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RESEARCH ARTICLE

Institutions and development in a fragile limited access order of late-medieval Lithuania

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Abstract

Applying the framework of North *et al.* (2009, *Violence and Social Orders: A Conceptual Framework for Interpreting Recorded Human History*. Cambridge: Cambridge University Press), this paper analyses institutional and economic development in a new setting – the Grand Duchy of Lithuania between 1245 and 1386. Although remaining a fragile limited access order, Lithuania achieved positive institutional change. Its elite became more stable by restricting ruling privileges to the grand duke's family and integrating rival dukes through administrative positions and hereditary property rights. This arrangement encouraged land accumulation and productive activity over extraction, while the elite started providing better security to traders and craftsmen seeking to finance its war against the Teutonic Order. Synthesised material evidence reflects development at the extensive margin. However, health data shows no increase in *average* living standards, potentially due to population growth and inequality. Both sets of findings are consistent with the conceptual framework, as it expects fragile limited access orders to be underdeveloped from a static perspective, but improve following institutional development.

Keywords: development; Grand Duchy of Lithuania; institutions; limited access orders

Introduction

This paper analyses institutional and economic development in the Grand Duchy of Lithuania (GDL) between 1245 and 1386. Comprising formal rules and informal norms (North, 1991), institutions are generally considered 'better' the more they can ensure the rule of law, secure property rights, and eliminate the costs of participating in the economy. North *et al.* (2009) offer a more holistic approach to institutions based on the concept of social orders. Broadly, social orders are collections of patterns by which societies limit and control violence, construct institutions and gather into organisations that enable the pursuit of common goals. Social orders reflect the functioning of the overall institutional environments that form incentives for political and economic activity, ultimately determining long-term development.

Late-medieval Lithuania provides an interesting case, as it lagged behind much of Europe politically and economically. Historians compare late-medieval Lithuania to the Western Europe[1] of the Early and High Middle Ages, 10th–12th century Poland, Hungary and Bohemia, or principalities of the Kyivan Rus' (Babinskas, 2022; Petrauskas, 2009; Rowell, 1994). However, the GDL's early history is unique because it emerged as a pagan entity in the presence of already-formed Christian states. Although Duke Mindaugas accepted Christianity and became a king in 1253, successive coups restored paganism and resumed Lithuania's relative economic isolation. Meanwhile, the elite faced a threat

[1]'Western Europe' refers to the territories west of Poland and Hungary, including the Holy Roman Empire.

from the Teutonic Order – an organisation of German knights seeking to convert Lithuanians to Christianity by conquest. The combination of inherited institutions, internal instability and external circumstances incentivised the elite to profit from organised violence, including expansion into Rus'. Consequently, until entering into a union with Poland and re-Christianising, Lithuania evolved as a fragile limited access order.

North *et al.*, (2009) define limited access orders (LAOs) in contrast to open access orders (OAOs). OAOs provide security through a state monopoly on violence, supported by strong institutions deterring violent behaviour and ensuring the accountability of the police and military. OAOs support the universal rule of law, impersonal exchange and the functioning of independent and complex organisations. In LAOs, security is guaranteed by a privileged elite that includes people with the capacity for organised violence and those who can mobilise and extract rents from the economy. Such rents stem from exclusive access to property rights, productive resources, and organisations protected by third-party enforcement. Understanding their similar incentives, the members of the elite commit to preserving peace and maintaining their exclusive privileges. The long-term stability of LAOs rests on the 'double balance' between limited access to politics and the economy. This alignment results in limited political and economic competition, while the shortage of independent organisations limits the benefits of cooperation, including the dispersion of knowledge, division of labour and innovation. Therefore, one should expect LAOs to be less developed than OAOs.

Fragile LAOs represent the least sophisticated type of social order, lacking a stable framework for limiting violence and barely sustaining the state itself. The composition of the elite is especially fluid and the possibility of violence increases with any changes in the internal balance of power. The resulting institutions are simple and ad-hoc and cannot provide a stable environment for organisations. Fragile LAOs can improve by building institutions that stabilise elite commitments and maintain the state's organisational structure. These features are characteristic of basic LAOs that also possess functioning public law and can support semi-private elite-owned organisations. Such organisations are important for enhancing the extraction of rents and create a layer of impersonality by benefiting all members of the elite. In mature LAOs, institutions are durable beyond specific elite arrangements, elaborate public and private law exists, and the state can provide third-party enforcement to some private organisations.

The GDL remained a fragile LAO throughout the analysed period. Its elite was internally unstable and bound by violence-based privileges, while inherited informal institutions could not support complex political, religious, or economic structures. Despite this, Lithuania achieved *some* institutional development, and its progress illustrates that LAOs are situated along a continuous spectrum. While most empirical applications of the conceptual framework highlight changes between different categories of social orders, this paper focuses on developments within a single category, considering that categorisation is one of the criticisms of North *et al.*, (2009) (e.g. Polachek, 2012). Moreover, exclusive focus on a fragile LAO allows illustrating that changes in institutions, especially informal ones, can result from an incremental process as much as from a discrete switch between regimes.

The Lithuanian elite became somewhat more stable with the restriction of ruling privileges to the grand duke's family and the integration into the nobility of rival dukes, whose privileges became tied with loyalty to the core elite. The nobles became key figures in warfare and the emerging administration, eventually obtaining hereditary property rights. Further incentives for productive activity developed as the elite sought to finance its resistance against the Teutonic Order by accommodating Christian settlers and expanding trade and crafts. Following the conceptual framework, identified changes in the social order raise a hypothesis that they should be followed by improving economic outcomes. Indeed, institutional development coincided with economic growth at the extensive margin, reflected by expanding agriculture, urbanisation, an increasing number of castles and the appearance of Lithuanian coins. However, as also expected from fragile LAOs, health data does not show increases in *average* living standards, potentially due to population growth and inequality.

A positive association between institutional and economic development is long-established in cross-country research (e.g. Acemoglu *et al.*, 2019; Rodrik *et al.*, 2004). This paper illustrates the

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relationship in a new historical setting and expands the literature based on North *et al.*, (2009) that focuses on periods before the Industrial Revolution. Among the few existing studies, Hermann-Pillath (2019) analyses Russia from the 18th century, Bogart (2017) studies the East India Company in England from 1600 to 1813, Carugati *et al.* (2019) test the theory on Ancient Athens, and Young (2021) studies the medieval Carolingian Empire.

This paper also contributes to the literature analysing social orders in Eastern Europe, which is popular for studying contemporary LAOs (e.g. Keudel and Carbou, 2021; Toshkov *et al.*, 2021). Finally, this paper is the first to apply an institutional economics framework to Lithuanian economic history. Earlier books discussing the GDL's late-medieval economy primarily follow a historiographic (or Marxist-historiographic) approach (Baronas *et al.*, 2011; Jurginis, 1978; Łowmiański, 1931-2; Šalčius, 1998[1943-1957]; Пашуто, 1959). They are largely integrated into modern historiography and/or cited as sources in the paper. The distinction of this paper is that it organises the existing findings under a coherent framework to focus on institutional development and incentives. Norkus (2007; 2018[2009]) makes a similar effort applying comparative historical sociology of empires, but does not relate his findings to economic outcomes.

General history of Lithuania (~1245–1386)

Lithuanian lands began attracting more attention in the chronicles of their neighbours in the 13th century, mostly in the context of battles (Kiaupa *et al.*, 2000).[2] A treaty with the Principality of Volhynia was signed in 1219 by 21 Lithuanian dukes, either representing their lands directly or representing ruling families associated with these lands. The Lithuanian lands, often separated by ancient forests and swamps, functioned like small chiefdoms, whose dukes mainly profited from collecting taxes and organising raids into other territories. Foreign campaigns, occasional confrontations with the Golden Horde and the arrival of the Teutonic Order incentivised the Lithuanian dukes to join their lands into a confederation.

A state emerged after Mindaugas consolidated his power over rival dukes. His domain was located in Lietuva – the largest ethnic Lithuanian land between the rivers Nemunas and Neris, which gave the name to the Grand Duchy (Figure 1). While the shortage of historical sources somewhat obscures his assumption of power, Mindaugas was already called 'the highest king' in about 1245 and, at least loosely, controlled all of ethnic Lithuania. He also controlled the Black Rus' and exerted significant influence over the Principality of Polotsk.

In 1253, Mindaugas reached a deal with the Teutonic Order to receive baptism and be crowned by the Pope in exchange for a large part of Žemaitija and parts of close Baltic lands that were not yet under his full control. Conversion to Christianity and failed military campaigns in Rus' caused discontent among the Lithuanian elite, which at first pressured Mindaugas to renew the war against the Order, before eventually killing him in 1263. Mindaugas was replaced by Treniota, who was soon killed himself by the former king's loyalists. In 1267, Mindaugas' only surviving son Vaišelga entrusted the throne to his cousin-in-law, the Duke of Halych Shvarno. Shvarno's rule was brief and not well-documented – he died in his homeland in 1269. The next grand duke Traidenis firmly re-established Lithuania's paganism.

Traidenis died under obscure circumstances in 1282, followed by the similarly brief and poorly documented reigns of Daumantas, Butigeidis, and Pukuveras, during which the conflict with the Teutonic Order escalated. Nevertheless, the period marked the birth of a ruling dynasty, as Butigeidis and Pukuveras belonged to the same family. Pukuveras was succeeded by his son Vytenis, who ruled without interruption until 1316, successfully resisting the Germans and expanding into Rus'. Vytenis was followed by his brother Gediminas. He is considered the proper founder of the ruling dynasty since he fully consolidated his power within ethnic Lithuania and solidified the clan's superiority over other aristocrats. Gediminas died in 1341, leaving the throne to his son Jaunutis. Previously undistinguished, Jaunutis was quickly overthrown by his older brothers Algirdas and Kęstutis in anticipation of a Teutonic attack.

[2]This book is used as the main source of Lithuania's general history throughout this section.

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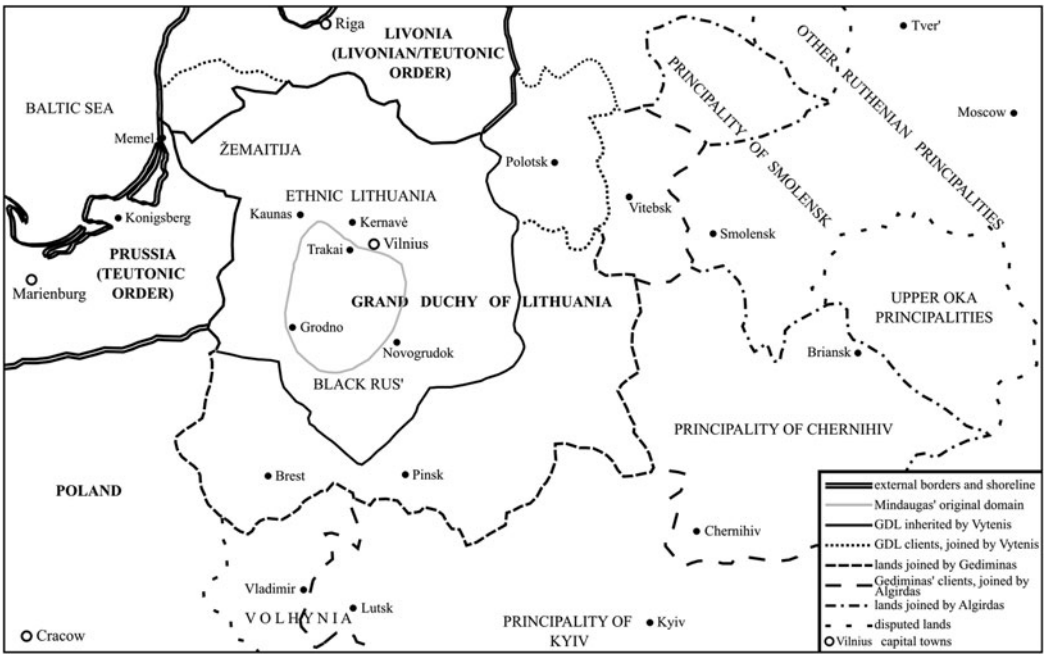

Figure 1. Map of the GDL in ~1245–1386 (author's reproduction based on Kiaupa *et al*., 2000: 83, 58).

Algirdas became the grand duke in 1345 with the full support of the elite. Until about 1362, the Teutonic Order suffered from the Black Death, and Lithuania further expanded its Ruthenian territories. However, the Germans recovered and reached ever deeper into Lithuania, while other conflicts – with the Principality of Moscow in northeastern Rus' and with Poland in Volhynia – increasingly strained Lithuanian resources. Thus, in 1377, Jogaila (Jagiełło) succeeded his father in a difficult situation, which he sought to resolve by considering conversion to Christianity. He signed a secret treaty with the Order that did not protect the lands of Kęstutis, prompting Kęstutis to oust him in 1381. Nevertheless, the consensus among the elite shifted towards ending the war, and Jogaila, backed by the Order and the citizens of Vilnius, returned to power in the next year.

Jogaila signed three further agreements with the Order, committing to adopt Christianity and give up a significant portion of Žemaitija. Yet, he did not ratify the documents, while Kęstutis' son Vytautas, who had escaped from captivity to Prussia, submitted to Jogaila in 1384. Jogaila and Vytautas feared that receiving Christianity from the Teutonic Order would threaten their sovereignty. Accepting Moscow's proposal to baptise Lithuania as Orthodox would have not only failed to end German aggression, but also removed the key distinction of the Lithuanian elite from the nobility in Rus'. The best option was accepting Christianity from Poland, which was Catholic and could provide military support. Furthermore, Poland searched for a new king, tempting Jogaila to fulfil his dynastic ambitions. Thus, the earliest period of the GDL's history ended with a dynastic union that Jogaila established in 1386.

Limited access order in the Grand Duchy of Lithuania

The reasons why late-medieval Lithuania was a fragile LAO are succinctly captured in a quote from Baronas *et al.* (2011):[3]

[3]This book is used extensively throughout the text. It is part of a series commonly called The Academic History of Lithuania, where leading historians synthesise the most important research on specific periods.

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> The early monarchy functioned not as a territorial state governed by institutions, but as a political entity based on personal relationships. The existence of such an entity required the elite to be directly tied by subordination, loyalty and friendship, while the political stability could be destroyed by the death of any specific ruler (300; author's translation).

Lithuania's categorisation as a fragile LAO is also evident from its history presented in the previous section. But stopping here would miss the conceptual framework's endogeneity.

The theory proposed by North *et al.*, (2009) encourages asking: why the fragile LAO in Lithuania functioned the way it did? Was there any institutional change? What economic incentives did the social order generate? (How) did these incentives feed back to institutions? To answer these questions, the application of the conceptual framework is organised into four themes, including the GDL's elite and its political, religious, and economic institutions. Organising the analysis thematically helps to make the most of the limited factual information and capture the incrementality of the changes.

Elite

The main feature defining Lithuania as a fragile LAO was the instability of its elite. In the 1240s, the elite accepted Mindaugas' superiority, but it was loosely knit and consisted of competing princely dukes (Baronas *et al.*, 2011: 313–315). Their main rents resulted from ruling privileges and provided tax revenue, income from trade and military resources. Rents from Ruthenian territories were particularly important due to their initial economic superiority and existing traditions of paying tributes (Łowmiański, 1932: 328–370; Norkus, 2018: 334–370; Baronas *et al.*, 2011: 363). Mindaugas sought to build trust in the elite through personal ties – Daumantas of Nalšia married Mindaugas' sister-in-law, while Lengvenis, also of Nalšia, and Treniota of Žemaitija were nephews on his sister's side (Baronas *et al.*, 2011: 245–251; Jankauskas, 2015). Mindaugas' nephew on his brother's side Tautvilas was forgiven for mutiny and allowed to rule Polotsk. His son Vaišelga ruled the Black Rus' from Novogrudok.

Yet, this can barely be called Mindaugas' elite – the power and privileges of the regional dukes were not granted by the monarch, but stemmed from their families' independent authority in the lands of the Grand Duchy. Daumantas, Lengvenis, and Treniota inherited their positions from their fathers. Even including the three mentioned dukes, Mindaugas' family directly ruled fewer than half of the GDL's regions (Bumblauskas, 2005: 37). Therefore, Mindaugas' hold on power was limited, and pressure from the Teutonic Order meant that family ties did not prevent Daumantas and Treniota from organising the coup of 1263.

Ruling privileges retained their primary importance throughout the analysed period. Nevertheless, Mindaugas started the consolidation of power, continued by his successors, that eventually improved leadership stability by shifting the source of privileges to membership of the elite. Mindaugas forced the brothers Dučius, Milgerynas and Gineika to flee Nalšia, killed the Bulionis brothers from Šiauliai, and is alleged in the sources to have killed two pairs of unnamed cousins and nephews (Baranauskas, 2000: 206–207; Baronas *et al.*, 2011: 43). The dukes of Nalšia and Deltuva disappeared from the historical record as independent leaders following Vaišelga's revenge for his father's death, and in Žemaitija, no powerful dukes emerged to succeed Vykintas and Erdvilas (Baronas *et al.*, 2011: 43–47, 306). Even if some lands were not integrated as easily, regional dukes ceased to rival monarchs soon after the reign of Mindaugas.

Jankauskas (2015) notes that due to internal fights and warfare, the number of regional dukes in ethnic Lithuania significantly declined by the time Gediminas assumed power. Gediminas is generally recognised as the first grand duke to fully consolidate his authority. His supremacy was no longer questioned by anyone inside the GDL – other dukes acknowledged castle building, the settlement of empty territories and establishment of administrative units as his exclusive privileges (Baronas *et al.*, 2011: 282–283). Gediminas also received support from foreign allies (often secured through marriages of his daughters), and positioned himself as the natural ruler of the whole Grand Duchy in

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treaties and letters to Western European towns (Baronas *et al.*, 2011: 337–348; Rowell, 1994: 87–94). Internationally, Gediminas was recognised as equal to Christian princes (Rowell, 1994: 59–65).

Gediminas established the ruling dynasty because, unlike Mindaugas, he concentrated the ruling privileges within his family (Baronas *et al.*, 2011: 334–341). He was not only no longer challenged by the regional dukes, but also managed to distribute rents among his sons in a way that left them satisfied (Rowell, 1994: 236–237). Elite stability was among the reasons prompting Gediminas to divide ethnic Lithuania into the duchies of Vilnius and Trakai, the latter of which was held by an unknown family member before Kęstutis was appointed in 1337 (*Ibid.*: 66–69). Increasing Lithuanian presence in Rus' further expanded the ruling privileges available to Gediminids – almost all family members controlled Ruthenian lands (Baronas *et al.*, 2011: 334–358). Algirdas ruled Vitebsk; Narimantas held Polotsk, Pinsk, and Grodno; Karijotas ruled Novogrudok; Liubartas obtained Lutsk and Vladimir. Kyiv was similarly held by Gediminas' brother Teodoras. Ruthenian principalities were typically granted to married sons, distancing them from the Lithuanian aristocrats and weakening their claims to the throne. As Rowell (1994: 293) notes, the Gediminid elite was both sufficiently large to secure extensive rents in Rus' and sufficiently small to share them.

The nature of rents from military activities also changed. Initially, the integration of the regional dukes' armies into a structure subject to the grand duke was key for state-building (Baronas *et al.*, 2011: 313–315). Private armies still engaged in independent raids, as with Lengvenis' men in Livonia and Volhynia, but they could be relied upon during wars and strategic campaigns. Gediminas further expanded this practice by contracting the Lithuanian armies to neighbours that also fought the Teutonic Order, including Poland, Riga, Pskov, and Novgorod (Rowell, 1994: 229–262). Foreign contracts helped to maintain good relations with other princes and ensure the soldiers' battle-readiness, while the Lithuanian dukes benefited from the spoils of war, including slaves.

Military activities remained a significant privilege, but became largely restricted to the Gediminid family and less critical for the regional dukes. In the second half of the 14th century, the regional dukes were noticeably less capable than in the mid-13th century (Jankauskas, 2015). Because the monarch needed to sign off on military campaigns, the armies of the regional dukes had become significantly weaker, if not obsolete, with their best-equipped regiments primarily convened for defence. Their independent activities became mostly confined to small-scale raids in the border territories and along trade routes.

Under Vytenis and Gediminas, regional dukes were gradually rewarded with administrative privileges and became heads of newly created districts around castles and estates (Jankauskas, 2015; Baronas *et al.*, 2011: 307–313; Petrauskas, 2002). The monarchs entrusted regional dukes to enforce their will, as they already possessed local personal networks. Additionally, the hold of important defensive castles was crucial for Gediminas' consolidation of power (Rowell, 1994: 59–61). Besides providing tax revenue and improving the grand duke's violence capacity, castles and estates generated rents that could be distributed to the regional dukes. As the district elders (castellans) likely already had family property rights, their positions could become hereditary (Baronas *et al.*, 2011: 311). Thus, the changing role of regional dukes contributed to the emergence of the nobility – a layer of the elite under the ruling family (Bumblauskas, 2005: 84–90; Rowell, 1994: 293).

District elders reduced the extent of the grand duke's itinerant rule, also reducing the demand for armed escorts (Baronas *et al.*, 2011: 258–259). This change eventually created another class of nobles. Starting from Gediminas, the monarchs began granting their escorts hereditary land to facilitate their preparations for war (Bumblauskas, 2005: 84). The lesser nobility emerged gradually through informal relationships during the 14th century, and war service was recognised as the nobility's formal distinction by Jogaila in 1387. The lesser nobility also included Ruthenians, who participated in military activities and whose support remained indispensable to their local Gediminid dukes (Rowell, 1994: 294–302). Yet, they remained outside the GDL's core elite since leading administrative positions in ethnic Lithuania were mostly occupied by locals, and Jogaila formally recognised only the rights of Catholics as an incentive to conversion (Rowell, 1994: 291–295; Frost, 2015: 68).

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Overall, there was an important difference in the Lithuanian elite on the eve of Jogaila's coronation in Poland, compared to the reign of Mindaugas. Although the elite was still bound by rents from ruling separate regions of the GDL, these privileges were now granted by the monarch to the dukes of the Gediminid dynasty, rather than the regional dukes whose power had originated outside the elite. Rents from military campaigns retained their importance only for the core elite. Regional dukes evolved into enforcers of the grand duke's will as local administrators, strengthening his position together with the lesser nobility. Despite the concentration of the ruling privileges in Gediminas' family, the emergence of both layers of nobility broadened the elite. The ruling dynasty distributed more privileges, including administrative positions and property rights, to more people and enjoyed broader support. The elite expanded from a single class of regional dukes to three classes of the ruling dynasty, the district elders and the lesser nobility.

These changes made the elite more stable, and fights for supreme power were increasingly contained within the ruling clan (Table 1). Leaving aside the conflict between Jogaila and Kęstutis and Jogaila's second tenure, the average uninterrupted rule of the Gediminids was 49 years (37 starting from Gediminas), compared to about 8 years before their ascension. Under the Gediminid dynasty, even forced leadership transitions were resolved more peacefully, as no overthrown leader was killed or left uncompensated. Algirdas allowed Jaunutis to rule the small Principality of Izyaslavl (Baronas *et al.*, 2011: 465). In 1381, Kęstutis installed Jogaila in Vitebsk, which he considered to be Jogaila's patrimony (*Ibid.*: 537). Only Kęstutis himself died in captivity during the counter-coup, although there is no clear evidence that he was killed (Kiaupa *et al.*, 2000: 121).

Political institutions and structures

Despite improving elite stability, Lithuania's organisational and institutional structure remained weak. The monopoly on violence was not achieved even in the 1380s. The Teutonic Order posed an external challenge to the elite, also making it more difficult to consolidate power in Žemaitija, where the local dukes retained autonomy and Lithuanian castles were not fully integrated into the administrative network (Baronas *et al.*, 2011: 45–47). The hold on Ruthenian territories was equally soft – Norkus (2007) argues that Lithuania was able to capture them primarily due to the power vacuum left by the Golden Horde's invasions. Besides collecting taxes and sourcing craftsmen, traders, and warriors, the Lithuanian dukes did not interfere in the daily life of the locals, and the Ruthenian nobility retained a significant influence (Rowell, 1994: 294–302). Multiple dukes themselves converted to Orthodox Christianity, which had been present in the region for centuries.

The GDL's political institutions remained simple, including the emerging administration. There was no division of administrative labour or defined positions, except for the district elders who were responsible for organising defensive activities and distributing justice (Baronas *et al.*, 2011: 307–313). However, since law was exercised primarily through tradition, the elders remained illiterate (*Ibid.*: 331). Reliance on patron-client networks also meant a decentralised tax system based on norms that had developed differently according to context-specific needs (*Ibid.*: 369–370). In the Ruthenian territories, at least some taxes and services were inherited from the Kyivan Rus', while in Lithuania, the obligations could differ between families of similar status. Žemaitija was no different in largely preserving its separate customs and faced lower taxation in return for military service (Norkus, 2018: 357–358).

No formal institutions existed even to manage leadership succession. Despite papal sanction, Mindaugas' plan to pass the crown to his son failed following his violent removal (Bumblauskas, 2005: 40). Although later rulers, starting with Pukuveras, inherited their positions from brothers or fathers, clear rules of succession did not develop. The elite did not practise the primogeniture common elsewhere in Europe (Baronas *et al.*, 2011: 354). Without institutions ensuring the nomination of a ready candidate, succession rested on the leaders' personal choices. Gediminas considered Jaunutis a compromise candidate, while Jogaila was also not particularly powerful and relatively unknown to chroniclers before his ascent (Rowell, 1994: 281–283; Baronas *et al.*, 2011: 354). Even if the

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Table 1. Leadership (in)stability in the 13th–14th century GDL.<TS: Please check all Table captions are copied from metadata.>

Period	Ruler	Continuous tenure	Succeeded by	Violent exit?
1240s–1263	Mindaugas	~20	Rival	+
1263–1269	Treniota / Vaišelga / Shvarno[a]	2/3/2	Rival/cousin-in-law / unrelated?	+ /-/?
1269–1282	Traidenis	13	?	?
1282–1295	Daumantas / Butigeidis / Pukuveras	63	Son/brother/son	?/-/-
1295–1316	Vytenis		Brother	–
1316–1341	Gediminas		Son	–
1341–1345	Jaunutis		[brother]	[+][b]
1345–1377	Algirdas	35	Son	-
1377–1381	Jogaila		[uncle]	[+]
1381–1382	Kęstutis	2	[nephew]	[+]?
1382(1392)–1430	Jogaila (Vytautas)	48	Jogaila's brother	-

[a]Two lines include multiple dukes due to their brief and poorly documented tenures.
[b][+] refers to transitions within the ruling family, where the losing rivals survived and were compensated.

Gediminids managed to resolve conflicts within the family, designating successors by ad-hoc decisions made them more vulnerable.

The only political institution already present in the 13th century was an informal council that provided a forum for the grand duke to consider the opinions of the core elite and the nobility (Petrauskas, 2005a; 2005b). The grand duke's council evolved from tribal gatherings, supplementing the ruler's travels throughout the Grand Duchy, and gradually became more important with the development of castles, estates, and a permanent capital. Although the exact power dynamic between the grand duke and other members of the elite is somewhat unclear due to the confidentiality of the meetings, many pivotal decisions were likely made inside the council (Petrauskas, 2005a). Throughout the analysed period, the council remained largely unchanged, while its informal nature and composition based on personal relationships made it less sophisticated than Western European parliaments of the time (Petrauskas, 2005b). Nevertheless, it provided at least some structure to elite relationships.

A few changes also improved the GDL's fragile institutional environment. The most important one was that by concentrating the ruling privileges inside his family, Gediminas restricted the pool of potential successors. Unquestionable support for the dynasty became the unifying feature of the elite since it reduced uncertainty and provided continuity to the GDL as the property of a specific clan. The Gediminid dynasty became synonymous with the state structure, thereby representing an informal institution in itself. With the clan retaining power throughout the 14th century, Gediminid dukes increasingly used common symbols (Baronas *et al.*, 2011: 353–355). Gediminas claimed to have been appointed by God (Rowell, 1994: 65), signalling a qualitative change in the understanding of the grand duke's role and implying legal authority, specifically to assign titles to lesser dukes. Following its de facto role, the ruling dynasty was cemented as an institution in Jogaila's formal privilege of 1387, where he emerged as the supreme owner of the GDL in public law, with the nobles obtaining the right to their patrimonies only by the permission of the grand duke (Baronas *et al.*, 2011: 282–283). The nobility thus became personally invested in the Gediminids retaining their power.

Gediminas further improved the state's administrative structure by establishing a permanent capital. While Mindaugas constantly travelled to collect taxes and impose his rule through physical presence, Traidenis was the first grand duke to have a more regular residence in Kernavė (Baronas *et al.*,

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2011: 322–327). The town's expansion improved his security and created a place for the concentration of economic resources, but Kernavė would be somewhat sidelined by Vilnius. Initially a village, Vilnius was purposefully developed in the 1290s to strengthen the power of Pukuveras and Vytenis (Girlevičius, 2016). Gediminas built two castles in the town, and in 1323, it already appeared in his letters to Western Europe as the capital (Rowell, 1994: 72). Inheriting the capital as their personal domain should have given future leaders a stronger hold on power.

A permanent capital likely contributed to the introduction of new taxes, such as tithes, that appeared with emerging administration (Gudavičius, 2002; Baronas *et al.*, 2011: 258). Throughout the 14th century, the network of castles and estates, originally important for housing the travelling monarchs, expanded significantly (Baronas *et al.*, 2011: 43–47, 367–369). With the integration of regional dukes into the nobility, a permanent capital made space for the castles and estates to start shaping regional centres and become the main places for collecting taxes and organising labour and war duties. These functions, as well as their defensive potential, made castles and estates akin to the *villae regis* of early-medieval kingdoms in England (Rowell, 1994: 59–61). Albeit decentralised, simple and informal, the emerging administration marked an improvement in comparison to the 13th century.

In sum, the Lithuanian elite achieved greater stability not simply because the Gediminids defeated their rivals, withstood the Teutonic attacks and resolved the leadership turnover. Greater stability was also the result of institutional change. With the changing nature of the ruling privileges, the state's organisational structure rested on the ruling dynasty, and in the context of customary law, the acceptance of the clan's rule became a central political institution. As the rents resulting from administration, military service, and property rights were granted by the ruling family, the nobility developed an increasing interest in the Gediminids remaining in power.

Religion

Paganism differentiated Lithuania from the rest of Europe and provided a pretext for the Teutonic crusades. However, it was a necessary condition for the grand dukes' legitimacy.[4] Regional dukes opposed Mindaugas' baptism, which may have itself been aimed at receiving support from Livonia in internal fights (Kiaupa *et al.*, 2000: 59–60). Traidenis' return to paganism and the reluctance of later leaders to baptise reflect the elite's traditional preferences. Žemaitija, already autonomous, was even more staunchly pagan, and baptism would have blurred the key difference between Lithuania and the Teutonic Order. For a long time, the net benefits of Christianity were unclear, while the Church would have required separate taxes, likely coming at the expense of the elite's income (Jurginis, 1978: 18–20). Furthermore, with multiple territories in Rus' still up for grabs, it was easier for pagan dukes to baptise as Orthodox and obtain local legitimacy than would have been the case if they were Catholic (Frost, 2015: 24–25).

However, the pagan religion could not support the grand dukes in their consolidation of power or distribution of rents (Rowell, 1994: 118–148; Laužikas, 2013a). In the absence of written culture, paganism was decentralised and not inherently conducive to a common authority or ideology. The GDL's Ruthenian regions and Žemaitija therefore retained their cultural distinctiveness. In contrast to Christianity, paganism could not provide public goods like education and healthcare or run monasteries that might have increased rents. There were attempts to centralise paganism, although as Bumblauskas (2005: 94) implies, Lithuania first needed state structures to be able to maintain the clergy. As a fragile LAO, Lithuania was unable to support a religious organisation. Yet, paganism also did not create a path dependence that would have prevented the elite's transition to Christianity once the structure of rents and external circumstances changed.

The LAO became organised around the Gediminid dynasty, which gradually replaced religion as the source of leadership legitimacy. The elite could now use religion more instrumentally. From at least the time of Gediminas, the grand dukes were increasingly interested in Christianity, which was necessary for

[4]See Rubin (2017) on how religion-based political legitimacy impacted economic incentives throughout history.

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improving trade and the capacity of local crafts. Ongoing war with the Teutonic Order required additional sources of income and high-quality defence infrastructure. Western Europeans were banned from trading with pagans, while the required expertise in crafts was sought from skilled Christian settlers (Rowell, 1994: 189–207). Vytenis had already invited Franciscan friars to preside over a Catholic church in Novogrudok to improve his relationship with Western Europe and serve German merchants (*Ibid.*: 58). By the time Gediminas built a central pagan shrine in Vilnius, three Christian churches had already been constructed for German and Ruthenian immigrants (*Ibid.*: 65).

Paganism and Christianity co-existed until the benefits of Christianity became more important for the elite's survival. The grand dukes initially hesitated to baptise as they could use Christianity to their advantage without accepting the religion for themselves (*Ibid.*: 197–228). Bumblauskas (2005: 124) argues that every Lithuanian ruler tried to convert: not only Mindaugas, but also Vytenis in 1298, Gediminas in 1323 and 1343, and Algirdas and Kęstutis in 1349, 1351, 1358 and 1373. However, it is debatable whether these attempts were genuine – grand dukes repeatedly reneged on their promises after receiving their sought-after diplomatic concessions (Baronas, 2019). The 1380s disturbed this balance – the increasingly difficult war against the Teutonic Order required additional resources, while further conquests in Rus' were unlikely due to emergent Moscow and the declining number of Gediminid dukes (Frost, 2015: 24–25). Thus, Jogaila chose the union with Poland.

While the grand dukes in the 13th century could not abandon paganism if they wished to remain in power, Jogaila received support for his move. Vytautas and Jogaila's brothers who had not inherited Ruthenian principalities – Vygantas, Karigaila, and Švitrigaila – quickly switched to Catholicism (Frost, 2015: 4). They could only expect rents if the Lithuanian elite survived. The nobility likely supported the second attempt at baptism for similar reasons. Given that the nobles no longer profited from the military economy as they had in the 13th century, they expected to receive the same rights possessed by their Polish counterparts as a result of Jogaila's coronation. Indeed, the formal privilege of 1387 granted at least similar rights, including free and hereditary disposition of land in exchange for taxes and military service (Baronas *et al.*, 2011: 282–283).

Economic institutions

Formal extension of property rights to the nobility in 1387 responded to an existing demand. Yet, as violence-based rents remained significant, this demand took long to coalesce. The key economic institution in late-medieval Lithuania was the allod – family-owned property rights, established in customary law (Baronas *et al.*, 2011: 251, 273). Allods were common in early Central European states, and in contrast to Eastern Slavic territories, allods allowed peasants to retain their farms (Babinskas, 2022; Baronas *et al.*, 2011: 255–257). Peasants working their own land led to only small-scale agriculture and weak incentives for its expansion for the elite (Babinskas, 2022; Baronas *et al.*, 2011: 367–368). In the 13th century especially, violence-based rents incentivised the elite to primarily focus on the war economy. Paganism also did not encourage the broader societal trust and impersonal relationships necessary for gathering into organisations (Laužikas, 2013a).

The peasants' farms were dedicated to personal consumption, and agriculture was generally unproductive (Baronas *et al.*, 2011: 97–99, 134). Its primary organisational system was shifting cultivation, while crop rotation was irregular (Šalčius, 1998: 15–17; Baronas *et al.*, 2011: 121–123). As the case of Dubingiai in Eastern Lithuania illustrates, further obstacles to crop rotation resulted from the elite's inability to prevent the violent campaigns of the Teutonic Order (Laužikas, 2013b). Besides contributing to the instability of the local population, the invaders stole cattle, and peasants could not save up for better tools like iron ploughs. Furthermore, patron-client networks were not universal and based on different local traditions (Baronas *et al.*, 2011: 273–284). While peasants paid various in-kind taxes, donated gifts, and gathered for large activities (like building castles, roads, and bridges), they were not generally obliged to carry out services in nobility-owned lands. For instance, rather than working in manors, peasants often made up the nobles' protective entourages (*Ibid.*: 248).

Incentives for non-agricultural activity were similarly limited. Initially, Lithuanian merchants depended on the elite, mostly fulfilling its orders (Baronas *et al.*, 2011: 261). The elite was more

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interested in the organisation of violence. Its armed bandits regularly marched into neighbouring lands and attacked merchants on commercial roads at least since the late 12th century (*Ibid.*: 267–268, 138–140). Particularly profitable was the export of slaves, who were sourced by capturing peasants during the raids. Many independent gangs existed as well, and the elite tolerated them as long as they did not directly act against the elite's interests (*Ibid.*: 267–273). The elite was reluctant to limit the activities of independent bandits fearing that they might opt for the protection of the Teutonic Order. Instead, the Lithuanian elite protected the gangs itself and benefited when they raided Prussia or Livonia. This way, the elite prioritised its own security over the general control of violence and commerce.

Like political development, changes in economic incentives were related to the consolidation of ruling privileges and the emergence of the nobility. While allodial land belonged to the family and tenured land was granted only for a limited time, the nobles naturally sought to maximise its exploitation without much regard for preserving quality (Machovenko, 2011). The gradual introduction of hereditary property rights to district elders and the lesser nobility in the 14th century allowed them to accumulate land. This made it possible to engage in larger-scale agriculture and acquire rents from more productive activities. Rents from the manor economy started appearing at the end of the 14th century – around the time when Jogaila formally established the property rights of the nobility in public law in 1387 (Baronas *et al.*, 2011: 284–286).

The redefinition of property rights according to political hierarchy increased access to land for those who had access to other resources required for its development. Early feudal relationships with peasants emerged as some became serfs by pawning their farms following events like natural disasters or bankruptcy (Bumblauskas, 2005: 90). The presence and protection of the nobility improved the peasants' food and personal security, while farms around castles and estates could achieve at least some specialisation, distributing peasants among activities such as forestry, beekeeping, fishing, or horsekeeping (Baronas *et al.*, 2011: 126–127, 256–258).

Banditry became an obstacle to commerce as it conflicted with Gediminas' plans to modernise Vilnius and attract skilled colonists (Baronas *et al.*, 2011: 270). In the 14th century, Lithuania signed at least five treaties with both branches of the Teutonic Order that granted security to travelling merchants (Mažeika, 1994). In the treaty of 1338, Lithuanian merchants were considered equal to Germans and Ruthenians, although there were also mentions of merchants still belonging to Gediminas and his elite (Baronas *et al.*, 2011: 262). At the same time, the promises of protection made in 1338 were weaker than those in 1323, signalling a non-trivial influence of the bandits (*Ibid.*: 271–272). Attempts to facilitate trade are again present in the 1367 treaty, where gangs were explicitly prohibited from travelling through areas designated safe to Livonian merchants, as enforced by the local nobility. Mažeika (1994) finds it possible that the trade with the Order, in fact, significantly financed the war.

The evolution of crafts also reflects the elite's political goals and changing institutional environment. Demand for craftsmen increased with the necessity to build masonry castles and Gediminas' efforts to establish Vilnius as a permanent capital (Kiaupa *et al.*, 2000: 78–79). Traces of the life and work of craftsmen are mostly found in and around major castles, where local production complemented imports and direct orders from towns like Riga (Baronas *et al.*, 2011: 264–265, 129–131). Alongside masonry construction, foreign craftsmen significantly contributed to the advancement of such industries as jewellery and pottery (*Ibid.*: 130–133). Even more importantly, skilled immigrants brought an inflow of capital and tax revenue, while the diversion of Livonian and Western European colonists from joining the Teutonic Order provided additional benefits (Malowist, 2010[1965]; Baronas *et al.*, 2011: 133–134). Eventually, the security that merchants and craftsmen received from the elite became an improvement in informal property rights, especially in (castle-)towns.

Institutional change and economic incentives

In sum, it is clear that late-medieval Lithuania was a fragile LAO. To answer the question raised at the beginning of this section, the GDL functioned the way it did because its elite's relationships were entirely personal and prone to conflicts, while the monopoly on violence remained distant. Political institutions

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Table 2. Changes in the Lithuanian LAO throughout the 14th century

	Before Gediminas (~1245–1316)	After Gediminas (~1316–1386)
Elite	• Consisted of competing regional dukes • Ruling privileges tied to independent local authority • Frequent leadership turnover	• Consisted of the ruling dynasty and the nobility • Ruling (and administrative) privileges tied to the elite • Conflicts contained inside the ruling family, leadership turnover less frequent
Political Institutions and Structures	• The grand duke's council as the only informal institution	• Simple administration around capital and castle districts • Acceptance of Gediminids as an informal institution regulating elite privileges
Religion	• Pagan religion decentralised and primarily used for political legitimacy	• Paganism gradually less important as a political institution • Accommodation (and eventual acceptance) of Christianity for political and economic benefits
Economic Institutions and Incentives	• Family allods based on customary law encouraged small-scale agriculture • The elite's incentives skewed towards extractive (vs. productive) activities	• Improving property rights, incentives for land accumulation and larger-scale agriculture • Improving security, structure and specialisation in trade and commerce (esp. in the capital and castle districts)

were informal and the state was unable to support complex political, religious, or economic structures. Paganism was a necessary condition for leadership legitimacy, but did not specifically help in consolidating authority. Lithuanian agriculture was defined by small farms dedicated to personal consumption, with the elite mostly profiting from violence-based privileges. Taken together, the features that made Lithuania a fragile LAO should have provided obstacles to economic development.

The second guiding question asks if Lithuania experienced institutional change. It did, and moved closer to being a basic LAO (Table 2). The elite became more stable with the concentration of ruling privileges within the grand duke's family and the integration into the nobility of regional dukes, whose status became dependent on supporting the ruling dynasty. Administrative and military service was increasingly rewarded with hereditary fiefs, creating a pathway for land accumulation and making it a more attractive source of rents than the organisation of raids. The nobility began forming a more pronounced demand for legal property rights that, together with the increasing necessity to finance the war against the Teutonic Order, opened opportunities to accommodate Christianity and transition from paganism.

The third guiding question helps to outline the changes in economic incentives. Administrative privileges and rents attached to military service created new classes of the elite and granted more productive streams of income than they had when the elite only comprised regional dukes. Stronger property rights improved access to land for those who had the means to invest and engage in larger-scale agriculture. Finally, addressing the fourth question, the realignment of economic rents alongside the political hierarchy fed back to political stability and improved the 'double balance'. With better security and increasing contact with Christians, local traders had more freedom to engage in market competition rather than just relying on the elite. Craftsmen were necessary in castles and could also learn from the immigrants and associate themselves with merchants.

Thus, throughout the analysed period, the conditions for productive activity in the GDL improved. The main hypothesis addressed in the next section is that Lithuania's economic outcomes should have been improving as well.

Development outcomes

Testing whether the economic outcomes of late-medieval Lithuania were associated with its institutional development presents a challenge. Neither approximate GDP estimates nor their inputs exist, while historians acknowledge the shortage of primary sources for establishing basic facts. Therefore,

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this section mainly synthesises available secondary evidence, which is common in historical settings without economic data. For example, Scheidel (2009) proxies the development of the Roman Empire on the number of shipwrecks, copper and lead pollution, meat consumption, and body height. Multiple studies in economic history measure prosperity with urbanisation or city growth (see review by Hanlon and Heblich, 2022). Studying medieval Low Countries, among other indicators, Prak and van Zanden (2023) consider church building.

Evidence on Lithuania's economic development is mixed, but generally supports North *et al.*, (2009). Malowist (2010) argues that in the 13th and 14th centuries, Eastern Europe lagged behind Western Europe both in production and trade. Within Eastern Europe, Lithuania belonged to the least developed region, situated between Rus' and Central Poland. Material evidence confirms the poor quality of life. According to data from a graveyard in Kernavė, average life expectancy ranged from about 20.5 to 28.5 years (Baronas *et al.*, 2011: 79). The health index of this site (comprising stature, illness, and trauma) ranks seventh out of 10 European excavations analysed by Steckel and Kjellström (2019), on average dated between 1200 and 1400.[5] Average life expectancy in 14th–16th century Alytus equalled about 27.8, roughly the same as recorded in another graveyard dated to the 5th and 6th centuries (Jankauskas, 1995; Baronas *et al.*, 2011: 79). No long-term improvements could be sustained due to high child mortality – only about two-thirds of children survived, while about half of all people reached the age of 20. Many women also died in childbirth.

From the 12th to the 14th century, the average height diminished by about 5 centimetres, likely as a result of food shortages brought about by wars and colder climate (Česnys and Balčiūnienė, 1988; Jankauskas, 1995; Baronas *et al.*, 2011: 80). The especially slow growth of children between the ages two and five (compared to a modern cohort), as well as delayed puberty, are similarly attributed to poor nutrition and environmental conditions (Šereikienė and Jankauskas, 2004). Jatautis *et al.* (2011) find that about 60% of Vilnius' population suffered from anaemia, also related to earlier deaths. In 13th–14th century Polotsk, *cribra orbitalia* – a condition associated with anaemia – was present in more than 30% of adults and 55% of children (Yemialyanchyk, 2020). Steadily poor health outcomes are consistent with the expectation that fragile LAOs should be underdeveloped.

Still, as the GDL made progress in building institutions, it achieved some material advances. One is the expansion of agriculture. Analysing communities living in similar geographic environments, as well as changes in the share of forests and bodies of water, Matulionis (1930) estimates that the total share of cultivated fields in ethnic Lithuania rose from 25% in 1200 to 30% in 1300 and 37% in 1400. A review of archaeobotanical studies by Grikpėdis and Motuzaitė Matuzevičiūtė (2020) finds the variety of cultivated crops also to have expanded during the 13th and 14th centuries.

Historiography generally agrees on an upward fertility-driven trend in population density (Jatautis, 2018: 195–200). Matulionis (1930) finds that the population density rose from 9 people per km^2 in 1200 to 12 people in 1300 and 16 people in 1400, although these numbers are considered too high. Pakštas (1968a) calculates the GDL's population density to have remained stable at 2 ppl/km^2 in 1263, 1341 and 1377, only rising to 2.5 ppl/km^2 in 1430. However, he argues that ethnic Lithuania was always denser than the annexed territories, estimating its population density in 1260 at 2.8 ppl/km^2 (Pakštas, 1968b). In 1430 (the only year for which regional numbers are provided), Pakštas (1968a) calculates that the population density in ethnic Lithuania increased to 6 ppl/km^2, compared to 2.25 ppl/km^2 in the rest of the GDL (2.9 ppl/km^2 excluding the Tatar regions).

The most widely supported work of Šešelgis (1988) estimates the population density in ethnic Lithuania in the early 13th century at 3.2 ppl/km^2, rising to 4.2 ppl/km^2 in 1410. While Šešelgis considers (1988) ethnic Lithuania smaller than Pakštas (1968a), his figures translate to the total population increasing from 207,100 to 277,100. The existing data are insufficient to compare the population density growth between the 13th and 14th centuries and check whether institutional development might have shifted the trend during the analysed period. Direct comparison would nevertheless be

[5]The average dating of archaeological sites, used to filter the authors' results, refers to the average year of the earliest and latest dating.

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difficult as the second half of the 14th century saw the Teutonic Order intensifying its campaigns. However, it is clear that the population of ethnic Lithuania grew despite the war, providing at least some indication of continued economic expansion.

Increasing population density is mirrored by evidence of urbanisation. Archaeologists document a significant growth of Vilnius during the 14th century (Katalynas and Vaitkevičius, 2001; Katalynas, 2006). As Vytenis and Gediminas increasingly settled in the capital, they created demand for the period's most advanced technology (Baronas *et al.*, 2011: 325–327). Material findings show that in the 1320s, the Lower Castle was renovated following Western European standards, including the expansion of settlements and infrastructure, such as wooden roads (Valionienė, 2019: 155–164). Vilnius continued to expand throughout the 14th century, and the distribution of household ceramics reveals its most intensive development in the third quarter of the 14th century. Valionienė (2019) shows that in this period, the town experienced a transformation and became relatively independent of the castle. Almost all roads that shaped Vilnius' later neighbourhoods formed already between 1350–1375.

In addition to archaeological evidence, approximate estimates in the database of the historic population of European towns confirm Vilnius' upward trajectory (Buringh, 2021). Having started at the bottom of the distribution with about 1,000 inhabitants in approximately 1200, Vilnius was already more populous than the median European town in 1300 (Figure 2). There were still about 130 larger towns in 1400, but since 1200, Vilnius had grown seven times (from ∼1,000 to ∼7,000 people). The estimates for Kaunas are stable at about 1,000 inhabitants, although archaeological findings suggest that its population density in the second half of the 14th century was increasing (Bertašius, 2016).

Buringh's (2021) estimates do not include Kernavė, which was likely comparable to Vilnius and had about 2,000–3,000 inhabitants in the 14th century (Baronas *et al.*, 2011: 68). The 13th and 14th centuries were the most prosperous for this town, with many luxury items imported from Rus' and simpler production dated to this period (Vėlius, 2005; Vitkūnas, 2006). Kernavė was primarily oriented towards trade, crafts, and defence rather than agricultural activity, and organised similarly to Ruthenian towns. A significant part of its production was made for export. Kernavė was the only place in Lithuania with evidence of specialisation, physical sorting (of stone workers, jewellers, smiths, and potters) and mass-production of similar goods, indicating production for the market (Bumblauskas, 2005: 62). Goods to and from Kernavė could travel to Riga, Rus', and, to a lesser extent, Western Europe.

Economic growth might be further inferred from the expanding network of Lithuanian castles. Castles were not built solely for defence, but also to serve as political and administrative centres, while material evidence reflects their economic importance. Castles had greater population density, more immigrants, hosted more trades, and provided storage for crops (Zabiela, 2016; Stančikaitė *et al.*, 2008). Archaeological findings show that Vilnius Lower Castle expanded since the second half of the 13th century and was densely populated in the 14th century (Kitkauskas, 2001). Stančikaitė *et al.* (2008) confirm the expansion of agricultural activity on the site until the mid-14th century. Although agricultural activity decreased somewhat in the second half of the century, this might be attributed to Vilnius' expansion beyond the castle borders. At the site of Impiltis castle (1050–1250), agricultural and other human activity significantly declined after it was destroyed, despite a settlement continuing to exist there until 1400 (Stančikaitė *et al.*, 2009). Skomantai hillfort in Žemaitija also recorded intensifying agricultural activity from the mid-13th century, potentially including crop rotation, before decreasing in the early 14th century with the destruction of its castle (Stančikaitė *et al.*, 2013).

Given the evidence of their economic role, it is logical to expect a higher number of castles to result in a larger economy, regardless of their original purpose. Baranauskas' (2003) summary of wooden castles in ethnic Lithuania that were important enough to have been mentioned in written sources allows to roughly estimate their relative number over time. Excluding the 15 castles mentioned only once, the number of recorded castles grew from six during Mindaugas' coronation in 1253 to 13 in 1300 and to 20 in 1350 (Figure 3). The number of important wooden castles peaked at 38 in 1385, in addition to seven masonry castles also built during the 14th century. Although the figures are likely imprecise, they reveal an upward trend. While wooden castles did start disappearing following the

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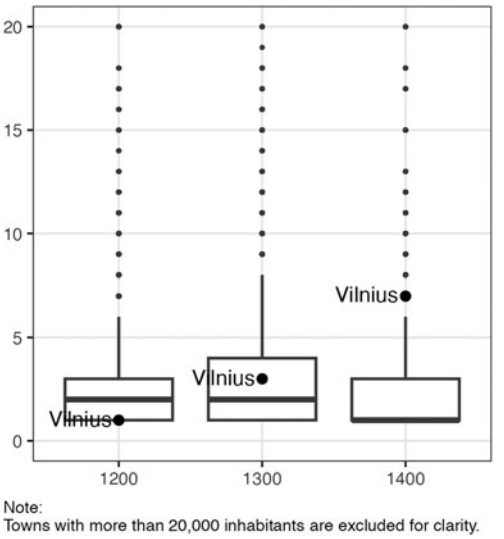

Figure 2. The distribution of towns in Europe by the number of inhabitants (in thousands) in 1200, 1300, and 1400 (based on Buringh, 2021).

defeat of the Teutonic Order, they still played an important economic role in the 14th century. Their multi-purpose nature is reflected by the complicated correlation between their number and the number of battles against foreign armies. Furthermore, after the analysed period, a share of the wooden castles developed into manors (Volungevičius, 2012).

Another testament to expanding market relations is the appearance of Lithuanian coins, replacing silver ingots that were difficult to partition (Baronas *et al.*, 2011: 153–156). Although debates about the precise dating of the first low-denomination coins have not been settled, they almost certainly appeared in the second half or the end of the 14th century (Ruzas, 2015: 45). Terleckas (2002) argues

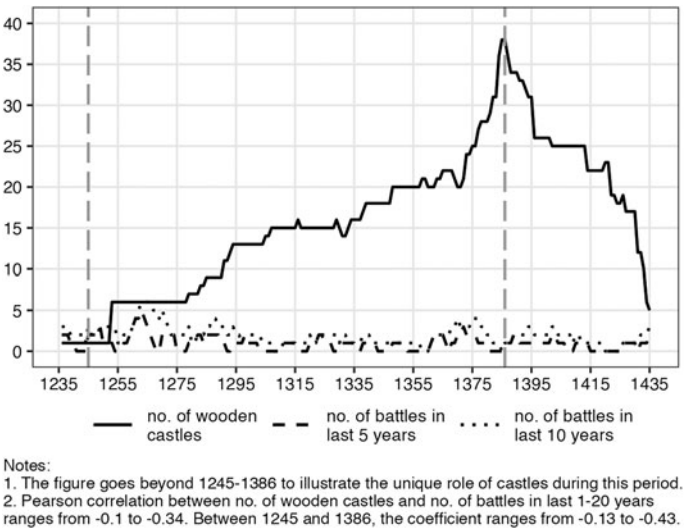

Figure 3. The number of wooden castles in ethnic Lithuania and the number of battles fought by the grand dukes' armies in the last 5–10 years (based on Baranauskas, 2003; Baranauskas, 2020).

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that the production of Lithuanian coins began before baptism – they were necessary for the silver tax (often considered to have appeared before baptism), which was universal and paid in monetary form. Moreover, people were already familiar with foreign coins and there was no shortage of skilled jewellers, while the Lithuanian coins had a unique design. Researchers nevertheless agree that the first low-denomination coins were the result of expanding activity during the 14th century.

In short, the synthesis of secondary evidence produces a twofold picture. It is clear that life expectancy and health outcomes in the GDL remained poor, and the economy did not deliver a good quality of life to the broader population. At the same time, the expansion of the castle network and cultivated fields, increasing population density, and urbanisation, as well as the usage of money, can be associated with improving specialisation and expanding markets.

How can economic development be reconciled with steadily poor health outcomes? The most likely explanation is that while the overall economy expanded, there was no per capita growth. In other words, the Lithuanian LAO could still only support a Malthusian economy. Building on the classical writings of Thomas Malthus, multiple scholars argue that pre-industrial growth was constantly matched by population increases, preventing any significant long-term gains in average living standards (Clark, 2007; Galor and Weir, 2000).

The described economic advances point to growth at the extensive margin rather than technological progress. Although agriculture covered more land, it remained largely based on shifting cultivation. In practice, insufficient productivity growth is reflected by the lack of increase in cattle height (Piličiauskienė and Blaževičius, 2018), or the fact that Lithuanians continued to primarily consume turnips and other less nutritious root vegetables despite the growing variety of crops (Česnys and Balčiūnienė, 1988; Grikpėdis and Motuzaitė Matuzevičiūtė, 2020). Non-agricultural production still represented a negligible share of the total. Jatautis (2018: 199–243) tentatively confirms the existence of the Malthusian trap with an analysis of burial data.

The failure of greater crop diversity to improve the average person's diet also suggests that development was felt by only a minority of the population. This makes sense, given that inequality and the elite's privileged access to the economy are important features of LAOs. Analysing data from several archaeological sites, Jankauskas (2003) finds a significantly higher incidence of a medical condition associated with obesity among high-status individuals, attributing the result to their higher consumption of calories. Buringh's (2021) data may reflect regional inequalities as the population of Ruthenian towns, including Polotsk, Vitebsk, Grodno, and Brest, declined during the 14th century (although their decline might have allowed the GDL to annex their principalities in the first place).

Thus, the seemingly contradictory conclusions regarding the development of late-medieval Lithuania do not dispute the conceptual framework. Evidence of economic development is compatible with steadily poor health outcomes since it took place at the extensive margin. Economic growth likely did not exceed population growth and was primarily experienced by the upper classes. While North *et al.*, (2009) expect fragile LAOs to be underdeveloped, as was the GDL, they should improve by expanding elite rents. Even if the existing data are insufficient to establish causality in the strict economic sense, recorded material advances at least coincided with (and were related to) the institutional changes that improved the stability of the elite and increased its incentives for productive activity.

Conclusion

Late-medieval Lithuania provides another case illustrating how institutional environments affect long-term development. As a fragile LAO, Lithuania was ruled by an unstable elite, its political institutions could not support complex organisations, while the elite's economic incentives were skewed towards extraction and the war economy. Although ensuring leadership legitimacy, paganism isolated the GDL from trading with Western Europe. These features indicate that late-medieval Lithuania should have been relatively underdeveloped, and studies of people's life expectancy and health support this expectation.

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At the same time, this paper illustrates that LAOs are not static. Despite limited changes in formal institutions, the consolidation of power and the concentration of ruling privileges within the Gediminid dynasty altered the informal institutional environment. The ruling clan started forming an administration around castle districts. Administrative privileges and war service were coupled with hereditary property rights, incentivising competing regional dukes and lesser nobility to support the ruling family. Consequently, the elite became more robust against external challengers and somewhat more stable internally, while the political role of paganism weakened. Property rights, better security, and accommodation of Christianity improved incentives to engage in productive activity. These changes raise the hypothesis that the GDL's economy should have improved.

Contrary to health outcomes, historical evidence shows some positive economic development, represented by expanding land cultivation, urbanisation, an increasing number of castles and the emergence of Lithuanian coins. These findings do not contradict the evidence of people's health since they only reflect expansion at the extensive margin. During the analysed period, the population likely grew at least as fast as the economy, suggesting that the GDL operated in the Malthusian trap, where per capita gains can only be temporary. Development was also distributed unequally.

Therefore, the case of a fragile LAO in late-medieval Lithuania supports the conceptual framework proposed by North *et al.*, (2009). It supports the theory from a static perspective, as the average living standards were generally poor and stagnant. From a dynamic perspective, the GDL's overall economy expanded in parallel with its institutional development, as reflected in the main hypothesis.

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