple sources: from each other, from neighbouring countries, and from the example of EU organisations. The 'utilisation' of different international contexts by change actors can explain the repertoire of solutions that are within the actors' grasp. It is this differing repertoire of solutions that enabled them to generate new institutional arrangements in the particular local setting (similar conclusions are also drawn by Jablecka and Lepori 2009).

Moreover, shifting the focus from an EU-centered approach to the interplay of multiple external influences will allow researchers to avoid methodological Eurocentrism. The shift in focus will allow them to compare different research policies and take account of other factors in the comparative institution and policy design, such as the size of the country, its geographical location, and its cultural context.

Notes

1. Similar to Masso and Ukrainski (2009), in this article 'competition' refers to competitive behaviour or rivalry among research institutions and researchers to obtain the research funding available on the market. Funding allocation mechanisms can thus favour rivalry (e.g. being competitive) or not through their design. In addition, we consider the mechanisms of funding criteria that define the borders of the market (national/international competitiveness).
2. Government sector expenditure comprises all possible R&D performing units in this sector (Central Government (ministries, departments), local councils, Government research institutes, public research centres, non-profit semi-government organizations, National banks, museums, libraries, public benefit companies), hence it exposes more resources than the directly distributed funding for research activity covered in this articles analysis (2017) online website: http://ec.europa.eu/eurostat/cache/metadata/en/rd_esms.htm.

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