Trade and Political Fragmentation on the Silk Roads: The Economic Effects of Historical Exchange between China and the Muslim East

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Abstract

The Silk Roads stretched across Eurasia, connecting East and West for centuries. At its height, the network of trade routes enabled merchants to travel from China to the Mediterranean Sea, carrying with them high-value commercial goods, the exchange of which encouraged urban growth and prosperity. We examine the extent to which urban centers thrived or withered as a function of shocks to trade routes, particularly political fragmentation along natural travel paths. We find that political fragmentation along the roads to Aleppo and historic Chang’an — major terminus locations for cross-regional trade — damaged city growth. These conclusions contribute to our understanding of how a pre-modern international system operated through an examination of exchange between the two most developed world regions of the medieval and early modern periods, China and the Muslim East.

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The Silk Roads were among the world’s most important historical commercial routes, connecting economic interests in prosperous areas, like China and the Middle East, for centuries. Commodities traded on these trans-Eurasian routes included silk, coral, pearls, glass, jade, gems, perfumes, and incense. During the medieval and early modern periods, Chinese-Middle Eastern trade was both a reflection and driver of economic prosperity with scholars suggesting that the Silk Roads constituted a cross-regional, economic international system (Buzan and Little 1994) that played a crucial, connecting role in an emerging “world system” (Abu-Lughod 1989).

Scholars focused on historical Silk Roads trade emphasize the costs and dangers associated with overland exchange (e.g., Millward 2007; Frankopan 2016). Scholarship in this vein suggests that political fragmentation may have been a hindrance to gains from cross-cultural trade. Fragmented political authority created opportunities for state actors to demand tolls and taxes from merchants; uncertain and unstable political control increased the possibility for brigands to predate on travelers, further raising the cost of exchange. We home in on historical overland trade between China and the Middle East to show the economic effects of political shocks on one important measure of economic development — city size. Merchants, including those who traded foreign luxury goods, were among the wealthiest urban dwellers of the medieval and early modern periods. We find that greater political fragmentation on the roads to Aleppo and historic Chang’an (contemporary Xi’an) — major Silk Road terminus points — damaged gains from trade since traders and their agents had to contend with uncertainty on their route. These results persist even after controlling for both city and time fixed effects, among other control variables, as well as the Chinese tribute-system, which created commercial, diplomatic and security ties between imperial China and smaller, surrounding polities.

The empirical results we present speak to the question of how jurisdictional uncertainty impacts the gains from cooperation. Scholars have long argued that a well-ordered world is conducive to trade and cross-cultural exchange. Simmons (2005, 843) argues that the question of “who is formally sovereign over what geographical space” is a first-order concern where ambiguity regarding rules and legal protections reduces the number of cross-border transactions. Epstein (2000, 8) finds that jurisdictional fragmentation increased “negotiation, enforcement, and exaction costs” associated with historical trade. For example, fragmentation created potential for actors like the medieval “robber barons” (or “robber knights”) to impose high taxes and tolls on rivers and roads that were located in their territory. Cox (2017, 726) defines the phenomenon more generally as intra-route fragmentation — the split in governing authority along a single shipping route, a situation which leads to over-taxation of the common pool of merchants. Our analysis provides an empirical assessment of how barriers to trade hindered pre-modern economic development.

These ideas contrast with research that has suggested political fragmentation — due to competing war-prone states (e.g., Tilly 1990), the effects of feudalism on executive constraint (e.g., Blaydes and Chaney 2013) or the existence of merchants’ exit options (e.g., Cox 2017)
— has had positive effects on institutional development in Europe. In Asia, political fragmentation — when it did occur — failed to generate forms of executive constraint and may have hindered the ability of societies to benefit from cross-cultural exchange.

This paper speaks directly to the question of how international systems operate — and does so in a way that increases our understanding of pre-modern international systems as well as systems that operate outside of the European context. Influential scholars in international relations have sought to draw attention to “system effects” in international history, arguing that systems are characterized by forms of interconnectedness where “the fates of the units and their relations with others are strongly influenced by interactions at other places and at earlier periods of time” (Jervis 1997, 17). Theoretical and empirical explorations of these issues have focused on the emergence of the system of sovereign states in Europe during the early modern period (Spruyt 1994) and the effects of the Chinese tributary regime on international system in the East Asian context (Kang 2010; 2013). We focus on the Silk Roads as an international system — one made up of a variety of interconnected actors including merchants, artisans, bandits as well as states and their agents — in order to contribute to scholarly understanding of historical global encounters and their effects.

1 The Global Economic Order before Western Hegemony

Existing scholarly work suggests the lack of a global economic hegemony before the 18th century. At the start of the early modern period, China was arguably the greatest economic power in the world with a population of more than 100 million, a productive agricultural sector and craft sectors superior to other parts of Eurasia (Atwell 1998). As European markets grew in importance, demand increased for Asian perfumes, spices, and silks. Many of these luxury goods traveled through Persia and the Levant, eventually arriving in Aleppo.

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2 The effects of historical political fragmentation are increasingly of interest for political science, including effects on the nature of conflict, including in historical China (Dincecco and Wang 2018).
3 Large and centralized states and empires were more common in Asia than in the European historical experience.
4 There is relatively little scholarship that address the question of how international systems function, particularly in the past, or the conditions under which they these systems wither or flourish. This intellectual blind spot is even more acute for regions outside of Europe as scholarly conceptions of the international system have been biased and based on the characteristics of the European experience (Buzan and Little 1994). Also see Albert et al. (2010) for a discussion of “new systems theories” applications in international politics.
5 Abu-Lughod (1989, 364-365) argues that the world economic system in the medieval period lacked a single hegemon but instead there existed multiple core powers in a non-hierarchical, interdependent world economic system.
6 Frank (1998, 324) writes that until at least 1700, there was nothing “exceptional” about Europe other than its relative marginality and correspondingly minor role in the world economy. On the other hand, areas like Xinjiang — the current-day westernmost province in China — were locationally important as being “roughly equidistant from population cores of China, India and the Mediterranean basin” (Millward 2010, 4).
7 For example, extensive collections of Ming Dynasty porcelain, are found in the Topkapi Museum in Istanbul, Tehran’s Archaeological Museum and across the Middle East and even East Africa (Atwell 1998).
This section discuss the conditions under which trade routes connected urban areas, including how political fragmentation along travel paths may have hindered the gains from exchange.

1.1 Eurasia’s Economic Distribution of Power

One key challenge associated with identifying the historical global distribution of economic power relates to measurement. We adopt city size as a proxy for economic development in the pre-industrial period influenced by an scholarship in the field of political economy. For example, De Long and Shleifer (1993, 675) suggest that the population of pre-industrial European cities serves as the best available indicator of economic prosperity, contending that urban areas were key nodes of information and economic exchange that relied on high levels of agricultural productivity and economic specialization. Acemoglu et al. (2002) present both cross-sectional and time-series evidence suggesting a close empirical association between urbanization and income per capita for cities around the world in the pre-industrial period. Stasavage (2014) uses city size as a proxy for economic flourishing in his examination of comparative economic development in pre-modern Europe.

City population estimates from Africa, Europe and Asia suggest that between 1100 and 1800 CE, the largest cities in the world were located primarily in China and the Middle East. Indeed, Eurasia’s urban ‘center of gravity’ for much of the last millennium was located contemporary Iran. Between 1500 and 1700, however, a more diverse set of urban centers emerged, including in Europe, South Asia, the Middle East and East Asia and by 1800 the cities of Northwestern Europe increasingly became among the world’s largest, alongside Asian cities. After that point, the cities of Western Asia, long favored as a result of their position as a “commercial and migratory turntable” (Frank 1998, 75), became less prominent than in previous periods; areas of Central Asia which used to be important crossroads “ceased to be so central to world history” as the “world historical center of gravity shifted outward, seaward, and westward” (Frank 1992, 44). Kupchan (2012, 3) argues that the world’s center of power shifted from Asia and the Mediterranean to Europe by the 18th century with important implications for the ability of the West to use “its power and purpose to anchor a globalized world.”

1.2 Trade, Cities, and Political Order

One reason that the Middle East and Central Asia thrived for so long relates to the central location of the region with regard to trade routes. Among the most prominent of these routes were the Silk Roads. The term “Silk Road” refers to “all the different overland routes leading west out of China through Central Asia to Syria and beyond” (Hansen 2012, 235).
Christian (2000, 3) defines the Silk Roads as “the long- and middle-distance land routes by which goods, ideas, and people were exchanged” between major regions of Eurasia.\(^{11}\)

Trade was an important driver of prosperity in urban areas. Merchants engaged in long-distance trade were often among the wealthiest residents of major Eurasian cities. Gilbar (2003, 1) argues that long-distance traders were “at the very top of the ladder of the commercial community” given the size and scope of their economic activities as well as their possession of considerable liquid wealth. Frankopan (2016, 144) finds that merchants made fortunes meeting demand for luxury goods from China and India. Scholarship focused on fifteenth century Cairo suggests that the two-hundred most important merchants each possessed millions of gold pieces (Labib 1970, 77). Court records from Bursa from the late fifteenth century suggest that the wealthiest merchants in the city were those involved in either the spice or silk trade (Inalcik 1994, 344-345).

Yet, trade ties could be disrupted damaging prospects for merchants. Caravan routes could be disrupted by war, political change, and Bedouin incursions (Constable 2010). How did shocks to trade impact the growth of cities in China and the Muslim East? And how did the rise of the Western international order damage these historical trade ties? Blaydes and Paik (forthcoming) find that proximity to historical Muslim trade routes was positively associated with urbanization in 1200 but not in 1800. In other words, Middle Eastern and Central Asian cities — long beneficiaries of locational centrality between Europe and Asia — declined as Europeans found alternative routes to the East and opened new trade opportunities in the New World.\(^{12}\)

In this paper, we focus on another disruption to trade — political fragmentation — that damaged economic growth along major land routes connecting Western to Eastern Asia. Why focus on Asia? Beyond the need to de-center world historical studies away from a focus on Europe, there are theoretical and empirical benefits from such an approach. First, as discussed in the previous section the Eurasian urban of center of gravity was located in Asia. The Middle East and China — despite important differences of religion and philosophy — shared historical parallels, including their vulnerability to external actors, like nomadic tribesmen (Harris 1993, 23).\(^{13}\) In addition, Park (2012, 191) writes that, “the history of contact and exchange between China and the Islamic world offers one of the most remarkable cases of pre-European encounter because it involves tremendous wealth, transformative ideas, and great power.” While exchange continued, largely without interruption for eight centuries, changing political dynamics created different phases and conditions associated with these interconnections (Park 2012, 191).

Second, we pick up on threads within the existing literature which suggest that China served as the global economic heavyweight with which other cultures sought to trade. Andre Gunder Frank is one of the most prominent proponents of this perspective. According to

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\(^{11}\)See von Glahn (2016, 197) for details on the goods traded.

\(^{12}\)This is not to say that mastery of long-distance seafaring was an accident. European navigational triumphs were “the result of deliberate processes of purposeful exploration” (Paine 2013).

\(^{13}\)In addition, within Asia — despite its tremendous diversity — there exists an “underlying unity” associated with technologies, cultures and disease patterns (Christian 2000, 1). Eurasian merchants, including those from Safavid Iran and Uzbek Turan, were seen as coming from a “broadly similar commercial and linguistic environment” which meant that they had the ability to carry out trade within a shared and understood legal and cultural circumstance (Dale 1994, 10).
Frank (1998, 111), China was “unrivaled” in its production of luxury consumer goods like porcelain ceramics and silks. As parts of the Middle East and Europe become wealthier, there was a strong interest in acquiring Chinese products. China has been described as exhibiting “outstanding absolute and relative productivity in manufactures” (Frank 1998, 127). Frank (1998, 116-117) goes as far as to argue that “the entire world economic order was — literally — Sinocentric” until the 18th century.

Even if we take Frank’s position on these issues to be extreme, relatively little scholarship has sought to understand the effects of political fragmentation outside of Europe. Much has been written about the benefits of political fragmentation in Europe where fragmentation is thought to have created conditions ripe for limited government and, eventually, economic development. While an influential literature has suggested that forms of political fragmentation has been directly or indirectly good for economic development (e.g., Tilly 1990; Blaydes and Chaney 2013; Cox 2017), fragmentation also damaged the gains to trade (e.g., Epstein 2000; Simmons 2005). In Eastern and Western Asia, growth-promoting institutions, like parliaments, were slow to develop; we consider the conditions which encouraged or discouraged economic exchange and development outside of the European experience. In this paper, we argue that political fragmentation hindered the exchange of goods, hurting economic prosperity — and that the most appropriate place to test this argument is in pre-modern Asia where the effects of fragmentation were not confounded by growth-promoting institutions, as were found in Europe.

1.3 Causes and Effects of Political Fragmentation

It is no coincidence that two of the most famous explorers of the medieval period — Ibn Battuta of Tangier and Marco Polo of Venice — made their famous cross-regional travels during the late 13th and early 14th centuries. In the century after the Mongols created the largest land empire in world history, political stability in Western Asia facilitated travel of people, goods, and ideas. Their characterizations of long-distance, cross-regional travel suggests the relative safety of their journeys. The most important challenges that they faced were related to extreme weather, not the dangers of travel. Indeed both travelers describe the relative wealth of the cities they visited and the hospitality of the people they met along the way.

But the movement of travelers, including merchants, might be disrupted for a variety of reasons, many of which were related to political fragmentation. In particular, periods of

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14 India also produced important and valued goods. But given the predominance of sea trade opportunities — and our interest in overland trade — we are focused primarily on trade with China. Europe was considered economically and geographically marginal (Frank 1998, 324).

15 Fragmentation is thought to have been a common feature of European history, to the point that scholars have argued that the emergence of the Roman Empire — Europe’s longest experience with imperial rule — was a historical anomaly (Schedel 2019).

16 At least three sets of arguments seek to link political fragmentation with European institutional development. Tilly (1990) focuses on the impact of competition between small, war-prone polities on the development of national states. Blaydes and Chaney (2013) argue that the decentralized forms of political control associated with feudal institutions had positive impacts on the emergence of executive constraint. Cox (2017) argues that political fragmentation — which provided exit options for merchants — combined with self-governing cities and parliaments to facilitate forms of executive liberty.
incomplete or uncertain political control could be highly disruptive to trade. For example, tribal warfare posed a security threat to traders (Abu-Lughod 1989, 158). According to Curtin (1984, 93-94), “to take a caravan through uncontrolled nomad country would have been dangerous in the best of circumstances.” While imperial states, like the Mughuls and Ottoman, levied taxes on travelers, merchants also needed to be concerned with “highway robbers” who demanded payment for serving as an “armed escort” through hinterland areas (Barendse 2000, 217). According to Harris (1993, 22), “the emergence of small warring kingdoms...made the East-West highway more dangerous and difficult and populations along the route began to decline.”

Beyond that, traversing a number of different polities might also lead merchants to incur multiple tolls as a result of the political fragmentation. Political fragmentation may have also increased jurisdictional uncertainty, increasing transaction costs associated with trade (Epstein 2000; Simmons 2005). Beyond the payment to nomadic people, payment was also required by “potentates through whose territories” merchant caravans passed (Goiten 1967, 279). Christian (2000, 6) argues that “when the agrarian civilizations or pastoralist empires dominated large sections of the Silk Roads, merchants traveled more freely, protection costs were lower, and traffic was brisk.” As a result, the importance and profitability of the Silk Roads “waxed and waned,” at least in part, as a function of the political stability on the edges of agrarian civilizations of China, India, Iran and Mesopotamia” (Christian 2000, 6).

The causes of political fragmentation are many and complex. At some times, large imperial units would take control of vast swaths of territory. The process by which this emerged often involved “initially consolidating groups into a single confederation” which might spread across the steppe to include new territories and peoples (Rogers 2007, 258). Rogers (2012, 206) argues that there is no obvious explanation for when and why these successful polities emerge; polities “emerged, existed, and collapsed in ways that often defy conventional understandings.” State formation and collapse, then, can be thought of as caused by a complex set of factors, with a large number of contingencies and, potentially, tied to cyclical patterns (Rogers 2007, 265). Indeed, part of our approach to causal identification relies on an increasing preponderance of archaeological and historical climate science evidence which suggests that state formation on the Eurasian steppe was a function of exogenous environmental factors.

One factor that might have worked against the negative effects of political fragmentation was the Chinese system of tribute. Zhang (2013) describes the tribute system (chaogong tizhi) as embodying institutions and diplomatic norms that dominated China’s relations with the non-Chinese world until the late 19th century. By providing stability and security, Chinese regional hegemony may have operated in a way consistent with hegemonic stability theory which suggests that a hegemonic distribution of power can have positive effects on trade openness (e.g., Krasner 1976; Gilpin 1981; Gilpin 1987). Other scholars, however, have suggested that pre-modern China was not able to create an open trade order (Shu 2012)

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17 Kang (2010, 594) writes that “Chinese civilization provided a common intellectual, linguistic, and normative framework in which to interact and resolve differences.”

18 In this setting, Confucianism served as a shared culture that helped to resolve conflicts between China and tributary states (Wang 2013, 213). Not all Asian polities were tributes of the Chinese state. Indeed, Kang (2010) writes that the semi-nomadic peoples on China’s periphery were often reluctant to accept Chinese authority. And states that did maintain tributary relations with China were still able to handle
and that the application of a tributary-system model to historical international relations is deeply problematic (Van Lieu 2017). For example, Perdue (2015) contends that arguments that suggest a systematic Chinese tributary system are misleading given the multiple and complex relationships of trade, diplomacy and ritual between China and other Asian polities. Our empirical analysis provides evidence testing the effects of changes in tribute status on urban growth.

2 Trade Shocks and Prosperity on the Silk Roads

Between 200 BCE and the beginning of the Common Era, overland trade between China and the eastern Mediterranean polities of the Middle East became a regular occurrence (Curtin 1984, 90). Indeed, the very origins of the Silk Roads have been associated with periods of time when Eurasia was characterized by a relatively small number of large land empires. The emergence of long-distance Eurasian trade was temporally linked to the Han Dynasty’s unification of China as well as Han extension of political control into the Xinjiang region. In Western Asia, the Roman Empire extended political control across the Mediterranean. The timing associated with the consolidation of these trade routes suggests a linkage between consolidation of political control in China and the Mediterranean basin. Thus while the location of the Silk Roads may have been determined by geographic features, like “mountain passes, valleys, and springs of water in the desert” (Hansen 2012, 235), the robustness of trade connecting urban areas may have been a function of political factors. In this section, we review some of the existing qualitative evidence regarding how forms of political stability and imperial consolidation impacted cross-cultural exchange in the pre-modern period. If our main conjecture is correct, we should see supportive evidence reflected in the historical literature.

2.1 Imperial Consolidation and Silk Road Development

Historians have argued that the Silk Roads enjoyed a “golden age” during the Tang Dynasty (618-907 CE), a period of time that coincided with the Arab conquests and the first two centuries of Islam. Scholars of the early Islamic period have suggested that the advent of Islam was an important force for breaking the control of the agrarian gentry from “Nile to Oxus” as well as the growth in importance of interregional trade (Hodgsen 1974, 65). According to Hodgsen (1974, 65), it was during this period that trade became “increasingly determinative of the fate of any given region” and mercantile and bourgeoisie interests strengthened relative to agrarian classes. The Tang Dynasty maintained military and commercial connections with Central Asian polities as far west as Persia (Benite 2011).

During this time, trade linking the Middle East and China was economically significant with implications for the growth and development of major urban centers. Caravans of horses and Batrian camels traveled from Mesopotamia to the Iranian plateau and then eastward

their own domestic and foreign policies, separate from China (Kang 2010). That said, Kang (2010) has argued that systemic stability was good for the political regimes in these Sinicized East Asian countries.

19 In particular, Shu (2012) argues that the regional economic order under tributary trade was never open to all states and that tributary relations were unstable because of dynastic changes in China.
toward the Oxus after which point there were multiple routes including those which passed through Kashgar and alternative routes that went through Kabul (Lombard 1975, 218). These trade routes not only provided the means by which goods were transmitted across huge distances but also involved the transmission of ideas, technologies and artistic practices (Christian 2000, 1; Hansen 2012, 5).

Political stability associated with large empires created the security zones under which trade might prosper. Curtin (1984, 91) argues that the “Tang Dynasty in China and the Abbasid Caliphate of Baghdad...provided imperial umbrellas over most of the trade routes between China and Mediterranean.” These favorable conditions, associated with the power of contemporaneously large empires, made it relatively easy for long-distance traders to move across vast areas (Curtin 1984, 105). Under the “long reach of Tang control to the west,” many Middle Eastern and European travelers were able to visit China (Curtin 1984, 105). Foreign merchants transformed small, oasis settlements across Central Asia into larger towns and cities (von Glahn 2016, 197). Merchants and agents, under the protection of local rulers, traveled with relative safety.

2.2 The Mongol Empire and Overland Trade

The rise and land conquests of the Mongols served as a common shock to both the Eastern and Western parts of Asia. For the Mongols, the rich societies of China, Iran, Iraq and Anatolia were particularly appealing targets of attack while “little-known, fragmented Europe” was relatively peripheral (Sinor 1999, 40). While much has been written about the destructive aspects of Mongol rule, historians are increasingly painting a more complex picture of the overall economic impact of the Mongol invasions. Some cities never recovered from the destruction of their populations during the conquests, but others saw relatively rapid rebounds in their population (Soucek 2000, 114). Manz (2011) describes both the destructive elements of the Mongol conquests as well as the new opportunities introduced for artisans and merchants.

One of the most important positive externalities associated with the creation of the Mongol Empire was the establishment of political order over regions that supported overland trade. Curtin (1984, 120) writes that “the new rulers united so much of Asia that travelers could move securely under a single authority from the shores of the Black Sea to China.” Anatolia became more connected to long-distance commercial relations coming from Central and East Asia (Meloy 2011). According to Abu-Lughod (1989, 154), the Mongols created “an environment that facilitated land transit with less risk and lower protective rent.” Benite (2011) argues that during this time period, larger numbers of merchants were coming to China compared to ever before, many of them from the Islamic world. One result of this increase in overland trade was that Chinese porcelain began to show up, to a greater extent, in the Middle East as well as in Europe (Meloy 2011).

Although the Mongols were a nomadic people, scholars have argued that Mongol rulers “ordered and patronized” economic exchange (Allsen 2001, 191). Manz (2011) suggests that trade was of major interest to the Mongols and that Mongol leaders directly engaged in international trade through commercial partnerships. Caravaners were “prime beneficiaries of the Pax Mongolica” as the formation of a pan-Asian Mongol Empire strongly supported overland, East-West trade (von Glahn 2016, 283). Frankopan (2016, 176) goes as far as to
claim that Mongol territorial successes of the 13th century reshaped the monetary system of Eurasia.

The break-up of the Mongol Empire may have also hindered forms of economic exchange. Genghis Khan’s efforts to divide the empire into parts to pass on to his sons planted the seeds of political instability (Millward 2007, 61). Subsequent internecine conflict among rival Mongol khanates encouraged a greater interest in maritime trade (von Glahn 2016, 283). This reflected a more generalized pattern that during times of political instability in Central Asia, merchants tended to turn to sea routes instead of overland trade (Schottenhammer 2015). This is not to say that the Mongol conquests were not long-term impactful; in the years after the Mongol invasions, China was able to project political power into Central Asia more effectively (Liu 2015, 99). That said, the lack of a large, overarching land empire covering the Silk Roads may have increased the cost of trade even if the Mongol conquests had important other legacies.

3 Empirical Analysis

At its height, the Silk Roads trade routes enabled merchants to exchange high-value goods across great distances, economic interactions that were crucial for urban growth and development. Historical accounts suggest that cross-regional exchange benefited from forms of stability associated with political consolidation of large, Eurasian land empires. In the pre-modern world economy, merchants sought to connect major urban centers through luxury goods trade in silk, porcelain and spices; they were best able to do so under stable, consolidated political circumstances.

Thus far, we have discussed a number of factors which might impact the gains from cross-cultural, overland trade. While some of these determinants are specific to particular locations, others may vary over time and additional factors may reflect an interaction of geographic factors with time. Some of the most significant of these disruptions involved the rise and fall of land empires in Central Asia. Frank (1992, 44) describes Central Asia as the location where diverse peoples and their civilizations “connected and interacted with each other.” Yet the factors that could influence the political stability of Central Asia may be difficult to predict. In this section, our goal is to understand how factors that were disruptive to trade — beyond city-specific or time-specific effects — may have impacted prosperity along the Silk Roads.

3.1 Determining Historical Travel Paths

One challenge associated with measuring the economic impact of trade and shocks to trade is that sources describe the location of the Silk Roads in different ways. While a number of studies have looked at commerce in historical China, little work has sought to measure long-term changes in the impact of long-distance trade (Liu 2015, 20). For example, a UNESCO report published in 2008 claims that there are over 70,000 extant manuscripts for the Chinese section of the Eastern Silk Roads alone, in historical written records from Buddhist monks, Persians and Turkic travellers, Marco Polo, and other 13th century European visitors.
route locations that have hitherto not been described in the existing literature. Our aim is, instead, to establish a link between Silk Roads access and economic prosperity, as a function of opportunities and hindrances to trade. For this purpose, we find it useful to look for evidence of how natural travel paths may have been carved, and whether these paths correlate with subsequent development changes in the region. Building on existing work on geography (Frachetti et al. 2017), we suggest that these paths were not endogenous to the Silk Road trade; that is, the path of travel was not chosen with trade or commerce in mind. Rather, we rely on natural geographic features to simulate the route using the strategies described in Frachetti et al. (2017). In doing so, we extend their original study of a particular zone within Inner Asia to a broader Asian sample.

In particular, Frachetti et al. (2017) design a GIS algorithm to simulate and identify routes taken by nomads for seasonal travel. This exercise in identifying nomadic travel paths is focused on highland areas, at elevations between 750 to 4000 meters. According to Frachetti et al. (2017), high elevation pathways were an essential part of Silk Road networks, but developed differently from those in lowland regions, the latter being predicted by terrain-based “least cost” travel algorithms on the basis of “ease of travel” and “connecting dots” between known Silk Road locations. This contrasts with the nomadic adaptive strategies that predict the Silk Road corridors in the highlands.

In higher-elevation regions, pastoralists historically migrated with their animals to highland pastures in the summer and travelled back to the lowlands during the winter to maximize food available for their herds. Using seasonal pasture quality and annual herding “flow accumulation” across highlands in Asia, Frachetti et al. create an empirical link between nomadic mobility and subsequent Silk Roads. Importantly, when generating the flow model, the authors do not include Silk Road routes or site locations as part of the algorithmic input. As a result, the herding paths that predict subsequent Silk Road routes plausibly circumvent endogeneity concerns since existing patterns of urbanization did not impact pastoralists as they sought the best available land for animal grazing. In other words, herding routes were not intended to connect population settlements, at least initially. Rather, they were pathways to secluded, rich grasslands that subsequently became corridors of commerce and travel.

Frachetti et al. use this flow accumulation model to create a network of short-distance herding corridors that are highly correlated with Silk Road travel routes. This result gives us confidence that the nomadic migration corridors are good proxies for the historical Silk Road passages. For further details, see Frachetti et al.
of Asia, when we use the same approach and extend the simulation scope to the highlands (750-4,000 meter range) in Asia.26

Our empirical analysis seeks to assess whether the Silk Roads, proxied by the historical nomadic migration corridors in the highlands and least-cost routes in low-lying areas, can explain changes in economic development. Our proxy for economic development is urban population size for eighty-five East, West and Central Asian cities for the years 1100 to 1800 CE, on the fifty-year interval. Our panel data set excludes South and Southeast Asia since trade in those regions was more likely to occur via sea routes rather than the overland routes that are the focus of this analysis.27 Our data come from Chandler and Fox (1974) and contain all the cities which appear at least once on any of the lists for the world’s largest cities across these time periods.28 Why operationalize economic growth and trade-related prosperity with city size? Beyond the existing literature in economics endorsing such an approach (De Long and Shleifer 1993; Acemoglu et al. 2002; Stasavage 2014), qualitative historical analysis also draws links between overland Eurasian trade and city growth. For example, Lary (2012, 51) argues that trade supported merchants who settled in the cities of Central Asia. Commercial markets created dense networks of exchange which reflected forms of product specialization (Wong 1997, 20). Christian (2000, 9) writes that “the urban geography of the Silk Roads...points to the importance of the trans-ecological routes,” with important cities, like Kashgar and Bukhara, located on major trade paths.

For our empirical analysis, we simulate Silk Road pathways between each city in our sample and the two Silk Road end points: Aleppo and historic Chang’an.29 Chang’an represented a major terminus of overland trade routes in the East (Allsen 2001, 13); Aleppo was an “emporium” for Asian goods in the West (Inalcik 1994, 57) and a long-standing destination of overland caravans. In Figure 2 we show the nomadic migration corridors which form the basis of our Silk Road proxies, and the cities in our sample. The simulated pathways connecting each city with Aleppo and Chang’an are also represented on the map. A foundational assumption of our project is that deviations from these natural travel paths are costly for merchants.

26Specifically, the geographical extent of this exercise spans from 25 to 135 degrees in longitude, and 5 to 56 degrees in latitude. Frachetti et al. focus on the inner Asian mountain corridors of Central Asia, those areas mainly connecting present-day Tajikistan, Kyrgyzstan, Kazakhstan and China.

27In particular, we restrict our sample to those located above the 25-degree latitude. Furthermore, the highlands of the nomadic people in Central Asia, characterized as grasslands in Frachetti et al., are different from the tropic and quasi-tropic forest highlands in Southeast Asia, in which rice cultivation rather than herding would have been common. Given our empirical approach to simulating nomadic migration corridors, it would make little sense to extend our analysis to those south of the 25-degree line. At the same time, this benchmark does allow us to keep all the relevant cities along the Silk Roads west of the Tibetan plateau and east of Aleppo.

28While actual population figures are often missing for cities on these lists, Chandler and Fox (1974) do provide rankings of cities in the order of their size. Blaydes and Paik (forthcoming) provide detailed discussion of this data, discuss previous works that have utilized Chandler and Fox (1974) for their studies, and advantages of using a single source for city populations over multiple continents. The Supplemental Appendix provides further description of city population interval data used in our empirical analysis.

29The calculation is based on a combination of both the paths along the nomadic migration corridors, as well as the least-cost path calculated from the city location to the nearest corridor. We confine cities in our sample to those west of Chang’an and east of Aleppo.
3.2 Measuring Political Fragmentation

Our main explanatory variable is the degree of political fragmentation merchants faced on the natural travel paths associated with the Silk Roads. In order to assess whether traders encountered different states along their travel paths, we utilize a set of maps from GeaCron, which provides state boundaries around the globe across different time periods. Based on these maps we obtain our main explanatory variable of interest: the number of times that each path crosses different states to Chang’an and to Aleppo. This variable measures the extent of political fragmentation that one would have observed when travelling on the Silk Roads towards the East and the West. We also gather information on whether the departure city was part of a polity identified in GeaCron as well as whether it served as a capital city.

It is significant that we code for how many non-state territories that merchants would have traversed on natural travel paths. By identifying areas outside of the purview of state control, or the number of “non-state” territories on the path, this allows us to include an additional dimension to our analysis as travelers in ungoverned areas may have been subject to predation by bandits and nomads. The mere presence of a state entity should be associated with more security for long-distance merchants. States sought to secure and maintain trade routes by building roads and armed fortresses at stopping points on major routes as well as constructing rest houses to serve merchants and pilgrims (Hanna 1998, 23). Muslim rulers in Central Asia, Persia, and South Asia invested in the maintenance and improvement of trade routes by repairing overland roads, providing security for caravans and quieting tribal peoples who sometimes obstructed commercial traffic (Levi 2010).

One concern that could be raised about our strategy for measuring political fragmentation is that we fail to take into account the endogenous formation of states; in other words, maybe Eurasian land empires were created to encompass profitable trade routes? One advantage of focusing on East, Central and West Asian cities is that state formation on the Eurasian steppe has come to increasingly be understood as a function of exogenous climatic factors, at least in part because nomadic statecraft has been shown to be sensitive to environmental conditions. This may particularly be the case since there are important links between forms of political authority in Central Asia and transport technologies that support pastoral cultures, especially reliance on horses (Honeychurch 2014). For example, the sudden rise of Genghis Khan was totally unexpected according to historians (Soucek 2000, 103). Scientists specializing in climate change, however, have found that the timing of the Mongol rise was closely linked to climate anomalies since unusually wet weather was associated with a proliferation of grasses to feed horses as the Mongols moved across the Eurasian steppe (Pederson et al. 2014). Additional studies in climate science suggest that the Mongol withdrawal from Hungary in 1242 may also have been a function of unanticipated climactic conditions (Buntgen and Di Cosmo 2016). This perspective is consistent with scholars who have suggested that the process by which Eurasian land empires have

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30See geacron.com for details on how these data were collected.
31For coding whether the cities in our data were capital cities or not, we utilize city data from Pierskall et al. (2017) and match our city-year observations to theirs. We also check the coding on Chinese cities with a number Chinese sources.
32Honeychurch and Makarewicz (2016) find that over the past two decades new field and laboratory methods have meant that archaeological research on traditionally pastoral nomadic regions has increased tremendously.
formed is relatively unpredictable (Rogers 2007; Rogers 2012), suggesting the importance of exogenous conditions.

Figure 3 provides a stylized illustration of our argument and empirical strategy. Merchants from City A seek trade opportunities that allow them to deliver goods to Aleppo and Chang’an. In order for those merchants to engage in commerce, they may need to traverse a number of polities to arrive at their destination. They may also traverse non-state territories, as well as tributary states under the Chinese rule. In this illustration, the solid lines represent independent polities while dotted lines represent independent polities that fall under the Chinese imperial tribute system. The number of state and non-state territories traversed included a large stochastic component related to how exogenous weather and environmental conditions impacted the creation of land empires on the Eurasian steppe.

3.3 Empirical Strategy

In order to estimate the impact of political fragmentation on economic prosperity in pre-modern Asia, we use interval data with population estimates for each city and a generalized maximum log likelihood interval model to obtain coefficient value estimates. The following equation follows a panel regression approach, and can be specified as follows:

$$Pop_{it} = \beta_0 + \beta_1 Path_{2Changan_i} + \beta_2 Path_{2Aleppo_i} +$$
$$+ X_i \Phi + \sum_{j=1800}^{1150} Z_i \gamma_j + \sum_{j=1800}^{1150} \rho_j I_t + \varepsilon_{it}$$

where $Pop_{it}$ is the natural log of city population of city $i$ in year $t$, $Path_{2Changan_i}$ and $Path_{2Aleppo_i}$ are our political fragmentation variables, and $X$ is a vector of time-varying control variables including the number of non-state territories crossed en route to Chang’an and Aleppo, the capital status and state rule existence of city $i$. $\sum_{j=1150}^{1800} Z_i \gamma_j$ are the city-specific geographic characteristics interacted with time-period fixed effects. Given that city location and their surroundings are paramount to trade and city sizes, these are meant to capture any time-differential effects of geographic variables that determine both the city’s access to the Silk Roads and urbanization. They include the distance to the nearest natural migration corridor in the highlands (as simulated in our analysis described above), distance to the nearest coast, longitude and latitude as well as the elevation mean and standard deviation. Finally, $\sum_{c} \gamma_c I_i^c$ and $\sum_{j=1150}^{1800} \rho_j I_t^j$ are the city and time-period fixed effects, respectively.

On average, a merchant’s path intersects with five polities to get to Aleppo and five on the path to Chang’an. There exists a great deal of variation across cities, however. For example, in this sample the maximum number of polities crossed is 16 on the path to Aleppo and 17 to Chang’an. Our main findings are reported in Columns 1-4 of Table 1 and suggest that the number of polities crossed to get to Aleppo and Chang’an (i.e.,

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33The coefficient estimates from the interval model can be interpreted in the same way as the OLS estimation; see the Supplemental Appendix for a brief explanation and Blaydes and Paik (forthcoming) for more details on specifying the log likelihood function.

34See Table 2 in the Supplemental Appendix for summary statistics of all variables included in our regression analyses.
political fragmentation in both directions) has consistently negative effects on city size. This is true after controlling for city and time fixed effects as well as the time-varying impacts of geography. Both variables are statistically significant when we control for the number of non-state territories on the paths. From a substantive perspective, every additional polity crossed to get to Aleppo is associated with a 12 to 14 percent decrease in city population, while for the polities crossed to get to Chang’an, a 5 to 9 percent decrease in city population, depending on the regression specification. We also find that while being a capital city consistently has a positive association with city size, being located in a non-state territory has the opposite effect on city population.\footnote{Our goal here is not to make a causal argument regarding the effect of capital city status on city size. Although it is possible that capital status may have been determined by unforeseen factors, rather than endogenously driven by city size, we mainly include capital status to control for alternative channels associated with city size.}

Columns 5-8 of Table 1 present an alternative way to test the idea that political fragmentation reduced the gains from cross-regional trade. Rather than considering the number of politics crossed to either Aleppo or Chang’an, the economic prospects for a particular city may be a function of fragmentation on the entire East-West trade artery. In other words, the health of the entire route may matter for garnering trade-related gains and, as a result, fragmentation on the two segments should not be considered to be independent from one another. In this set of specifications the main explanatory variable of interest is the total number of polities crossed. We find that a larger number of polities crossed on the combined trade path is associated with lower city population. Every additional polity crossed along the route is associated with a 11 to 12 percent decrease in city population after controlling for capital city status and the number of non-state territories. In other words, the results we report are similar to those found in first four columns of Table 1.

Our empirical strategy rests on the assumption that deviations from the travel paths that we have identified (i.e., the combination of highland “nomadic corridors” and lowland “least-cost paths”) are costly to merchants who view these paths as preferred travel routes. The topography of Central Asia — with large natural barriers like the Taklamakan and Gobi Deserts — make large deviations unlikely yet, nonetheless, we also validate our main findings using the travel paths identified in Hansen (2012) instead of the paths we have simulated.\footnote{See Figure 2 in the Supplemental Appendix.} Using the routes identified in Hansen’s routes to generate our key independent variable — rather than our simulated Silk Road routes — we find the results to be similar to our main findings as reported in Table 1.\footnote{See Table 3 of the Supplemental Appendix for these results.}

Next, we include variables related to forms of hierarchy and hegemony within the East Asian political sphere through an empirical investigation of the effects of the Chinese tributary system. Kang (2010, 591) writes that the East Asian tributary order was an “enduring, stable, and hierarchic system, with China clearly the hegenon” and a “viable and recognized international system with military, cultural, and economic dimensions that all intersected to create a...stable security system.” In return for recognizing the legitimacy of Chinese preeminence in regional affairs, “China, as the economic, military, and cultural leader, was responsible for maintaining the political and security order in the region” (Wang 2013, 213). We test the impact of crossing Chinese tributary states, by including the number of polities...
on the paths classified as tributary states as additional control variables. We also include an indicator for whether the city is inside a tributary state or not.

Table 2 reports these results. While scholars have argued that tributary practice and exchanges may have facilitated trade in a number of ways (Hamashita 1994; Kim 2016), we find that crossing tributary states was also negatively associated with city size. With a full complement of control variables included, we find that crossing tributary states when heading to Aleppo to be more damaging than when heading to Chang’an; this suggests that the tribute system may have spurred less damaging effects for those travelling towards Chang’an and, thus, closer to China. The main results on polities crossed to Aleppo and Chang’an, respectively (Columns 1-4), as well as total polities crossed (Columns 5-8) show similar effects as reported in Table 1, suggesting that even after controlling for tributary state status the main effects persist.

3.4 State Capacity as an Additional Consideration

One potential concern that could be raised about our existing analysis relates to omitted variable bias associated with differential levels of state capacity, in particular the relatively low levels of administrative capacity enjoyed by East, Central and West Asian polities in the medieval and early modern periods. States during this historical era were vastly different entities than the ones that we observe today. As a result, how can we understand the ability of these historical states to effectively govern their territories? We provide two empirical strategies for operationalizing state capacity in order to take into account how political fragmentation may have interacted with the capacity of historical states to impact the economic development outcomes that we observe.\(^{38}\)

First, we use a measure of state capacity based on a distance-decay model where our key assumption is that state capacity declines with distance from major cities. Throughout much of history, state capacity depended heavily on political authority emanating from nearby cities given the role of urban areas as locations of political and economic power. Merchants traveling on trade routes benefitted from protection and amenities provided by cities, benefits that may have declined as one traveled farther from urban centers. We can calculate a state capacity proxy that takes into account distance to cities and city size for each trade route.\(^{39}\) For example, the capacity measure for route \(i\) (extending from city \(i\) to Aleppo or Chang’an) in time \(t\) can be calculated as the total population estimate of all the cities in our data sample, weighted by their distance to the route, and written follows:

\[
\text{Capacity}_{it} = \sum_{j \neq i}^n \frac{\text{pop}_{jt}}{\text{dist}_{ij}}
\]

where subscript \(\text{pop}_{jt}\) is the mean population estimate of city \(j\) at time \(t\), and \(\text{dist}_{ij}\) is the geodesic distance between city \(i\) and city \(j\).\(^{39}\)

\(^{38}\)This is beyond the analysis we have already conducted regarding the impact of traveling through non-state areas.

\(^{39}\)This familiar distance-based argument is similar in spirit to Boulding (1962)’s distance-decay mechanism explaining a state’s potential reach.
In Columns 1 and 2 in Table 3, we report results that also include our distance-based capacity measures as additional control variables. In both columns (for separate and combined travel paths), we find that the negative relationship between polity-crossing and city size remains consistent. The distance-based capacity measure has the opposite impact depending on the type of route; having clusters of big cities near the trade route towards Aleppo is associated with smaller city size, while the opposite is true for routes to Chang’an. On the combined route, the positive and statistically significant coefficient estimate for the capacity control suggests that having more big cities closer to the trade route is overall beneficial for urbanization.

Our second operationalization of state capacity seeks to identify the extent to which there was an enduring state presence along each route in previous periods. Relative to a situation of historical “statelessness,” state presence is generally associated with stability and rule of law. As a result, this measure seeks to capture the difference between non-state and state presence in the past along each trade route by calculating the fraction of the trade route that was under state rule in the previous century. More specifically, for each trade route connecting each city in our sample to Chang’an and Aleppo in our data, we note which segments of the route intersected with polities in a previous period. Next, we divide the segment length by the total route length to derive the fraction for each city and year.

Columns 3 and 4 in Table 3 present the results, in which we again replicate our main specifications but add control variables for historical state capacity. We find that the negative relationship between polity-crossing and city size remains robust, and the magnitude increases with the addition of these control variables.40

4 Conclusions

Historical global encounters involved the movement of people, goods, ideas, and diseases as well as values, ethics, and aesthetic traditions and offered opportunities to build channels of understanding across space. While some of the most prominent works on historical development have focused on the origins of states and state institutions, scholars have increasingly drawn attention to the importance of transnational and global dynamics (Go and Lawson 2017, 8), including forms of pre-modern, proto-globalization.41 Cross-regional trade routes, like the Silk Roads, connected economic interests between prosperous regions of the world for centuries.42 In this paper, we take a long view with regard to the global economic order in the spirit of international relations scholars who are focused on longue durée trends in power and influence (e.g., Kupchan 2012; Acharya 2014).

Our empirical results suggest that the benefits of cross-cultural exchange are diminished as a result of shocks to political stability on trade routes. We find that intra-route fragmentation makes trade difficult, suggesting the costs of jurisdictional uncertainty (Simmons 2005),

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40In Table 4 of the Supplemental Appendix, we also provide results for a 50-year as well as 100-year lags. The results remain substantively the same as in Table 3 Columns 3 and 4.
41For example, Held et al. (1999, 32) argue that early forms of globalization tended to be “accompanied by a slow and largely haphazard development of territorial politics.”
42Indeed, Spruyt (1998) argues that historical sociology might be used to advance systems theory in international relations.
formal and informal barriers to trade (Epstein 2000), and taxation on the common pool of merchants (Cox 2017). Recent interdisciplinary work in archeology and historical climate science has suggested that pre-modern state formation on the Central Asian steppe — a key location of Silk Road corridors — has been subject to exogenous weather-related shocks that impacted pastoral communities in ways that may not have been the case in other world regions.\textsuperscript{43} We also extend recent scientific work that identifies likely Silk Road routes along naturally-occurring migration corridors that formed across the highlands of Asia. Political fragmentation along likely routes is associated with smaller city size, even after controlling for city and time fixed effects and the inclusion of a variety of control variables, including Chinese imperial tributary state status.

Our results draw attention to trade and exchange between West and East Asia, the most prosperous regions of the world before the rise of Western hegemony. Our focus on prosperity in pre-modern Asia does not tackle the question of why Europe pulled ahead of other world regions economically but does allow us to understand more about variation in development in a world of “natural states” rather than “open access orders” (North et al. 2012). Epstein (2000, 39) points out that while scholars have commonly viewed all pre-industrial economies as equally stagnant, “regional diversity has became the central question of recent research.” This paper represents our attempt to contribute a partial answer to this question and offers evidence that pre-modern forms of globalization flourished during historical periods characterized by large, land empires in Eurasia.

References


\textsuperscript{43}In particular, the growing preponderance of climate science shows that even climatic fluctuations combined with particular environmental conditions can have important historical implications for the creation of nomadic empires.


Blaydes, Lisa and Christopher Paik. forthcoming. “Muslim Trade and City Growth before the 19th Century: Comparative Urbanization in Europe, the Middle East and Central Asia.” *British Journal of Political Science*.


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Robust standard errors reported in parentheses.* p < 0.1, ** p < 0.05, *** p < 0.01.
Table 2: Effect of Political Fragmentation on City Size with Chinese Tributary State Control Variables

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Robust standard errors reported in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.
<table>
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<td>(0.084)</td>
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<td></td>
<td>(0.086)</td>
<td>(0.139)</td>
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<td>Polities crossed</td>
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<td>-0.232***</td>
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<td>(0.051)</td>
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Figure 1: Silk Roads Mapped (Top); Highlands and Nomadic Corridors (Bottom)
Figure 2: Natural Travel Paths as a Proxy for Silk Roads
Figure 3: Stylized illustration of the argument regarding the effects of crossing jurisdictions on the costs of trade. The solid lines represent divisions between independent polities. The dotted lines represent independent polities that fall under the Chinese imperial tribute system.