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‘An Extended Literature Review on the Contribution of Economic Institutions to the Great Divergence in the 19th Century’

Jessica Annalise Richens

Student ID:14324344

Supervisor: Professor Gianni De Fraja

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Abstract

Since Pomeranz's radical paper was published in 2000 the debate around the so-called 'Great Divergence' between Europe and China has been a contentious one. This paper synthesizes over a decade's worth of literature regarding a controversial channel of the debate, to establish the contribution of institutions to the Great Divergence. An analytical framework is established and underpinned by a general theory of institutional contribution to economic growth, combined with an insight into the process of the Industrial Revolution. Literature is drawn together and assessed in a unique way, which allows for institutional specific understanding from each paper. Across the literature European-centric analysis is highlighted, and whilst critiquing Pomeranz's results, his conclusions regarding similarities in institutions in China and Europe cannot be completely dismissed. Yet, evidence determines that institutions did play an influencing role in the Great Divergence.

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1. Introduction

1.1 Introduction and Motivation

This dissertation will discuss the contribution of economic institutions[1] to the Great Divergence in the 19th Century. The economic debate around the Great Divergence between China and Western Europe has been widely discussed, lending itself well to a literature review. We will explore one specific channel of thought to combine the literature into a single debate. By focusing on economic institutions, we will bring together literature regarding Chinese and European divergence whilst considering theory regarding foundations for economic growth**.** We will examine the arguments for and against the **institutional argument;** the claim that institutional variation was the catalyst for the Great Divergence.

Our motivation lies in the importance of economic history (Nunn, 2009), which can be used to predict future economic events, and understand modern phenomena. Spolaore and Wacziarg (2013) use empirical evidence to suggest economic development is impacted by characteristics passed through history.

There has been little consideration of apparent similarities between Chinese and Western European[2] institutions and how this impacts arguments for institutional causes of divergence. Shiue and Keller (2007) assert future research is needed to improve understanding on 'what factors trigger industrialisation' and 'what factors facilitate market integration' (pg.1206). Our research question will explore these questions with specific focus on institutions.

1.2 Analytical Framework

A theoretical framework is required to support the analytical framework (Figure 1) we will use to answer our question.

We will establish the broad institutional theory behind growth, specifically the transition from a traditional economy to a modern one (North and Thomas, 1970. North, 1981).

[1] Institutions can be defined as the economic and political organisations which regulate human interaction and economic activity (North, 1990)

[2] Hereafter, when 'Europe' is discussed, this will be specific to '**Western Europe**' (England, Netherlands, Germany etc), unless otherwise specified.

This will underpin discussion around institutions as a catalyst for the Great Divergence. This dissertation will link established theory, to the sub-question:

i) Were the necessary institutions for growth present in both China and Western-Europe by the 19th Century?

This sub-question will allow us to split the literature and synthesize it into two arguments.

If a paper concludes the necessary institutions for growth **were present** in both nations, they are classified as **against the institutional argument**. We will discuss this literature with a further sub-question in mind.

ii) Discussion to the extent of these 'good' institutions in both nations.

This will allow us to confidently formulate a judgement. Literature generally aims either to disprove institutional argument for the Industrial Revolution (Pomeranz, 2000) or to suggest surprising similarities between Chinese and Western-European institutions (Shiue and Keller, 2007. Li, 2000)

If a paper concludes that the necessary institutions **were not present in both nations**, this aligns with thought that institutions did cause the Great Divergence, they are classified as **for the institutional argument.**

The common thought is the necessary institutions were present in Western-Europe and not China, resulting in the Great Divergence (Broadberry and Gupta, 2006. Li and Zanden, 2012).

Regarding this literature we ask the sub-question.

iii) Did institutions cause the Great Divergence? This will be an assessment combining the theoretical model with the conclusions of these papers.

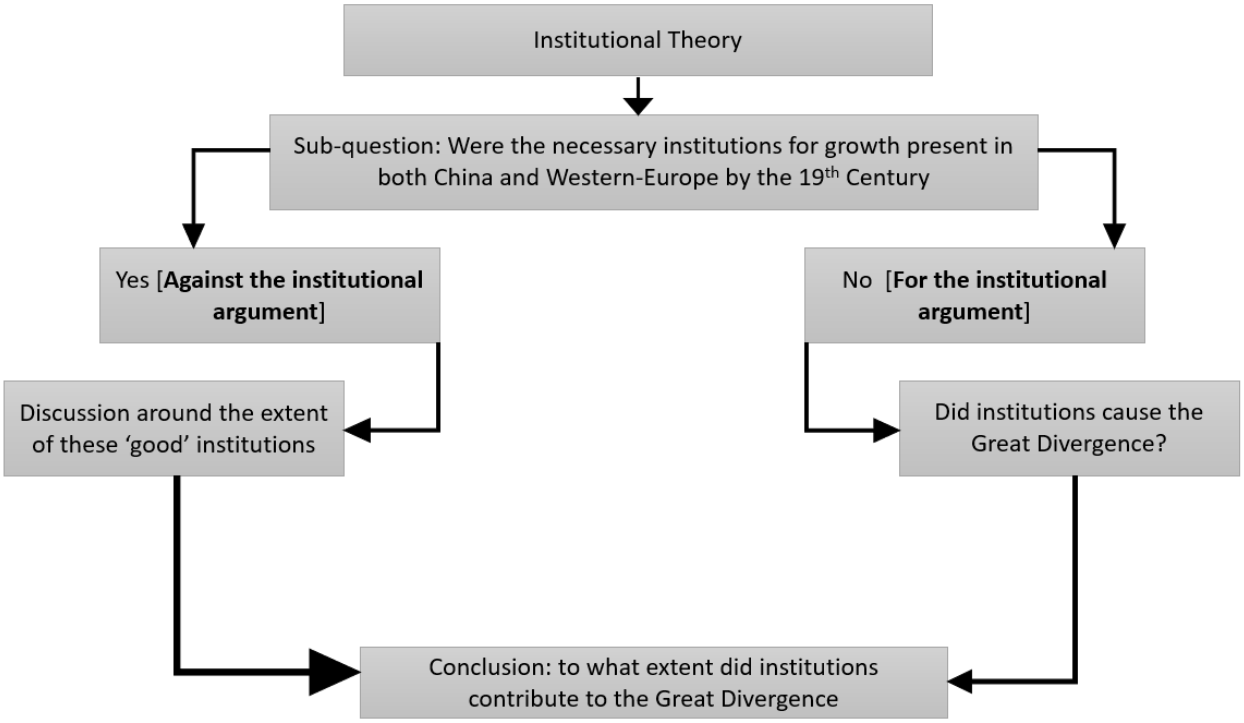

Figure 1: Flow chart illustrating the analytical framework.

2. Theory

Establishing the institutional theory behind growth allows us to understand how 'good' quality institutions in countries can cause economic transformation such as the Industrial Revolution.

2.1 Institutional Theory

The Great Divergence articulates the gap that occurred between European economies and China, in the 19th Century, here European countries transitioned from traditional to modern economies, China did not. Traditional economies demonstrated Malthusian structure.

$$Malthusian\ Model\ Y_{Mt} = A_{Mt}K_{Mt}^{\phi}N_{Mt}^{\mu}L_{Mt}^{1-\phi-\mu} \quad [3]$$

[3] M denotes the Malthus sector. Variables A_j, Y_j, K_j, N_j, and L_j defined as; total factor productivity, output produced, capital, labour, and land employed in sector j. (Hansen and Prescott, 2002).

Malthus' model declares any benefits of technological progress would be absorbed by expanding populations, and as population can increase exponentially, GDP per capita falls, resulting in stagnated growth (Galdor and Weil, 1999). An Industrial Revolution describes the transition to a modern economy, technological progress[4] is introduced into the model which leads to sustained economic growth which is not offset by population increases. Technological progress increases efficiency of the combination of labour and capital, contributing to an increase in GDP. The below Solow model is a production function that describes modern growth, it emphasises economic and technical efficiency (Breton, 2004). Hansen and Prescott (2002) represent technological progress in A, noting employment of technology in a profitable way[5].

$$Solow\ Model\ Y_{St} = A_{St}K_{St}^{\theta}N_{St}^{1-\theta}\ \ ^{6}$$

Regarding our discussion of to what extent institutions contributed to the Great Divergence; it is important to understand how institutions contribute to an economy avoiding a 'Malthusian trap'[7] because, if one region had good institutions (over the other) this would have accelerated their growth and catapulted them into an Industrial Revolution.

Fundamental institutions are required to redirect incentives towards 'productivity-raising… economic activity' (North and Thomas, 1970, pg.1) therefore, institutional innovations such as improved property rights allowed countries to escape Malthusian stagnation. They state the Industrial Revolution is a 'manifestation of innovative activity' (pg.1) due to economic incentives, insinuating for growth to occur institutions must be 'good quality' e.g., compatible with economic growth. They determine that institutions shape the behaviour of individuals within an economic system towards growth. They lay out their explanatory model as a theory behind growth, providing an integrated analysis of economic change within the model of institutional change. North and Thomas state changes in institutions provided economic agents with greater encouragement to strive for higher productivity, including incentives such as

[4] As opposed to static technology i.e., a static production function in the traditional economy.

[5] Appendix.1: Extension on details of the transformation from Malthus to Solow.

[6] S denotes the Solow sector (Hansen and Prescott, 2002).

[7] A Malthusian trap: when an economy is trapped in a situation with economic stagnation (Kögel and Prskawetz, 2001, pg1).

‘increased private profitability of innovation’ (pg.10). More specifically, the creation of institutions and property rights enables private rate of return from an individual’s market activities to be closer to the social rate of return, therefore making the employment of technological progress profitable. This resulted in increased efficiency, and growth from traditional economy to an industrial modern economy.

North and Thomas, elaborate how institutions lay the foundations for growth. They accredit the development of property rights (i.e., legal enforcement of contracts) and patent laws, to raising the rate of return on economic activity and encouraging innovation. These institutions enable contracts between agents, providing a framework that facilitates secure economic transactions, allowing a region to escape the Malthusian trap and industrialise.

Acemoglu and Johnson (2005) use an instrumental variable approach to find that property rights institutions have a ‘first-order effect on long-run growth, investment and financial development’ (pg.949).

An OLS regression establishes a correlation between institutions and ‘long-run economic growth, investment rates and financial development’ (pg.952). However, an issue of OLS is that it is unable to ascertain a causal effect. Acemoglu and Johnson utilise a multiple instrumental variable (IV) approach, which should ‘correct any omitted variable bias (OVB) or the reverse causality’ (pg.959).

Using this strategy, they find ‘robust evidence that property rights institutions have a major influence on long-run economic growth, investment, and financial development’ (pg.40). Although this paper’s precise empirical analysis focuses on former European colonies, we apply their conclusions as support for the theory of institutions supporting an economic industrial transformation.

Overall, countries with greater institutional constraints on elites including property-right protection against expropriation by power economic agents will have a higher long-run growth rate (pg.953). Therefore, institutions are fundamentally required for industrialisation and transformations into modern economy to occur. This is our **institutional theory**.

One branch of thought regarding the Great Divergence is the presence of good institutions in Western Europe (North and Weingast, 1989. Zhu, 2012. Brandt et al.,

2014), and the lack of them in China resulted in the divergence. Western Europe was able to industrialise, shifting into a modern economy due to the presence of 'good' institutions, as theory suggests institutions are a catalyst for economic growth (North and Thomas, 1970. Acemoglu and Johnson, 2005. Acemoglu and Robinson, 2012); this is the **institutional argument.**

3. Arguments relating to Economic Institutions

3.1 Against the Institutional Argument

Some economists argue there was little difference between Chinese and European institutions, this being the main position against the institutional argument for the Great Divergence. We begin by providing evidence for this case.

Kenneth Pomeranz is one of the key scholars behind this argument, his book *The Great Divergence. Europe, China, and the Making of the Modern World (*2000), provides a fundamental starting point for our argument against the institutional argument. Pomeranz (2000) argues against the fact that unique and established European institutions set them on a trajectory to escape Malthusian stagnation and transform into a modern economy. Pomeranz is supported by the 'California School'[8].

Why the Industrial Revolution occurred in Western Europe and not China was Pomeranz's focus. This is a controversial study as it pointed out many of the institutional characteristics vital for an economy to transform into a modern economy were not exclusively European. Pomeranz argues China's economic structure was very similar to Europe's; they would have been able to sustain the development of a robust consumer market, and therefore had the institutional facilities to industrialise. The institutional argument for growth we have previously discussed, revolves around

[8] This includes scholars such as R. Bin Wong and James Lee, who are not necessarily appropriate in our specific discussion but support the conclusion of 'surprising similarities' between the economies of Eurasia. Scholars such as Vries (2010) comment that this school of thought tends to exaggerate the resemblances between Eurasia and disregard institutional roles.

the importance of incentives for economic agents, such as property rights. Pomeranz alleges China had a sophisticated system of property rights and competitive markets.

The weight of importance on institutions was minimised by Pomeranz. He disproves the efficiency of European institutions systematically e.g., land markets, labour systems and markets. He discovers many institutions present in Europe at that time opposed enterprise and thus hindered economic growth, noting European property rights were not 'unusually efficient' (pg.80), and by 1789 European markets where 'further from perfect competition' (pg.17) than China. Pomeranz's conclusion doubts the importance of institutional theory and suggests similarities between China and Europe. Wong (1997) supports Pomeranz's doubt of institutional theory, directly criticising our established institutional theory, stating 'European political economy did not create industrialisation' (pg.151). Instead, the economy itself created a set of institutions which possessed the 'ability to support industrialisation once it appeared' (pg.151), thus institutions were not a catalyst for growth.

Pomeranz (2000), suggests two arguments as to why Europe industrialised, the first being the discovery of coal, which provided an ecological relief (pg.263), allowing Europe to increase its industrial production. The second being the discovery of the New World and the untapped resources it provided, helping Europe to overcome the land constraint in growth. Pomeranz illustrates this point by comparing import data from goods that were now widely available due to access to new primary products (i.e., sugar and cotton) from the Americas in 1800, to the counterfactual of before the discovery of the Americas. By 1830, Britain had imported over 263,000,000 pounds of New World cotton (pg.275) which fuelled British industry.

Despite institutions being necessary to convert the factors Pomeranz attributed to divergence into technological progress, he argues against institutional importance in growth.

Therefore, Pomeranz underestimates the importance of the institutions and innovation occurring in Europe, this claim is backed by reviewers of Pomeranz's work (Vries, 2001). Pomeranz states regarding the development of coal energy 'alleged differences in economic institutions… seem largely irrelevant' (Pomeranz, 2000, pg.68). We note Pomeranz has not provided sufficient proof of their irrelevance, as geographic luck did not give Europe the ability to exploit their coal resources. One claim is good institutions

encouraged technological progress, allowing Europe to take advantage of their natural resources and fuel industrialisation.

Li and Van Zanden (2012) directly critique Pomeranz's conclusions, noting there is a lack of supporting data for his conclusions. Pomeranz's evidence was 'impressionistic' (pg.958) as it relied on data regarding consumption, not necessarily measurements of real income. His conclusions are based on circumstantial evidence, allowing Pomeranz to overestimate the capitalist nature of the Chinese economy, overplay the role of the state, and underestimate the role of European institutions. Papers such as Allen et al (2011), utilised comparisons of real wages, concluding there was in fact a large gap in the purchasing power of real wages between Europe and China.

Overall, Pomeranz's case against the institutional theory of growth is weak. He is systematic in his disproval of unique European institutions, alluding to an argument for similarities between Chinese and European institutions. Further empirical analysis is required to support this argument. Pomeranz's alternative arguments for the Great Divergence are very sensitive to his dispute of institutional similarities.

North (1981) implies that one way of identifying good institutions, which allow for efficient allocation of resources and private returns for economic agents, is to recognize the presence of integrated markets. Pomeranz has already established a claim that China and Europe were highly similar, particularly on a market level.

Shiue and Keller (2007) argue against the institutional argument, using three centuries of data, to establish that markets in China and Europe were similar prior to the Industrial Revolution. Only post industrialisation do we see a divergence in market likeness. Therefore, they infer that the divergence was not caused by unique institutions in Europe which were more conducive to growth, at least in terms of market integration. This paper provides the first direct econometric evidence for Pomeranz's (2000) argument of similarities between Chinese and European markets.

A simple framework is established by Shiue and Keller (2007) comparing the spatial integration of grain markets.

To analyse market prices for European markets, the dominating good in most regions, grain is used, in comparison to rice prices in Chinese markets. The lack of available data to perform a direct comparison in terms of precise goods here could highlight a

weakness in Shiue and Keller's comparisons. However, they claim when comparing data from a Chinese province, Hunan, where both data for wheat and rice is available, there is no 'major influence' (pg.1194) on their results.

The summary characteristics for the price series[9] highlight further criticisms of the data, not least the lack of available data for some regions and the varying data collection methods.

Shiue and Keller employ cointegration techniques to consider a long-run cross-continental market efficiency comparison of Chinese rice markets with European wheat markets, as cointegration generally supports the notions of trade and market integration. These notions are determined by transport costs and the level of institutions, a unified institutional system can reduce transaction costs assuming standardisation of currencies, weights, and measures (pg.1198). Shiue and Keller apply Engle and Grangers cointegration methods, they also consider Johansen's (1988) maximum likelihood method[10].

Using Engle and Granger's method to answer whether a long-run (cointegrating) relationship exists between p_{1t}, p_{2t}, they estimate the following OLS regression:

$$p_{1t} = \beta_0 + \beta_1 p_{2t} + e_t \quad [11]$$

A unit root test is then performed to test if e_t is stationary which would imply p_{1t}, p_{2t} are cointegrated. To reduce problems due to serial correlation, the dependent variable lagged once is added as a regressor, and an Augmented Dickey Fuller Test is performed (pg.1199).

$$\Delta\hat{e}_t = \delta_1 \hat{e}_{t-1} + \delta_2 \Delta\hat{e}_{t-1} + \mu_t$$

The lower the t-statistic of δ_1, the more evidence that p_{1t}, p_{2t} are cointegrated.

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[9] Appendix.2

[10] Engle-Granger method can lead to loss of efficiency, however, is robust and requires few distributional assumptions. Johannsen's method allows for estimating speed of adjustment but is more restrictive (pg.1199). Both lead them to the same result.

[11] Where we consider the price series in location 1 and 2, p_{1t}, p_{2t}. e_t is equilibrium error and $\beta = [\beta_0 . \beta_1]$ is the cointegrating vector (pg.1199).

Wheat and rice are agrarian goods; therefore, the impact of weather can influence the price. To control for this, Shiue and Keller have performed a robustness test comparing historical weather data, concluding spatial weather patterns were not very different across China and Europe, and therefore did not bias their comparison of market efficiency (pg.1202).

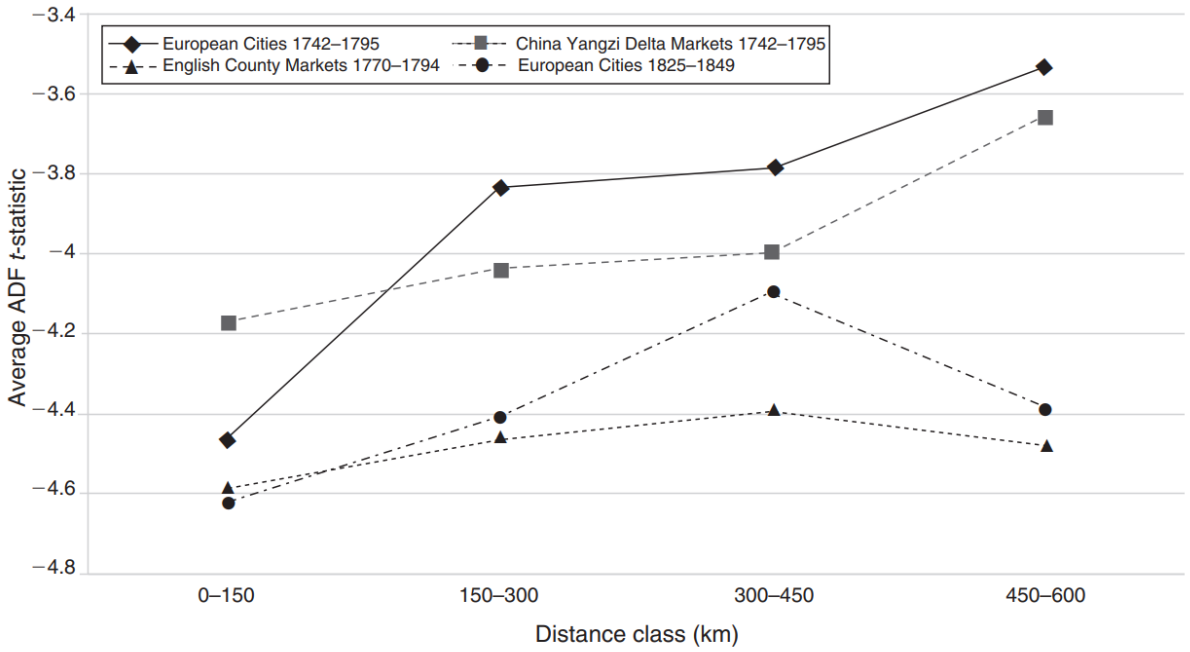

Figure 2- Cointegration in Yangzi Delta, England 18th Century and Europe 19th Century (Shiue and Keller, 2007, pg.1202, Figure 5)**.** *This graphically illustrates how the ADF t-statistic varies with distance across the assortment of markets. For distances less than 150 kilometres, evidence for cointegration is stronger in Europe than China, whilst for distances exceeding 150 kilometres China appears to have a slightly greater market efficiency in the 18th Century.*

Consistent with the previous analysis, the overall results show no substantial difference between China and Europe in terms of market efficiency. Yet, English markets compared to the Yangzi Delta[12] in China, show stronger evidence of cointegration over all distances (Figure 2) implying higher market efficiency in English markets. These results of market integration are substantiated through the earlier

[12] The Yangzi Delta was one of the most economically advanced parts of China in our period. It plays a core role in the literature of the Great Divergence acting as key comparison representing Chinas economy. (Appendix.3)

paper of Shiue (2002), whose results suggest that even though China did not grow as much as Western economies, a substantial part of China was integrated through trade (pg.1407).

We can to some extent corroborate the findings of Shiue and Keller, by proving that both Europe and China had integrated markets.

We know Europe had the necessary institutions for industrialisation, due to the economic transformation that took place there in the 19th Century. There are studies that specifically demonstrate market integration in Europe (Bateman, 2011. Clark, 2015. Jacks, 2004.), proving Europe did have significant levels of integration, domestically and to some extent cross-country, confirming theory that good institutions allowed for industrialisation.

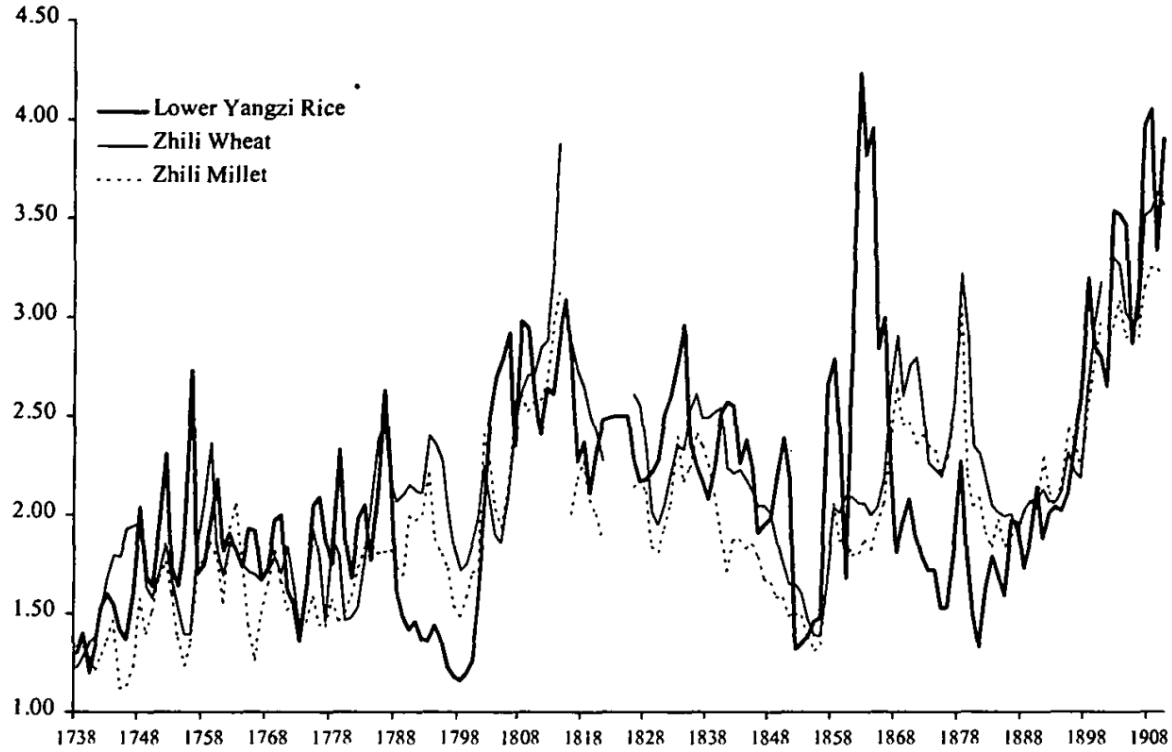

Figure 3: Grain prices in Zhili and Lower Yangzi 1738-1910. *Note annual solar averages*[13]. (Li, 2000, pg.694. Figure 6)

[13] For most calculations, data has been converted to solar months, as majority of prices from Chinese sources were reported according to the Chinese lunar calendar (Li, 2000, pg.673).

Li (2000) studies grain prices[14] and markets in North China between 18th-19th Century (pg.668). Li demonstrates price integration amongst Chinese regions grew more closely integrated throughout the period. Figure 3 demonstrates the altering relationship between grain prices in North China's Zhili region and Lower Yangzi. Illustrating that 'pre-Industrial Revolution', there was a close relationship of prices (pg.693). The correlation of Zhili grain prices with Lower Yangzi rice prices shows there was an increase in wheat price correlation of 15.7% from previous year between 1738-1798 (pg.695), illustrating increasing market integration pre-19th century[15]. Li's results prove a substantial convergence of price levels, this price integration confirms a 'national network' (pg.695). These results infer that market institutions had to be in place, alongside state organisation of investment including rail transport. Referring to our institutional theory, market integration proves institutions presence insinuating Chinese institutions were substantial and national, so we can infer from this study of price integration the Chinese institutions would have supported an Industrial Revolution, like Europe.

These results seemingly prove separately both China and Europe had high levels of market integration. Verifying that both had the institutions required to support an Industrial Revolution, suggesting another factor was the catalyst for economic transformation in Europe. We note how unique Shiue and Keller's paper is in providing a specific cross-country analysis in the Great Divergence literature, allowing the direct comparison of market integration in China and Europe.

Overall, in terms of market integration, institutions were present to a large extent in both nations. There is empirical evidence to support a measured take on Pomeranz's conclusion, concluding that 'good' institutions were present in both China and Europe. Therefore, the presence of similar institutions in terms of market integration seemingly goes against the institutional argument.

[14] The grain-price series used by Li (2000), is from an empire-wide system of reporting. Due to the imperial capital Beijing location in the centre of North China, these results are complete and more accurate than other Chinese provinces, providing a detailed insight in Qing period market behaviour (pg.673).

[15] Appendix.4

Considering the established institutional theory, if technological progress is introduced into the model, labour and capital are more efficiently combined, leading to sustained economic growth, which can overcome the constraints of population increases. This technological progress is underpinned by institutions which support economic returns to innovation. Thus, another way to prove institutional similarities (and disprove the institutional argument) is to establish that innovation levels in China and Europe were similar.

Regarding innovation, Needham (1986) questioned why despite China's advancement it was not now ahead of the rest of the world. Lin (2008) notes in the '1,000 years pre-Industrial Revolution, China was the country with the most advanced technology and the prosperous economy' (pg.64). As China had developed 'modern' institutions including a market system that Lin (1995) claims provided incentives for technological innovation (pg. 271). This infers that China had the pre-requisite institutions for innovation.

Lin (2008) states even by the early period of the Ming dynasty (14th Century) China had developed all the major elements that were vital for the Industrial Revolution that occurred in 18th Century Europe (pg.65). Lin proposes the divergence between Chinese and European innovation was due to the lack of a scientific revolution in China, which occurred in Europe in the 15th and 16th Century. The scientific revolution was the point at which new discoveries were being directly used in innovations of new technologies. However, this shift towards a more structured market for innovation infers perhaps although Chinese institutions had supported innovation, they did not support the transfer of these innovations into technological progress which could stimulate growth. Thus, China had fewer incentives to acquire the human capital required for 'modern' technological progress (Lin, 1995, pg.284). Needham (1969) determines that the Chinese bureaucratic system emphasized agricultural production, and failed to combine technology with scholars' mathematical methods, thus the absence of a 'scientific' revolution in China (pg.211). Therefore, China could not escape Malthusian stagnation.

Similar levels of innovation in Eurasia pre-Industrial Revolution seemingly prove that institutions were alike. However, explanations regarding the scientific revolution are fundamentally flawed to disregard institutions, and they contradict the similarities

argument. Scientific revolution relied on institutions to support the conversion of innovation into technological progress. So, levels of innovation may have been similar, but Europe possessed better institutions, contradicting the 'against' argument.

One issue raised by Wong (1997) that supports the 'against' argument, is that when assessing Chinese economic history, it can be difficult to compare to Europe's due to dramatic differences in state making and the political economy. Therefore, Wong states there were many differences between Eurasian economies, but the importance is 'assessing which of these differences mattered' (pg.15). Li (2015) picks up this critique of European-centric analysis, stating to study China's early modern economy, one should depart from the 'West-centric straight jacket' (pg.91). The California School are credited with a greater movement away from eurocentrism[16], which could suggest why their results are more favourable towards Chinese institutions, than those who side with the 'for' argument. Li argues the impact of the Chinese state was not negative, it has simply been assessed regarding a 'West European model' (pg.100).

Overall, the most convincing case against the institutional argument lies in the basis set out by Pomeranz, that the necessary institutions for growth (institutional theory), were present in both nations, and therefore institutions were not a catalyst for industrialisation. Pomeranz's paper can be critiqued due to its weak supporting evidence. However, empirical support for Pomeranz, in terms of market integration (Li, 2000. Shiue and Keller, 2007), seemingly proves Europe and China had similar quality institutions. Levels of innovation (Lin, 1995, 2008) as a proof of presence of Chinese institutions is a flawed argument in our case, as this suggested alternative to the divergence is rooted in institutional differences. Wong (1997) interestingly highlights that not everything can be analysed in the sense of a European model; this should be kept in mind as we discuss the 'for' argument.

[16] The focus on European history, viewing it as superior and disregarding a broader global view.

3.2 For the Institutional Argument

The institutional theory highlights institutions as a fundamental driver of economic growth, and thus Industrial Revolution. Here, we hope to prove it was the lack of good institutions in China and the presence of institutions in Western Europe which caused the divergence.

North and Weingast (1989) provide a necessary analysis of European institutions, particularly English institutions. In our analysis, we heavily focus on the level and quality of Chinese institutions, taking European institutions as a given. Following our institutional theory institutions are necessary to support an Industrial Revolution, therefore insinuating that Europe had high quality institutions. Later in this section we will discuss the argument that China lacked the institutions that England possessed, and therefore institutions were a catalytic contributor to the Great Divergence in the 19th Century.

The evolution of European institutions can be attributed to European settlers, who brought with them their heritage of good institutions (Acemoglu et al., 2001). The existence of inter-region competition created a volatile political composition in Western Europe allowing for dynamism and the 'emergence and evolution of institutions conducive' to growth (Ma, 2011, pg. 40). The quality of institutions in European economies can be shown by examining both private and public capital markets. Capital markets were particularly sensitive to the security of property rights because they provided predictability and commitment, allowing agents to form reliable expectations over their future actions (North and Weingast, 1989, pg.824). Therefore, they provided a visible indicator of the improvement in institutions (pg.819). Improved public finance and capital markets (Figure 4), shows increasing trust surrounding fiscal institutions.

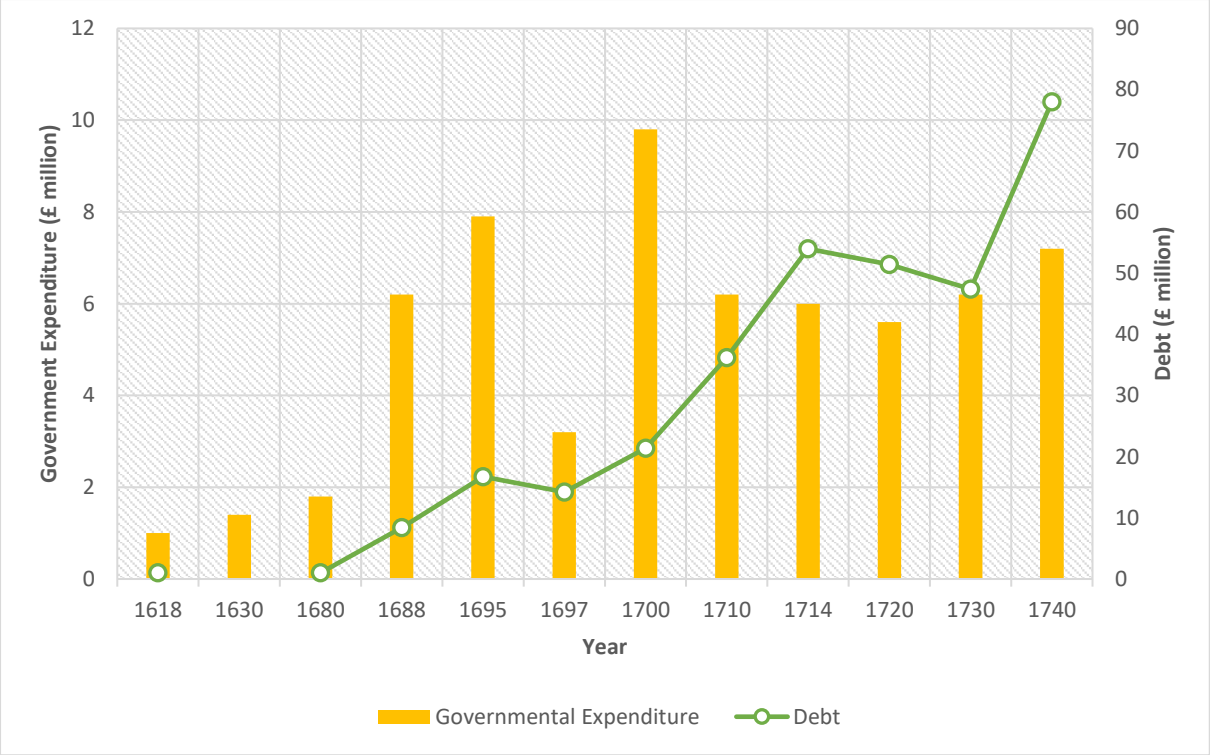

Figure 4 - Growth of English Government Debt, 1618-1740 [Data source: North and Weingast, 1989, pg.822. Table 3] *This figure displays graphically the steady increase in government expenditure and debt, after the 17th Century. This proves public capital market institutions were improving within the English economy, seen in the borrowing and fiscal ability of the government. Note: prices were relatively stable within this period[17].*

North and Weingast (1989) indicate that 'attempts to maintain private rights were largely successful' (pg. 823), based on evidence from large-scale trading in private securities, private interest rate levels and the increase in the number of banks, after the Bank of England was established[18]. In this paper, North and Weingast suggest further systematic tests are required regarding these markets, as current evidence cannot be used to discern precise estimates (pg.828).

[17] Appendix.5

[18] By 1720 in London, there was approximately 25 banks, by 1800, 70 (North and Weingast 1989, pg.826).

Overall, North and Weingast provide evidence for the evolution of institutions, such as property rights which supported the Industrial Revolution, by providing greater incentives for public and private investment (North, 1981. North and Thomas, 1973)

Brandt et al. (2012) directly disagree with the California School about the importance of institutions (pg.47). They argue that China's economic failure, and the subsequent divergence was due to the Chinese imperial institutional system, which protected the interests of elite, who resisted technological progress to maintain power.

An advantage of Brandt's et al. paper is that they expand further than the traditional 'oriental despotism'[19] frameworks of Chinese institutions, which they maintain is misleading. Although the Chinese state had absolutist characteristics, and had an extremely centralised political structure, there were signs of state being involved with formation of property rights and incentives (pg.60). Yet, they counter this by expanding upon the institutional theory, to state that a dominant state can 'threaten the security of private ownership' (pg.61). Therefore, Brandt et al. formulate a multistage discussion of institutional analysis.

They focus on the Chinese imperial systems capacity to constrain growth, which prohibited the economy from escaping the Malthusian trap. They attribute this to the limited state capacity of China, the emergence of informal property rights which were not cohesive to growth, and the system of patronage which was linked to corruption and impeded innovation (pg.79). Therefore, in their review they infer that Chinese institutions resisted changes which threatened the stability of the elite (pg.80) and so China did not have the necessary institutions in place to support technological progress and experience an Industrial Revolution. This conclusion is supported by Ma (2011) who notes within the Chinese states centralised structure, 'fundamental incentive misalignment and information asymmetry problems' (pg.1) determined China's economic trajectory.

Previously, we have discussed that under the institutional theory, North (1981) describes market integration as evidence of good institutions. Broadberry and Gupta (2006) aim to debunk the idea that Europe and China had similar levels of market

[19] A term coined by Wittfogel (1957), which can be inferred as the potentially oppressive holding of absolute power by one ruler.

integration, and thus similar institutions. They use silver wages to illustrate that Western Europe's markets were more integrated and therefore had more advanced institutions, which were a catalyst for divergence.

Silver wages in the study of the Great Divergence is defined as the 'daily wages of unskilled and skilled building workers… compared in terms of silver content of the local currency' (Van Zanden, 1999 cited in Broadberry and Gupta, 2006, pg.4). These wages had increased on previous levels due to the number of days worked per year increasing to meet consumption, for example between 1750-99, days worked p.a. increased from 250 to 300 (pg.8). Plus, urban population data displayed a substantial structural movement from low-paid agricultural employment to higher-paid industrial employment. This secondary industrial sector increased levels of symmetric information sharing, leading to technological progress (Marshall, 1977). High levels of technological progress imply good institutions in Western-Europe, as increasing private-returns for agents can incentivise productivity.

Broadberry and Gupta (2006) claim high silver wages in North-Western Europe reflected high productivity in the traded goods sector, implying a good level of market integration. The high real silver wages in the 18th Century reflects increased consumption of market-supplied goods.

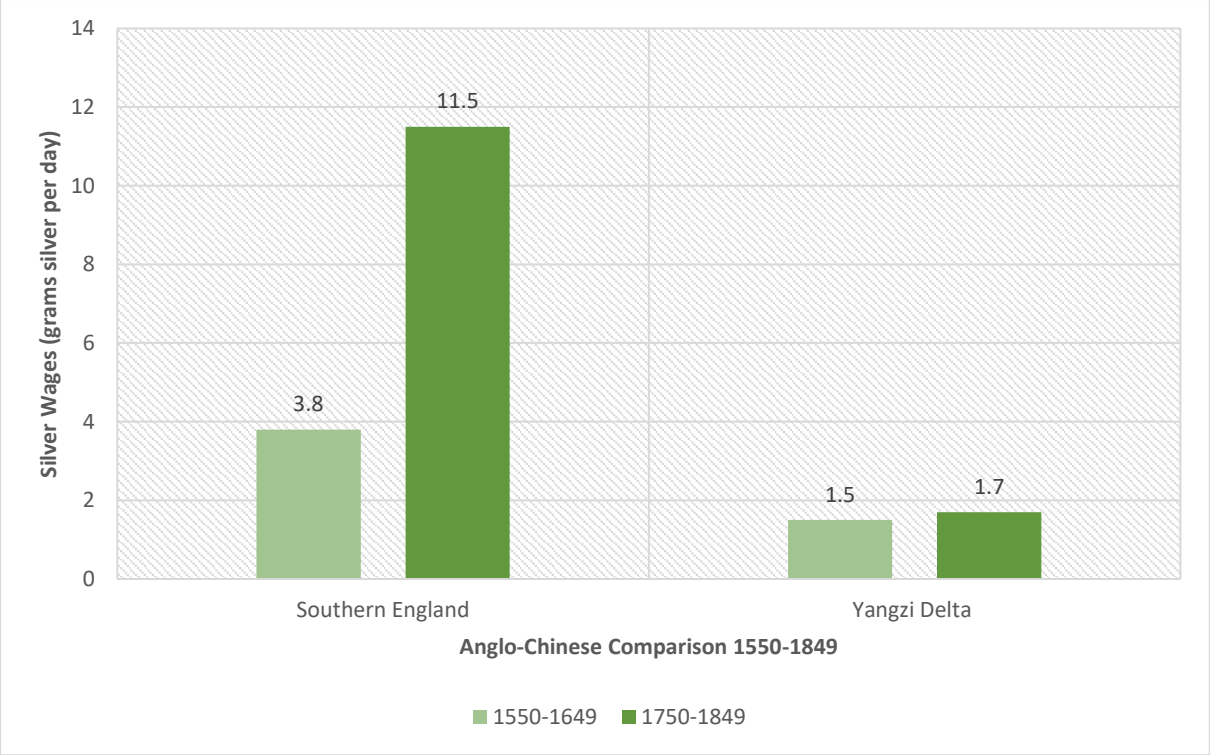

Figure 5: An Anglo-Chinese Comparison of the Daily Wage of Unskilled Labourers, 1550-1849 [Data Source: Broadberry and Gupta, 2006, pg.19. Table 8]

Broadberry and Gupta show a quantitative comparison between advanced areas of North-Western Europe and the Yangzi Delta region. Figure 5 illustrates the comparison in silver wages, showing Chinese wages were 15% of English wages between 1750-1849. The lower silver wage in China reflects lower productivity in their tradeable sector. This conclusion allows us to infer Western-Europe had more integrated markets and considerably better institutions than China.

Grain wages displayed a ‘mirror-image’ (pg.6) of the silver wage results in Europe, implying rising silver wages in North-Western Europe did not translate into high grain wages. Thus, the movement of people into economically developing towns, were not able to buy more food. This disproves one stream of Pomeranz’s (2000) thought, as he used purchasing-power of wages, and per capita food consumption to prove similarities between North-Western Europe and Chinese markets. China experienced low wages in terms of silver content, but high wages in terms of grain they could purchase, which is a pattern conventionally associated with Southern and Eastern Europe (pg.11), therefore Chinese market integration was not similar to (North-Western) Europe’s levels.

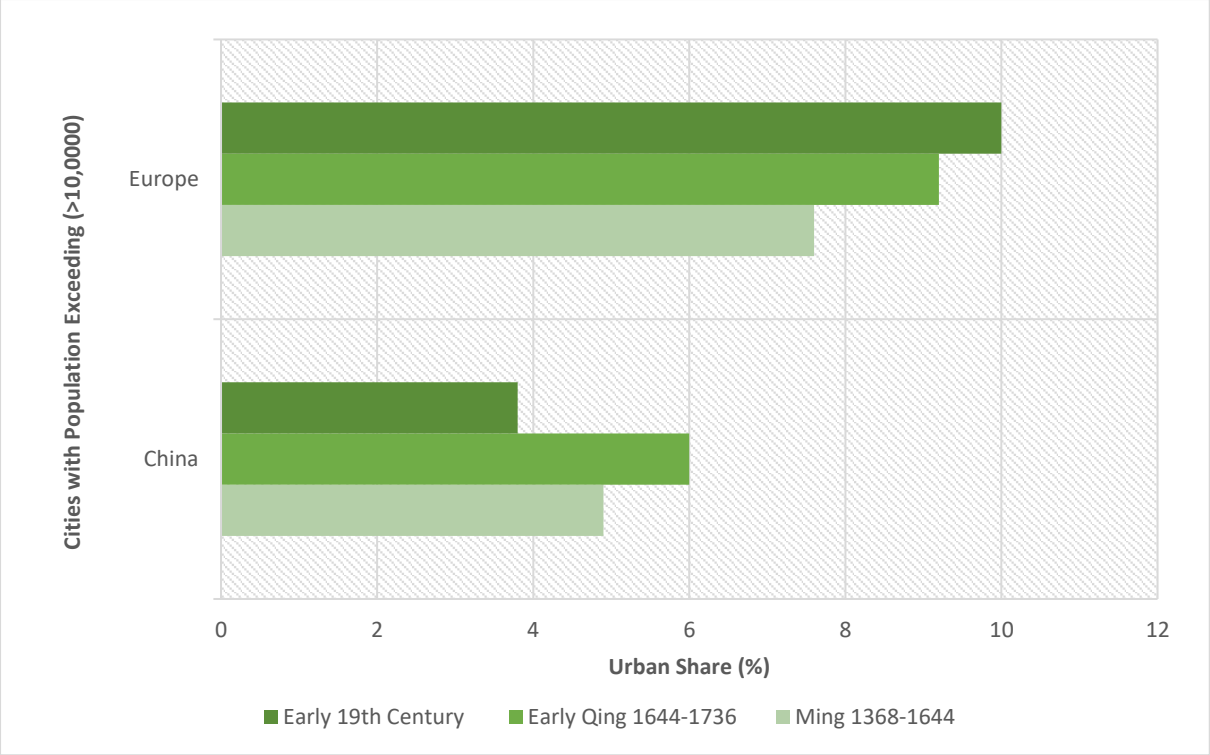

Figure 6: Urban Shares of the Population in China and Europe 1368-1820 (%)

[Data Source: Broadberry and Gupta, 2006, pg.20. Table 9]

Broadberry and Gupta further their investigation of differences between Europe and China, Figure 6 graphically represents their data surrounding urbanisation levels in China and Europe. They conclude there is no data to suggest, regarding urbanisation ratios, that China was on the same development level as Europe (pg.21). This supports the institutional theory, as institutions are fundamental for economic development therefore, when a country urbanises, they are moving away from a traditional agricultural economy, and utilising technological progress. For large urban settlements to grow, property rights and laws must be in place to ensure returns on infrastructure development. Therefore, their conclusion supports the argument that Europe had superior institutions to China pre-19th century.

To substantiate their conclusion, Broadberry and Gupta explore other factors which could explain the relatively higher silver wages in Europe. They dismiss the explanation of inflows of precious metals (bullion) from the New World impacted the wage, as the countries that obtained the bullion were not the ones that prospered e.g., Spain (pg.23).

Although both Broadberry and Gupta and Shiue and Keller (2007) use silver wages in their comparative studies between Europe and China, they come to different overall conclusions. The difference in their conclusion could be due to lower quality data which could exacerbate existing differences. Also, Shiue and Keller include a wider range of regions in their analysis, including Italy, which during the 17th and 18th centuries experienced stagnation in their economic activities. As Broadberry and Gupta (2006) compare the Yangzi Delta to strictly North-Western European areas, which at the time exceed central and eastern Europe in terms of economic development, we can begin to understand why their results of market integration were more optimistic with respect to Europe. Our dissertation focuses on 'Western-Europe' as we have defined in the introductory remarks, therefore, this could lessen the relevance Shiue and Keller's results have on our conclusion.

Overall, this paper supports the institutional argument, as it empirically proves European markets were more integrated, in contrast to Shiue and Keller's discussion on market integration. Broadberry and Gupta use silver wages to infer superior European productivity and market integration, as well as using urbanisation levels to illustrate higher levels of development and institutions. The institutional theory states this difference led to divergence as it allowed Europe to industrialise.

Productivity measures can also be used to signal positive institutional changes. North and Thomas (1970) extend the institutional theory, to state that 'institutional changes channel incentives towards technological change and sustained productivity growth' (pg.4), noting institutional innovation builds productivity into the system which enables escape of the Malthusian cycle[20] (pg.1). Therefore, by demonstrating that Europe was more productive than China pre-Industrial Revolution, this confirms the divergence occurred due to a lack of good institutions in China.

Li and Van Zanden (2012) demonstrate a productivity difference in their analysis. Their comparative study of the economic development of China and Europe proves overall Europe was more economically developed than China. They examine real wages,

[20] Output will grow more rapidly than population, as productivity increases are built into the system, a 'sustained increase in productivity can only be accounted for by the theory of institutional change' (North and Thomas, 1970, pg.3).

which reflect labour productivity, therefore comparative analysis of real wages can indicate the difference in institutions (pg.958).

Unlike previous studies, Li and Van Zanden focus on the Netherlands[21] as their European region, relative to the Hua-Lou area, located in the Yangzi Delta (pg.959), these areas were chosen due to their high levels of urbanisation, common geography and reliance on a water system.

This water system highlights institutional differences. In the Netherlands, specialized private institutions managed the water system, whilst in the Yangzi Delta, the local governments led by elites managed the water system by working together. Private institutions drive economic growth as they drive efficiencies.

Their quantitative comparative analysis concludes that labour productivity in the Netherlands in the 18th century, was double the level found in the Yangzi Delta, they link this with the fact that real wages in the Netherland were approximately 70% higher than in Yangzi (pg.979). This conclusion supports the idea that Europe had significantly more growth orientated institutions, as shown by relatively higher productivity (pg.982).

Brenner and Isett (2002), formulate their paper around a systematic disproval of Pomeranz's (2000) paper. Reflecting on Pomeranz's conclusions that the Yangzi Delta encountered no superior institutional barrier to growth than did Europe, therefore, Europe possessed regulation that was no more supportive of economic growth (pg.610). Brenner and Isett (2002) conclude, in contrast to Pomeranz, that England (and by extension Europe) had unique institutions in place, to support markets and rising productivity which catapulted England out of Malthusian stagnation into a period of growth, whilst the Yangzi Delta (and by extension China) had an economic structure which 'pursued a Malthusian path' (pg.650).

Comparative statics are used to disprove the claims of Pomeranz and provide evidence for their conclusion. As discussed in our 'against' argument section, the presence of technological progress proves the existence of innovation supporting institutions. Brenner and Isett claim Pomeranz minimised the technological lead that England maintained over China (pg.644). They support the institutional theory further,

[21] At the time, the Netherlands was one of the most developed parts of Europe.

by stating it was not simply the level of technological creativity, that one region possessed that was important. They focus on the ability of one region to implement technological progress, thus highlighting the importance of implementing institutions such as private companies, property-rights regulation and the competitiveness and responsiveness of sectors.

England's institutions created a responsive and adaptable industrial sector (pg.645), Figure 7. Contrastingly to Pomeranz, Brenner and Isett state English innovations were forward thinking and widely spread across sectors including steel, iron, and power technology (pg.645).

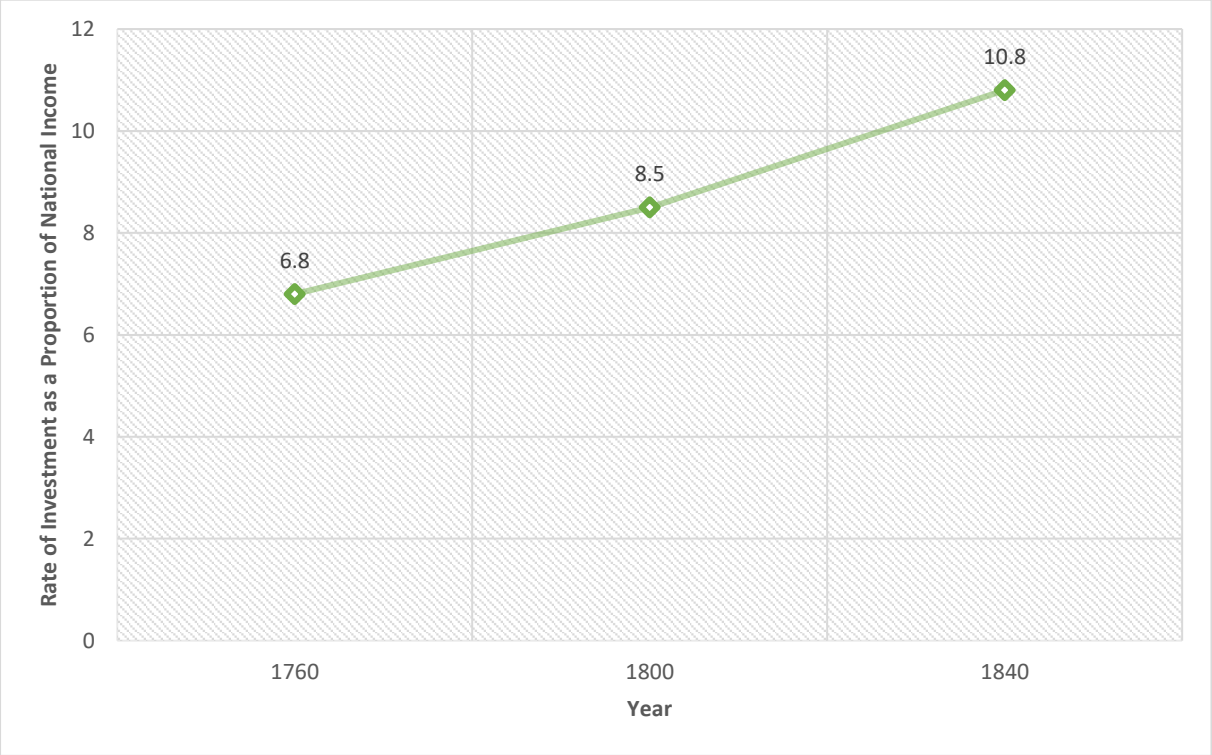

Figure 7: Rate of Investment as a Proportion of National Income [Data source: Crafts, 1994, pg.45. Table 3.1]. *This graphically illustrates the increased rates of investment out of national income. Alongside this there were high rates of capital accumulation and of technical change, representing the success of English institutions in implementing innovation into a responsive industrial sector (Brenner and Isett, 2002, pg.645).*

As established by Brenner and Isett, English institutions were unique in their ability to implement innovation. They provide an explanation, and specific development on the

institutional theory, as to why these institutions encouraged technological progress, as opposed to Yangzi institutions.

The institutional framework of England encouraged a profit-maximising approach (pg.614) to market participants, leading to competitive markets which encouraged ‘allocation of resources as to maximise their rate of return’ (pg.613). This encouraged the conversion of innovation into technological progress, which allowed the region to experience self-sustaining growth, which caused Industrial Revolution (pg.613).

In contrast, the Yangzi Delta institutions shielded economic agents from competition, and productive resource allocation, which was not conducive to economic development. Brenner and Isett state this caused a Malthusian stagnation which implies the necessary conditions for Industrial Revolution were not in place. Therefore, a divergence between the two regions occurred.

For our argument, if we take these conclusions regarding the two economic hubs of our respective regions and extend them to be general conclusions for Europe and China. Then we can prove that Europe had superior institutions regarding technological progress, and innovation, which according to our institutional theory led to industrialisation in Europe.

Overall, we have established that Europe’s good institutions were conducive to growth (North and Weingast, 1989), regardless of what side of the institutional argument you are on, most papers establish this as a stylised fact. In our ‘for’ argument we have seen it can be argued China did not have the correct institutions in place for modern growth (Brandt et al., 2012). Broadberry and Gupta’s (2006) results suggest that Europe had better institutions by looking at market integration and urbanisation, this result directly contrasts Shiue and Keller’s (2007) result. Li and Van Zanden (2012) prove Europe had more growth orientated institutions through analysis of productivity levels, whilst Brenner and Isett (2007) expand on the criticism of the innovation as a proof of similarities, that was discussed in the ‘against’ chapter. Therefore, there is a range of literature that contrasts the Pomeranz led ‘against’ argument.

4. Final Remarks

4.1 A Comment on the Data

Deng and O'Brein (2017) discuss the fact that many 'non-Chinese speaking academics tend to accept stylised facts from Chinese sources too readily' (pg.1), and often these facts then fall on to the negative side. Due to the lack of widespread good quality Chinse data, they challenge the idea that 'any number is better than no number' (pg.1). To account for the problem of flawed data, many papers we have discussed have omitted incomplete data or replaced missing observations with representative values. To encourage more empirical analysis in this debate we could suggest the use of sensitivity bounds, a diagnostic which conveys the degree of uncertainty caused by the incomplete data (Fiebig and Uldry, 1999)

One example where we can critique our data comes with the comparisons of wages, Deng and O'Brein state the evidence for Europe is more extensive and reliable, than the comparative workforce in China. As the relative proportion of the Chinese population that was dependent on waged labour was significantly smaller (pg.9), the Chinese working-class only made up 5-10% of the workforce in the Qing dynasty (pg.9). Consequently, the relevance of inferences from this data may not be the most accurate of comparisons (pg.9) to European data, such as Allen et al. (2011) and Broadberry and Gupta (2006), both of whom utilised wage comparisons.

Generally, 'price and wage data that is available for China is not of the same high quality as European data' (Broadberry and Gupta, 2011, pg.11). Yet, analysis of existing data, in particular long-run analysis has allowed economists to draw conclusions. Therefore, when making conclusions regarding our questions we must remember that the quality and selection of each papers quality of data is varied.

4.2 Conclusion

Throughout this paper we have discussed two specific arguments in the institution's channel within the causes of the Great Divergence debate, to determine the extent of the contribution of economic institutions to the divergence between China and Europe in the 19th Century.

We self-defined two terms to help formulate our discussion. The first of which was the **institutional theory**, this helped us discuss the theoretical argument that institutions are fundamentally required for countries to grow (North and Thomas, 1970. Acemoglu and Johnson, 2005. Acemoglu and Robinson, 2012). The second was the **institutional argument**, where we applied the institutional theory to the Great Divergence debate. If institutions are fundamentally required for economic transformation, then did China not have the appropriate institutions, whilst Europe possessed them, catapulting Europe rather than China into industrialisation.

Discussion of literature regarding the Great Divergence, allows us to say with certainty that the institutions in Europe were strong (North and Weingast, 1989), and in application of the institutional theory, they were supportive of economic transformation. From our discussion and evaluation, we can conclude that innovation and productivity supporting institutions, which our institutional theory states inspired technological progress and escape from the Malthusian trap, were better established in Europe (Brenner and Isett, 2002. Desmet et al., 2012. Li and van Zanden, 2012). This argument highlights flaws and disproved the corresponding papers in the 'against' argument (Pomeranz, 2000. Lin, 1995, 2008). Therefore, we can say with some definitive stance that European institutions were conducive to growth, therefore in some respect contributed to the Industrial Revolution occurring.

The key to answering our proposed question, once we have established the quality of institutions in Europe is asking, was the institutional argument correct, were these institutions unique?

The literature shows unique European institutions to some extent, implied from the critiques of Chinese institutions (Brandt et al., 2012) supported by the quantitative work of Broadberry and Gupta (2006). However, we cannot confidently state China did not have good institutions as, Shiue and Keller (2007) and Li (2000) provide significant empirical evidence to prove apparent similarities regarding market integration, contrasting the quantitative results shown by Broadberry and Gupta.

Overall, our literature proves that Europe did have good institutions which supported the economic transformation and implies the differences in the quality of institutions could have been a contributing cause of the Great Divergence. As, when using a

European-centric model, there is evidence amongst the literature that Chinese institutions limited its economy's ability to transform away from a traditional economy.

However, to achieve a more decisive and confident conclusion, regarding the extent of institutional differences contribution to divergence, our research has highlighted some further areas of focus, which we will now discuss.

Consideration of limitations, and thus advancements are needed in Chinese data as a comparison tool (Deng and O'Brien, 2017).

Across the Great Divergence debate, Western prejudiced analysis could imply many of our papers have embedded European-centric bias (Wong, 1997. Li, 2015), further research should focus on less European-centric views. For the 'for' argument to be developed, similar comparative results need to be found using a Chinese model, Brandt et al., (2012) come the closest to this in our research. Additional assessment of the economic ability of Chinese institutions would allow us to elaborate on whether Chinese institutions were growth blocking, or whether they were fundamentally different from European institutions, thus assumed to be constraining.

Potentially our question could be further elaborated on by taking a backward-looking view, by assessing why China eventually industrialised in the 20th Century, if institutional change inspired this growth, then we could propose that it was their 18th-19th Century institutions that prohibited them from industrialising at the same time as Europe.

Finally, Shiue and Keller (2007) highlighted England was ahead in terms of market integration, further research could ask why and therefore did England have more developed institutions, even than other Western-European countries?

5. Appendix

A.1 Further Details on Hansen and Prescott (2002) Transformation from Malthus to Solow

Hansen and Prescott (2002) attribute the transition from a land-intensive (traditional) economy to an industrial (modern) economy to positive total factor productivity growth, in the Solow model, this allows for adoption of new technology (pg.1215). They quote Mokyr (1990), who infers that modern growth stems from the application of new technology rather than simply just new ideas. This links to our institutional theory, that institutions provided a framework for technological progress. Mokyr illustrates his point using the example of the steam engine, which required developments made before industrialisation (Hansen and Prescott, 2002, pg.1125). Therefore, the transition from stagnant Malthusian economy to a modern economy with Solow growth occurs when 'profit-maximising firms respond to technological progress' by employing 'less land-intensive production' (pg.1205) which is now profitable to operate.

Table 1. Data Sources

I	II	III	IV	V	VI	VII	VIII	IX
Country	**Location**	**Source**	**Frequency**	**Years**	**Method**	**Max/Min Obs.**	**Spatial Aggregate**	**Quantity Weighted**
Austria	Vienna	Pribram (1938)	Monthly	1692-1914	Average	no	no	yes
Belgium	Brussels	Verlinden (1959)	Monthly	1568-1696	First day	no	no	no
		Verlinden (1972)	Monthly	1728-95,1800-89	First day	no	no	no
	Bruges	Verlinden (1973)	Monthly	1796-1914	First day	no	no	no
		Verlinden (1959,1973	Monthly	1564-1604	Avg./1st day	no	no	no
	Diksmuide	Verlinden (1959)	Monthly	1482-1615	Average	no	no	no
	Aalst	Verlinden (1959)	Monthly	1750-1802	Average	no	no	no
	Antwerp	Verlinden (1959)	Monthly	1608-1817	First day	no	no	no
China	Hunan province (13 pref.)*	see Perdue (1987)	Monthly	1738-1858	First day	yes	yes	no
	121 Prefectures	see Shiue (2002)	Monthly	1742-1795	First day	yes	yes	no
	Anhwei province (13 pref.)		"					
	Fujian province (12 pref.)		"					
	Guangdong province (13 pref.)		"					
	Guangxi province (13 pref.)		"					
	Guizhou province (12 pref.)		"					
	Hubei province (10 pref.)		"					
	Hunan province (13 pref.)		"					
	Jiangsu province (10 pref.)		"					
	Jiangxi province (14 pref.)		"					
	Zhejiang province (11 pref.)		"					
England	London	Beveridge (1965)	Monthly	1683-1801	Average	no	no	no
	London and 40 Counties	London Gazette	Weekly	1770-1794	Weekly avg.	no	yes	no
France	Toulouse	Freche (1967)	Monthly	1486-1913	First day	no	no	in part
	Paris	Baulant (1960)	Monthly	1520-1698	First day	yes	no	no
	10 Generalite (Regions)	Labrousse (1932)	Annual	1756-90,1806-1900	Average	no	in part	in part
	50 Cities, 48 Departments	Drame (1991)	Biweekly	1825-1903	First day	no	yes	yes
Germany	Cologne	Ebeling (1976)	Monthly	1531-1797	Average	no	no	no
	6 Cities Mecklenburg-Schwerin	Mecklenburg (1873)	Monthly	1770-1870	Average	no	no	no
	14 Cities in Bavaria	Seuffert (1857)	Monthly	1815-1855	Average	no	no	no
	Munich	Elsas (1936)	Monthly	1790-1855	First day	no	no	no
Italy	Siena	Parenti (1942)	Monthly	1546-1765	Average	no	no	no
Luxembourg	Luxembourg	Ruwet (1966)	Monthly	1722-1795	Variable	in part	no	no
Netherlands	Nijmegen	Tijms (1977)	Monthly	1558-1916	First day	start 1814	no	no
	Utrecht	Sillem (1901)	Monthly	1534-1647	Average	no	no	no
		Posthumus (1964)	Monthly	1774-1814	Average	no	no	no
	Ruremonde	Ruwet (1966)	Monthly	1599-1796	First day	yes	no	in part

Notes:
Column VI indicates whether the prices were calculated from the first market day of the month or with a temporal averaging method.
Column VII indicates if the data records a range of prices, ie, typically the minimum and maximum prices observed.
Column VIII notes if spatial aggregation is involved; these cases are only relevant for regions larger than a city market, such as departments or prefectures.
Column IX indicates if price averages have been quantity-weighted in the original source.
*Hunan series of monthly prices for both rice and wheat.

A.2 Summary Characteristics for the Data Source (Shiue and Keller, 2004, pg.47. Table 1)

The data source utilised in Shiue and Keller's published 2007 paper, can be assessed through this data source from their paper in an earlier working state.

This table illustrates the variation in method of data collection and the level of price information for each location, this could be noted as a weakness of Shiue and Keller's data.

However, they have accounted for the impact of inflation, as even though their 'overall sample stretches over three centuries' (Shiue and Keller, 2004, pg14), they perform their comparison within a 25-year period, which avoids times of elevated and volatile rates of inflation (Shiue and Keller give the example of the Napoleonic Wars as a volatile period). Therefore, they believe that inflation does not have an influential impact on their results.

Furthermore, the importance of inflation is regarded in their empirical analysis as they allow for a 'trend in the deterministic component of the cointegration relationship'(pg.14).

A.3 The Yangzi Delta Comment

The lower Yangzi Delta was a prosperous region in the southeast of China, therefore providing a good comparison to prosperous regions in Europe. It possessed the highest per capita GDP in China and was amongst the highest in East Asia for the majority of the 19th Century (Li, 2015, pg.101), due to its expanding cotton and silk industries (Wong, 1997). In Li and Van Zanden (2012) it is indicated regarding GDP per capita, Yangzi Delta matched Western Europe as an aggregate, providing an apt comparison.

CORRELATION OF ZHILI GRAIN PRICES WITH LOWER YANGZI RICE PRICES
(solar annual prices)

Subperiod	Wheat	Millet	Sorghum
		Price Level	
1738–1798	0.094	0.142	0.134
1799–1869	0.287*	0.318**	0.295*
1870–1911	0.819**	0.834**	0.795**
		First Difference of Prices	
1738–1798	0.150	0.118	0.178
1799–1869	-0.052	-0.052	-0.065
1870–1911	0.407**	0.308*	0.244
		Percentage Change from Previous Year	
1738–1798	0.157	0.176	0.219
1799–1869	0.060	0.094	0.090
1870–1911	0.441**	0.318*	0.258

* = Significant at the 5 percent level.
** = Significant at the 1 percent level.
Note: Zhili provincial averages exclude Xuanhua and Chengde.
Sources: See the text.

A.4 The Correlation of Zhili Grain Prices with Lower Yangzi Rice Prices (Solar Annual Prices) (Li, 2000, pg.695. Table 6)

GROWTH OF GOVERNMENT DEBT, 1618–1740
(£ million)

Year	Governmental Expenditure[1]	Debt[2]	Prices[3] (1701 = 100)
Stuart England			
1618[4]	£0.5	£0.8	
mid-1630s[5]	1.0	1.0	
1680[6]	1.4		113
1688[6]	1.8	1.0[7]	99
Post Glorious Revolution			
1695	6.2	8.4	116
1697	7.9	16.7	122
1700	3.2	14.2	115
1710	9.8	21.4	122
1714	6.2	36.2	103
1720	6.0	54.0	102
1730	5.6	51.4	95
1740	6.2	47.4	100
1750	7.2	78.0	95

A.5 The Growth of Government Debt (North and Weingast, 1989, pg.822. Table 3)
It should be noted that the figures in the table above are obtained from a wide range of sources, therefore they should only be used to indicate underlying trends but no more (pg.822).

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