Gender Relations, Family Systems and Economic Development: Explaining the Reversal of Fortune in EurAsia

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Abstract

This paper argues that gender relations matter for economic development, and in particular help to explain growth trajectories in EurAsia between the Neolithic Revolution and the present. Firstly, we offer a set of hypotheses drawn from the literature about the links between gender relations and economic development. Secondly, we approach gender relations via the classification and measurement of historical family systems, and offer a set of global maps of the institutions concerning marriage, inheritance and family formation that determine the degree of agency that women enjoyed at the micro level. Thirdly, we use these concepts to explain the genesis of the EurAsian pattern in family systems and gender relations as a by-product of the process of ancient state formation that followed the Neolithic Revolution 10,000 years ago. Finally, we link these patterns in family systems and female agency to economic growth after 1300; we empirically demonstrate that high female agency was conducive to growth between 1500 and 1800 and was also positively correlated to growth during the Great Divergence between 1800 and 2000. The 'reversal of fortune' that happened within EurAsia between 1000 and 2000, whereby the ancient centers of state formation and urbanization in the Middle East, India and China were overtaken by regions at the margin of the continent (Western Europe, Japan, Korea), can be explained by the spatial patterns in gender relations and family systems found there (and reconstructed here).

Introduction: hypotheses linking female agency to development

There is now a well-established literature in development studies (inspired by the work of Amartya Sen) arguing that female agency is conducive to economic growth and institutional development (Eswaran 2014; Klasen 2002; Klasen and Lamanna 2009; FAO 2011; Teignier and Cuberes, 2014). The World Bank 2012 report 'Gender, Equality and Development' summarized this literature and contended that strengthening the autonomy of women was 'smart economics'. Agency here is defined as the ability to make decisions and to undertake action in a given environment to achieve a desired outcome. In 2014 a further World Bank report, "Voice and Agency – Empowering women and girls for shared prosperity", highlighted that although gaps between men and women in many dimensions have narrowed, systematic differences continue to persist, which they ascribe to differences in agency (World Bank 2014).

Gender inequality has consistently been shown to inhibit economic growth and development (Klasen 2002; Klasen and Lamanna 2009; FAO 2011: McKinsey 2011). This idea that women might be an engine for economic development has risen to prominence in development studies over the past 20 years, largely as a result of the work of Ester Boserup (1970). The line of reasoning received further support in 1992 from the then chief economist of

the World Bank, Lawrence Summers, who argued that investments in the education of girls might just be the highest return type of investment possible in developing countries (Summers 1992). A number of quantitative studies have built on these ideas to explore the empirical relationship between gender inequality and economic growth and development (Klasen 1999; Teignier and Cuberes 2014). The overall result has been to show that gender inequality is detrimental to growth. Teignier and Cuberes, using a model whereby women are inhibited from contributing to the labour force in various ways, find an implied income per capita loss of 27% for Middle Eastern and North African countries and a 10% loss for Europe (Teignier and Cuberes 2014), an economically significant result.

However research has also demonstrated that the effects of achieving gender equality extend beyond simply economic gain. Improving the position of women has been shown to have positive effects on a wide range of development outcomes: children's educational attainment (Currie and Moretti 2003; King *et al.* 1986; Schultz 1988; Strauss and Thomas 1995), the quality of government, particularly by reducing corruption (Dollar, Fishman and Gatti 2001), reduced infant mortality (Dollar and Gatti 1999; Eswaran 2014), improved household efficiency (King and Hill 1997) and reduced fertility (Rosenzweig and Schultz 1982).

These ideas have, however, not played a significant role in the debate on the long term development paths of countries and regions that has been the focus of much new research by economists and economic historians. A major source of inspiration for the latter has been the development of new institutional economics, with seminal publications by North (1981, 1990), North, Weingast and Wallis (2009) and Acemoglu and Robinson (2012). North stresses the importance of rules that constrain the behaviour of *those in power* . The power of the executive has to be limited to ensure property rights of citizens and hence create the right incentives to invest. Institutions should, in his view, create a level playing field and guarantee a certain balance of power between ruler and ruled. Such institutions limit the freedom of the powerful, but enhance the agency of the great majority of the population. This basic idea has become highly popular in NIE; it is, for example, at the core of the writings about 'inclusive' versus 'extractive' institutions by Acemoglu and Robinson (2012). Similarly, the introduction of 'rule of law' for elites is considered to be the first step towards an 'open access regime' by North et.al. (2012). Many studies have analysed the importance of democratic institutions for economic development, in the more distant past and contemporaneously (Rodrik et.al. 2004; Przeworski et.al 2000).

But NIE seems to be primarily, if not almost exclusively, interested in constraining *political* power. Other sources of power – such as 'patriarchy' – have not received the same attention, although gender inequality may have similar effects in undermining the 'level playing field' of women. Gender inequality seriously limits the agency of approximately half of humankind, who can therefore not work, invest and innovate as they would under free conditions. Patriarchy undermines female property rights and investment incentives in the same way as unconstrained sovereignty may destroy incentives for innovation and investment for (male) entrepreneurs. For instance, the lack of well-defined property rights for women has

been highlighted as a substantial barrier to efficient agricultural production in sub-Saharan Africa (see Doepke, Tertilt, and Voena 2012 for a review).

It follows that we can formulate what we have called the *gendered North hypothesis*, arguing that constraints on power holders at the micro level – on the power of the patriarch or the parents – will improve incentives and property rights of women (and young men) and therefore the quality of decision making at that level. A special case of this is related to the switch from 'quantity' to 'quality' of offspring, introduced by Gary Becker and his associates (Becker 1960; Becker and Lewis 1973; Becker and Tomes 1976; see also Schultz 1961). The idea of the quantity-quality trade-off is that parents face constraints in terms of time and money, and therefore have to make a choice between the number of children and the amount of time and resources they can invest in them. If they choose to have fewer children, they can increase investment in the human capital of those fewer children. This trade-off is in particular driven by the opportunity cost of childrearing for women, as they are the ones who bear most of the costs of having and rearing children. Thus, the higher the level of female education, the larger the costs will be of having more children, in terms of their productivity and the opportunity costs of their time (Becker 1965). And the stronger the bargaining position of women in the household, the more these considerations will affect the parental decision making process. The *gendered Becker hypothesis* states that increasing the bargaining position of women will further the process of switching from quantity to quality of offspring, and enhance levels of human capital formation of the next generation (and in that way stimulate economic growth). A third hypothesis relates female agency to processes of democratization. Emmanuel Todd (1985, 1987) has developed ideas about the relationship between family systems and the existence of broad, global differences in (political) institutions and ideologies. The underlying intuition is that children learn how to deal with power in the families in which they are raised, which has important implications for the way in which power, at the level of the polity, will be used or abused. The patriarchal household will teach other lessons to children than the bargaining household in which all have a say. This Todd hypothesis will help to explain why certain societies experience, during the process of economic development, a relatively unproblematic change towards democracy, whereas in other parts of the world this change has been difficult and incomplete.

We are going to test these ideas in a case study of development paths in EurAsia between the Neolithic Revolution (NR) and the present. In this version we will focus on the link between female agency and economic growth, and will not discuss connections with human capital formation and democratization. We will in particular try to explain the 'reversal of fortune' that occurred in this part of the world between 1000 and 2000. In his seminal book on the causes and consequences of the Neolithic Revolution, Jared Diamond (1997) discusses the cumulative, self-reinforcing character of technological change. He argues that this is the principal reason why EurAsia, the largest continent with the biggest population, after pioneering the Neolithic Revolution, has dominated technological change since. That it was the first region to move to sedentary agriculture – and hence developed complex societies, cities and states first – gave the continent a head start over Sub-Saharan Africa, the Americas,

and Australia – but also the ease of communication across the Continent (due to its East-West orientation) – and finally the cumulative character of technological change explain why EurAsia became the core of the world economy until very recently (and is arguably, with the rise of China, reclaiming this position after a 'temporary' loss to North America).

There is indeed a lot of evidence confirming the path dependent, cumulative nature of technological and economic change (eg. Comin, Easterly and Gong 2010). In the year 1000 the core regions of EurAsia were the 'old' centers of the Neolithic Revolution – the Middle East (then dominated by the flowering of the Arab world), China (under the Sung arguably the most developed part of the world economy) and, perhaps less obviously, Northern India (which was in an interlude between the Gupta Empire and the Moghul Empire). Since times immemorial, the economic and urban backbone of EurAsia was the band between the eastern shores of the Mediterranean (including Greece and Egypt) and the great river valleys of China – connecting the three early centers of the Neolithic revolution in the Middle East (Fertile Crescent), the Indus Valley and the Yellow River Valley with long distance trade (such as the famous Silk route). Even in 1500 – and some would perhaps argue, 1750 – this was the basic pattern of the EurAsian economic and urban system.

Until 1000, perhaps 1500, the map of EurAsia confirmed Jared Diamond's expectations: based on their headstart, the centers of the Neolithic Revolution by and large maintained their leading position. Afterwards things changed fundamentally: the Industrial Revolution did not originate in Baghdad or Kaifeng, and the first nation to 'catch up' with the leaders, was not found near Harappa, the oldest center of the Indus Valley civilization, but was Japan. It was the periphery of EurAsia – North-Western Europe, Japan – that pioneered the industrialization of the post 1800 period, completely overturning the economic map of the continent. At present, the old backbone of Eurasia consists of countries with below-average income levels, the exceptions being the oil producing countries of the Middle East who do not really thank their ranking to endogenous advances in technology and institutions (Olsson and Paik 2013, 2015). But the band stretching from Egypt and Turkey in the west to China in the east was, in 1950 for example (before the 'oil boom'), and still is, a region of on average low GDP per capita levels, although the recent catching up of China and India is weakening this pattern. As Olsson and Paik (2013) have demonstrated, between 1500 and 2000 a 'reversal of fortune' occurred, during which some of the 'marginal' regions of Eurasia developed very rapidly, whereas the core stagnated. This was a different 'reversal of fortune' from the one analyzed by Acemoglu et.al. (2002) when researching the effects of European colonization on global inequality; their focus was on the institutions introduced by European expansion after 1500, we will focus on the institutions that emerged much earlier, in the period of ancient state formation between c 3500 BC and 0 AD.

Why did the center of gravity of EurAsia move from the central belt between Egypt and China to Western Europe and Japan? We build on the hypothesis originally developed by Friedrich Engels that the rise of sedentary, complex societies, and in particular the 'urban revolution' that began after about 3500 BC, resulted in a fundamental change in gender relations. Before the Neolithic Revolution, in hunter-gatherer societies, gender relations were

relatively equal, an hypothesis confirmed by recent research.[1] The subsequent development of cities, states and hierarchical societies following the Neolithic Revolution resulted in the introduction and spread of more hierarchical family systems, backed up by hierarchical state structures. The family systems with greater autonomy for women only survived in the marginal parts of EurAsia, at great distances from the original centers of the Neolithic Revolution and the urban revolution. This is a gendered version of the hypothesis developed by Olson and Paik (2013, 2015), who also find a strong negative link between 'years since transition to agriculture and contemporary levels of income', a link which they attribute to the long-term impact of hierarchical values and structures arising in ancient societies, which gave rise to autocratic states.

Firstly, we test this hypothesis by (1) quantifying the position of women (or reversely, the level of patriarchy) in the family systems of Eurasia (building on work by Emmanuel Todd and Murdock), and by (2) empirically testing for the correlation between the early adoption of the Neolithic Revolution in the mentioned three centers and the features of the family system. We show that near the centers of the Neolithic Revolution family systems emerged which were relatively patriarchal and allowed less agency for women, whereas at greater distance from these centers family systems (as analyzed by 19th and 20th century anthropologists) were much more 'female friendly'.[2]

Next, we set out to quantitatively explain the 'Little Divergence' (between 1500 and 1800) and the 'Great Divergence' (between 1820 and 1913/1950) by focusing on the link between female agency and economic growth. We demonstrate that the correlation between GDP per capita and female agency as made possible by family systems of EurAsia becomes gradually stronger over time, and that IVregressions (using distance to the nearest centre of the Neolithic Revolution as an instrument varaiable) seem to confirm that female agency is causing economic growth.

The long-term consequences of the Neolithic Revolution for female agency

The Neolithic Revolution, which began some 10,000 years ago, is one of the crucial turning points in world history, which had a fundamental impact on all aspects of social life. It led, as is well known, to the rise of cities, states and complex societies. There are reasons to believe that it also impacted on gender relations. There is, to begin with, a growing literature arguing and demonstrating that hunter-gatherer societies were characterized by relatively equal

[1] Dyble et.al. (2015) analyse sex equality among hunter gatherers as an adaptive strategy to maximize cooperation, and see this as a 'shift from hierarchical male philopatry typical of chimpanzees and bonobos'

[2] We should make explicit here than when we talk about the position of women or female agency we do not construe these in the way that modern measures of gender equality do (i.e. with data on labour force participation, life expectancy, political empowerment etc,). Rather we turn to institutional measures which capture the position of women in the ways families organise themselves across Eurasia.

gender relations.[3] Boserup (1970) for example argues that it was the spread of the plough that gave rise to increased specialization between men and women, which resulted in growing inequality between the sexes. This hypothesis has been rigorously tested by Alesina, Guiliani and Nunn (2014), who found strong correlations between early adoption of the plough and contemporary attitudes towards women, and in particular their employment. In this paper we focus, however, not on the rural determinants but on the urban roots of gender inequality. Archeologists studying the long term evolution of gender relations in the millennia after the Neolithic Revolution have pointed out that it was in particular the rise of cities (and related complex hierarchies) that seemed to make the difference. Wright (2007) in a recent analysis of the evolution of gender relations in the first urban societies in Mesopotamia between 6000 and 2000 BC confirmed the hypothesis (which goes back to the ideas developed by Engels in the 19th century) that it was the rise of urban society in the late 4th Millennium which gave rise to patriarchal systems and that the status of women declined during the corresponding process of state formation (Wright 2007). A recent comparative analysis of ancient civilizations summarized the evidence as follows: 'In early civilizations … inequality was regarded as a normal condition and injustice as a personal misfortune…. Structures based on differential power were pervasive. Every child was born into and socialized by a family that was internally hierarchized in the image of the state. The subordination of children to their parents and, to varying degrees, of wives to their husbands went unquestioned…. Young people were expected to obey older people, especially older men. 'Father', 'king', and 'god' were often synonymous and metaphors for power…. If egalitarian social organization was known to people in early civilizations, it was a feature of small-scale and usually despised societies beyond the pale' (Trigger 2003: 142). This neatly summarized the argument developed here.

The anthropologist Emmanuel Todd (2011) in his recent analysis of the development of family systems in EurAsia in the very long run, came to a similar conclusion, based on the spatial distribution of family systems. He pointed to the geographical concentration of patriarchal family systems in the heartlands of the continent, and the existence of more female friendly family systems in its margins – in Western Europe, Sri Lanka, Japan, Mongolia and South-East Asia. This links to the findings of Goody (1989, 1996) who points to certain similarities between Asian and Western-European family systems, but in our view these similarities are a phenomenon of the periphery of the EurAsian continent. The hypothesis that Todd formulated was that early states developed patrilineal hierarchies, fundamental changing the original balance of power between men and women which predominated in the nuclear family of the earlier hunter-gatherers. The patrilineal, community family organization type leant itself well to empires based on conquest; as a result early state formation (following the Neolithic Revolution) resulted in family systems that constrained female agency. Only in the margins of EurAsia, at great distance from the centers of the Neolithic Revolution (which spread only slowly), did female friendly family systems

[3] M. Dyble et.al. (2015) Sex equality can explain the unique social structure of hunter-gatherer bands, Science 15 May 2015, 796-798, analyse sex equality among hunter gatherers as an adaptive strategy to maximize cooperation, and see this as a 'shift from hierarchical male philopatry typical of chimpanzees and bonobos'

survive. The idea that the original form of family organization is female-friendly and has been replaced by a more male-oriented version with the rise of private property harks back to the work of Lewis H. Morgan and Friedrich Engels. In what follows we refer to this as the Engels hypothesis to distinguish it from a different Todd hypothesis, elaborated on in other work which links family-level practices how power is dealt with at a societal level.

A similar spatial structure in contemporary value systems was analysed by Olson and Paik (2013, 2015), who found a strong negative link between 'years since transition to agriculture and contemporary levels of income', a link which they attribute to the long-term impact of hierarchical values and structures arising in ancient societies, which gave rise to autocratic states. In short, the historical and archeological literature and the anthropological evidence suggests that there is a direct link between the Neolithic Revolution, the subsequent process of ancient state formation, and the emergence of family systems that suppressed female agency.

We test this hypothesis in two steps: first we use anthropological data to reconstruct the 'female friendlyness' of Eurasian family systems. In a related paper 'Towards an ethnographic understanding of the European Marriage Pattern' Sarah Carmichael and Jan Luiten van Zanden (2015) have used ethnographic information (Murdock's database and Todd's studies) to classify the societies of Eurasia on various marriage and family-related institutions, such as monogamy, consensus, female inheritance, exogamy and neo-locality). All these institutions have a 'girlfriendly' version: monogamy is from this perspective to be preferred to polygamy; consensus to arranged marriage; female inheritance to systems without them; exogamy to endogamy (which restricts the choice of marriage partners to kin-members), and neo-locality to patri-locality. An easy and transparent way to classify societies is to let them score on all five dimensions; societies which are monogamous score one point here, and societies with polygamy do not score a point. Female inheritance, exogamy, matrilocality and consensus all score similar points (see for full details Carmichael and Van Zanden (2015)). The scoring is presented in the table below:

Table 1: Scoring for the 'female-friendly index'

Variable	Lowest Score	Intermediate Scores	Highest Score
Domestic Organisation	Extended – 0	Stem – 0.5	Nuclear – 1
Cousin Marriage	Endogamy – 0[4]		Exogamy – 1
Monogamy	Polygamy – 0		Monogamy – 1
Marital residence	Patrilocal and	Avunvulocal – 0.25	Matrilocal – 1

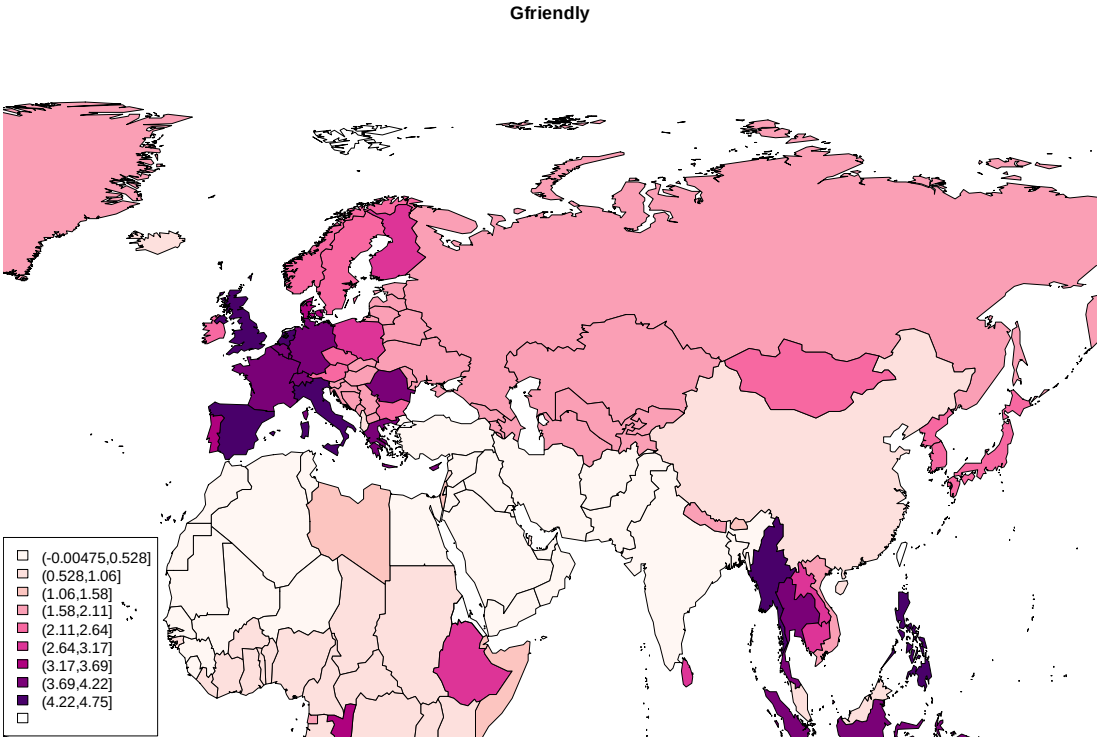
[4] Assigning a score to the extended family variable and the endogamy is complicated as in some cases living in extended, endogamous families can be beneficial to women as it keeps their natal kin close-by and can provide them with a support mechanism in times of need. An argument could therefore be made for assigning a half point for the combination of the two however for simplicities sake this has not yet been implemented here (moreover it has only a marginal effect on the Eurasian distribution).

	Virilocal – 0	Ambilocal – 0.5 Neolocal – 0.75	
Inheritance	Patrilineal – 0	Children daughters less – 0.5	Children equally – 1 Other matrilineal - 1

The data used for this is derived from a combination of three sources. First and foremost we use Murdock's *Ethnographic Atlas*. The atlas was featured in *Ethnology* from 1962 to 1980. In 1967 the data was compiled into a book. It contains data on 1267 societies for a wide range of characteristics. In each case the data is meant to represent the earliest possible observation for each society made by ethnographers (some economists therefore refer to the data as pre-industrial). These were then translated to country-level indicators by Jutta Bolt, using the Atlas Narodov Mira (Bolt 2012). The dataset used here is largely as classified by Murdock, with a number of corrections made on the basis of comparing his categorisations to those of Emmanuel Todd. This is only relevant for the domestic organisation and cousin marriage variables.

Using this index, the 'female-friendlyness' of family systems in Eurasia can be established: the more points a country scores on the range between 0 and 5, the more its institutions can be said to favour female agency. It is a bit arbitrary to weight all institutions in the same way, but it is highly transparent. Alternative ways of processing this information, via the estimation of a 'latent variable' 'constraints on female agency' (see Carmichael and Rijpma 2015) give almost identical results, but require more data, as a result of which less observations are available (the R2 between our female friendliness index and the 'constraints on female agency' estimated by Carmichael and Rijpma is .78). The results of the FFindex are presented in map 1, which shows that Europe to the west of the Hajnal line is clearly very 'female-friendly', but so is South-East Asia (in Carmichael and Van Zanden (2015) we present qualitative information confirming this pattern). When looking more closely, we find that in the other margins of the EurAsian landmass – in south India (Kerala is a famous case), Sri Lanka, Japan, and Mongolia, marriage systems also allow for female agency. The map below presents this visually at the country level for Eurasia.

Figure 1: Female-friendliness Index mapped for Eurasia



Shifting the focus to Europe we find, with the exception of Romania and Greece, the pattern is remarkably similar to the Hajnal line, with Poland, the Czech Republic and Austria displaying an intermediary pattern and the UK and the Netherlands, along with Italy and Spain attaining the highest scores. A somewhat similar 'patriarchy index' was constructed by Siegfried Gruber and Mikołaj Szoltyzek (2015); although the focus and methodology are rather different, constructed as it is of large micro-datasets concerning demographic behavior, measuring 14 different dimensions, such as 'familial behavior, including nuptiality and age at marriage, living arrangements, postmarital residence, power relations within domestic groups, the position of the aged, and the sex of the offspring'. Their results, which are however available for only 12 countries and can therefore not be used for the regressions shown below, demonstrate the same West-East gradient in patriarchy as was found in our reconstruction of the 'female friendly' index. Their results, averaged at the country level, correlate strongly, but obviously negatively, with our index (R2 = .53). Another check can be conducted using the correlation with current day measures of gender inequality. For this we use the Historical Gender Equality Index developed by Selin Dilli, Sarah Carmichael and Auke Rijpma (2015). This measure captures gender differences in life expectancy, labour force participation, infant mortality, educational attainment, marriage ages, and political participation. Again, our index is highly correlated with contemporary measures of gender inequality, although the correlation is far from perfect (R2=.33); Sweden, for example, is currently world leader in gender equality, but did not score very well on the female-friendly index.

The map above of the spatial distribution of the gender dimension of family systems in Eurasia seems to confirm our hypothesis. However in order to test this more rigorously we employed two different techniques. First, we established the distance of (the capital cities of) all countries to the three centers of the Neolithic Revolution in the Middle East, the Indus Valley and the Yellow River valley in China. On the basis of secondary literature, we selected three cities: Mosul in Iraq, Harappa in Pakistan and Xian in China to geographically represent the transition to agriculture in these three regions. We assumed that the further away a country was from the nearest center the more female friendly the family system would be. This is clearly demonstrated by the evidence for a group of the 47 countries for which we have these data (Figure 3).

The second test looks at the underlying mechanism: the process of ancient state formation following the Neolithic Revolution. These states first emerged in Mesopotamia, followed by Egypt, Northern India and Northern China, and then gradually spread to adjacent areas. The 'World History Atlas and Timelines since 3000 BC' by GeaCron presents maps per century of the changing boundaries of these ancient states (see the example for 500 BC). We reconstructed for each contemporary country if an ancient state existed on its territory between 3000 and 1 BC, and on that basis constructed an 'ancient state index' using the same method as the 'state antiquity index' by Putterman and Bockstette (3.1 version), which covers the 1-1950 AD period. All countries are scored per century (and before 1500 BC per half millennium) on the existence of a state, and these scores are added using a discount rate of 10% per century. States with old roots, such as Iraq, Egypt, India/Pakistan, and China, score (nearly) the maximum, whereas regions such as Scandinavia, South-East Asia and Japan, where states emerged or spread to after 1 AD, score zero. The result is presented below (figure 3). It is clear that all very ancient states have rather female-unfriendly family systems, and that the family systems with high levels of female agency are generally found in societies which did not have a state before 1 AD. Moreover, as might be expected, the correlation between the ancient state index and distance to the centers of the Neolithic revolution is high and significant (R2=. 46), confirming that state formation spread from the identified three centers (which is also obvious from the maps published by GeaCron).

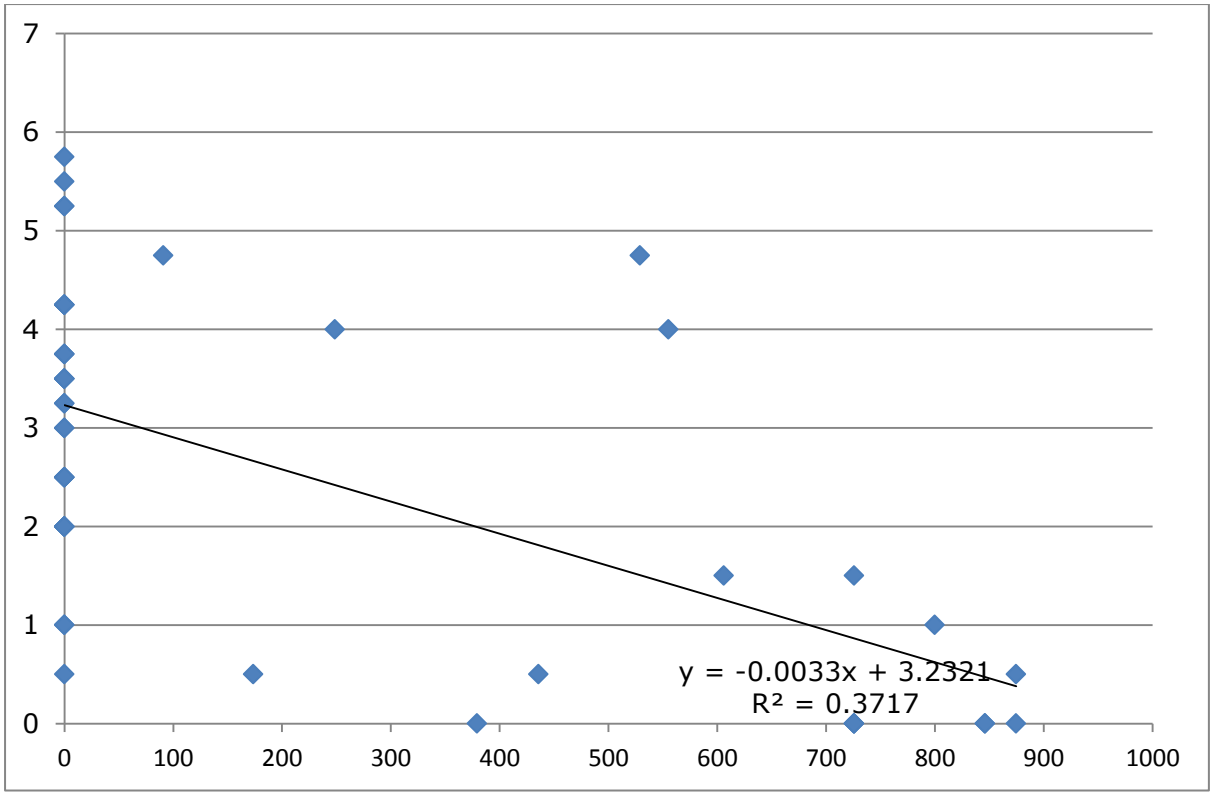


Figure 2. FFIndex (vertical axis) and Ancient state index (horizontal axis)

As the ancient state index is constructed in the same way as the state antiquity index by Putterman and Bockstette, we can link our data to theirs and construct a continuous series of 'state antiquity' running from 1 AD to the present. Does the link between the ff-index and state formation only relate to 'ancient states' (say before the rather arbitrary date of 1 AD), or does it persist over time? The extended state antiquity index for 1300 (again a rather arbitrary date) correlates much less closely with the ff-index (r2=.17), the 1800 version even less (r2=.09). If the state antiquity index is calculated without the ancient states from before 1 AD, then the correlation completely disappears. This suggests that the 'ancient states' originating before 1 AD are the ones negatively affected female agency, and that, for example, the spread of states in Europe following the Roman conquest, did not have similar long-term consequences.

Next we turn to a similar plot of the FFindex against distance to the nearest center of the Neolithic Revolution. Here we see the expected relationship; the further away a country is from the nearest center of the Neolithic Revolution the more scope there is for it to have female friendly family organisational features. Given the different manners in which the two variables are constructed the R^2 of 0.44 is high. We can observe that those societies closest to the centers of the Neolithic Revolution are the only ones to score a 0 on the female friendliness index. It is only as one moves away from these centers that higher scores can be observed.

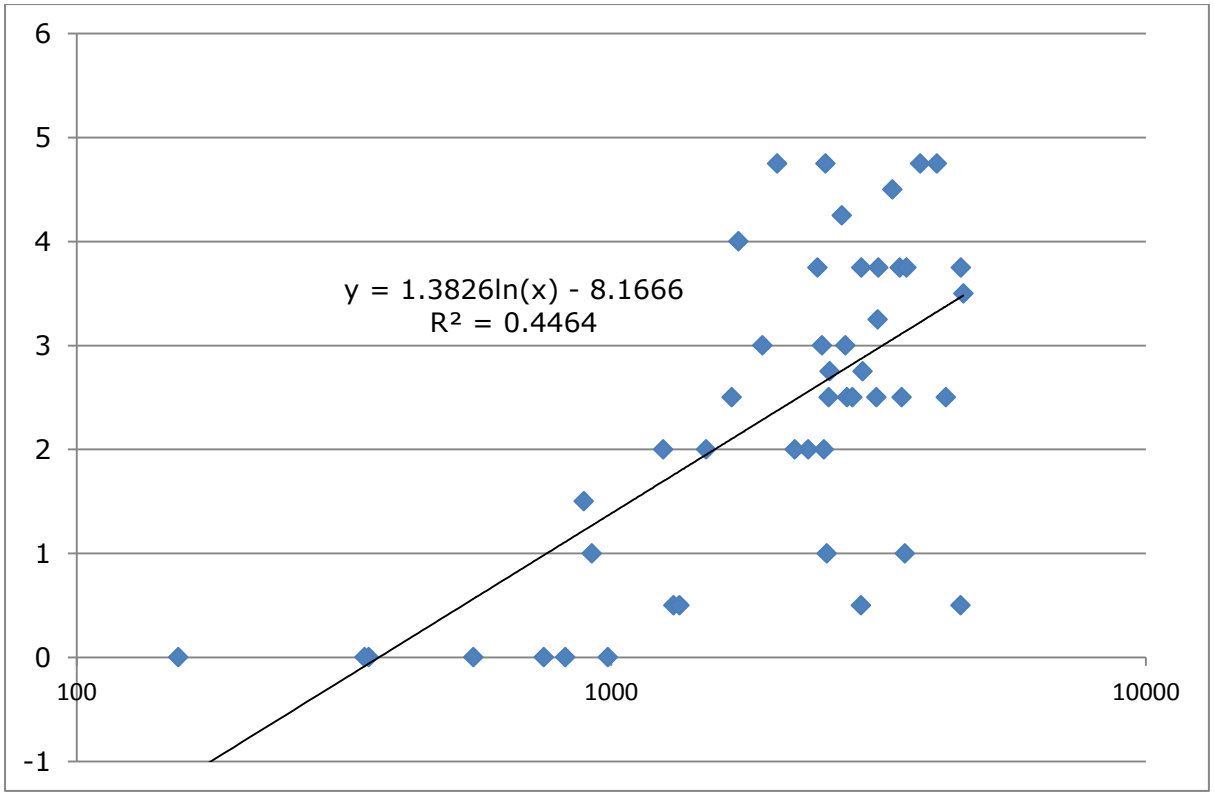


Figure 3 FFIndex (vertical axis) and Log of distance to nearest center of Neolithic Revolution

We can also correlate the FFindex with technology indices for 1000 BC, 0 AD and 1500 AD constructed by Comin, Easterly and Gong (2010); these indices reflect the degree of technological advancement of various parts of EurAsia in these years. There is a significant negative link between technology in 1000 BC and the FFindex, again confirming the fact that in the centers of ancient development female agency was severely constrained. This correlation becomes very weak in 0 AD, [5] and becomes positive for 1500, thereby anticipating the 'reversal of fortune' that we try to explain.

How does this explanation of the EurAsian distribution of family systems (very patriarchal near the centers of the NR and increasingly female-friendly towards its margins) compare with alternative explanations – for example taking religion into account? Adding religion to the regressions increases their explanatory power, but the link between the FFindex on the one hand and the ancient state index and the distance to the centers of the NR on the other hand remains intact. Adding control variables for climate and geography also does not change the links established (see the first stage regressions below).

Explaining the reversal of fortune

[5] But we have doubts about the scaling of most European countries at AD 0, which are all given the maximum score – even distant Finland or Norway gets a 1,0 value for that year, implying that it is as advanced as China or Egypt at that time; the R2 between FFindex and technology is: 1000 BC: .24, 0 AD: .03 and 1500 AD 0.12

We have so far established why and how a distinctive spatial pattern of institutions concerning the family and gender relations emerged in EurAsia, as a byproduct of the Neolithic revolution and the ensuing state formation. Our main argument in this section is that this spatial variation in gender related institutions had important consequences for the pattern of economic growth after say 1500 AD, and helps to explain the reversal of fortune that is a dominant feature of growth between 1500 and 2000.

In the current section we test this hypothesis empirically using Two Stage Least Square (2SLS) regression analysis. The second stage regresses the female friendliness index on per capita GDP of each country in our sample at different points in time: 1500, 1800, 1870, 1910, 1950 and 2000.

$$Ln\ Y_{it} = \alpha + \gamma_1 Z_{it} + F_i \beta + \varepsilon_{it}, \quad (1)$$

where $Ln\ Y_{it}$ denotes the log of per capita GDP in country i in century t, F_i is the female friendliness index of country i, Z_{it} is a vector of control variables which we introduce below, and ε_{it} is the error term.

In the first stage, F_i, the female friendliness index of country i, is instrumented by NR_i, the log of the distance to the nearest center of the Neolithic Revolution of country i.

$$F_i = \eta_1 Z_{it} + NR_i \lambda + \mu_i, \quad (2)$$

where Z_{it} is the same vector of control variables, and μ_i is the error term.

Next to testing for the relationship at various points in time, we evaluate our conclusions using a panel. Since the female friendliness index is time-invariant, as are many of our control variables, we estimate the relationship using Two-Stage Least-Squares Random Effects (2SLS/RE) models. All panel regressions include a full set of century dummies, and report on the robust standard errors.

We start with reporting the results from the basic OLS regressions. Results are shown in Table 2. Columns (1) to (6) restrict the sample to the points in time for which we have evidence on per capita GDP – i.e. 1500, 1800, 1870, 1910, 1950 and 2000. Columns (7) and (8) report the results following the panel regressions. Column (7) does so for all countries in the sample for which we have evidence on per capita GDP (unbalanced panel). Since some of the countries enter the sample later on, Column (8) only includes those countries for which we have estimates on per capita GDP throughout the whole period under consideration here (balanced panel).

The regression results illustrate a positive association between female friendly institutions and per capita GDP. A closer look to Columns (1) to (6) reveals that the coefficient on the FF index increases over time, indicating that the correlation between female friendly institutions and per capita GDP becomes stronger over the period 1500 and 2000, which is

exactly what we expect to happen during a 'reversal of fortune'. Similar conclusions emerge from the panel regressions reported in Columns (7) and (8): the coefficient on our female friendliness index has the expected sign, is highly significant at the 5% level and the link becomes stronger over time.

TABLE 2. OLS REGRESSIONS EXPLAINING PER CAPITA GDP, 1500-2000

We now evaluate the OLS regressions by instrumenting the female friendliness index with the log of the distance to the nearest center of the Neolithic Revolution. As expected, the results from the first stages in Table 3 show that the relationship is strong and robust: ca. 40% of the variation in female agency can be attributed to distance to the nearest centre of the Neolithic Revolution. The corresponding coefficients on female friendliness of the second stages are sometimes larger than those from the OLS regressions. This can probably be attributed to measurement error in the female friendly variable that is likely to bias the OLS coefficient downwards.[6]

TABLE 3. 2SLS REGRESSIONS EXPLANING PER CAPITA GDP, 1500-2000

The next step is to control for confounding factors. We first of all introduce a measure to capture geography, which is absolute latitude (measured as distance from the equator). This is to control for climatic influences as such: if the 'reversal of fortune' that we analyse is due to the temperate climate of more northern regions, this variable should pick this up. It is expected that countries close to the equator had relatively lower levels of per capita GDP. To account for trade potential we introduce the log of the coast-to-area measure (Sachs and Warner 1997). It is expected here that countries with relatively long coastlines were more likely to engage in (international) trade, which was arguably key to economic development after 1500 (and perhaps much less so before 1000). To capture any effects stemming from Malthusian dynamics, we include the land-labour ratio as a control variable. This measure takes the total share of cropland over total population (Klein Goldewijk ***). We expect it to be negatively correlated with per capita GDP, especially for those countries in our sample that made the transition to sustained growth in the 19th and 20th centuries, such as, amongst others, the Asian Tigers. Finally, we account for the effects stemming from ethnic fractionalisation by introducing one of the variables for linguistic fractionalization developed by Desmet et.al. (2012) (we use his ELF15 variable, and have conducted a number of robustness check with the alternative Elf1 variable). Table 4 reports on the regression results.

The obtained results from the first stage regressions report a positive correlation between the coast-to-area measure and the female friendliness index, which might, very tentatively, be related to openness (following the literature which argues that economic openness has consequences for the 'open society' at large, an idea that can be traced back to Popper). The

[6] As the female friendliness index is constructed from late 19th and early 20th century ethnographies this seems a plausible explanation.

coefficient on latitude is significant in columns (7) and (8) indicating that female friendly institutions were more secure the farther away the country is from the equator. To some extent this is what is to be expected: The Northern countries, on average, had more secure institutions favouring female agency than countries near the equator. Overall, there is still a strong significant relationship between distance to the nearest centres of the Neolithic Revolution and our female friendliness index. The corresponding second stage results illustrate a strong link between female friendly institutions and economic outcomes: The coefficient on the female friendliness index enters with the correct sign and is highly significant in all of the regressions, and again increases over time. There is no effect from trade potential on per capita GDP, but there is a negative association between latitude and per capita GDP indicating that economic performance was worse in countries close to the equator. The land/labour ratio shows the expected sign, but is paradoxically only significant towards the end of the period. Ethnic fractionalisation does not seem to matter here, and the coefficient has a positive sign, which is unexpected (if we use the Elf1 variable the sign is still positive but the coefficient is never significant).

TABLE 4. 2SLS REGRESSIONS EXPLANING PER CAPITA GDP, 1500-2000: CONTROLLING FOR CONFOUNDING FACTORS

As a final step we account for the effect of religion. We add four religion variables to the regressions. Christianity was arguably a 'female friendly' religion, in particular Medieval Catholicism (with its doctrine of marriage based on consensus) (De Moor and Van Zanden 2011), and Protestantism, following Weber's famous theory, was favourable for economic growth; it may also have affected the development (or consolidation) of female friendly institutions, but we return to this point below. Similarly, the literature has argued that economic growth was lower in Islamic countries than in non-Islamic countries (***), and that Islam coexisted with institutions which were not particularly female-friendly. We finally test for a positive link between Buddhism and religion (for reasons outlined below). Table 5 shows the regression results.

*** Table 5 IV Regressions and first stages: controlling for religion *****

These religion variables clearly change the found relationships, as the link between the FFindex and GDP is now in almost all cases not significant anymore (except for a weak link in 2000). Catholicism and Protestantism is strongly correlated with GDP in almost all regressions. Moreover, in the first stage, Islam is strongly negatively correlated with the FFIndex, and Buddhism, Catholicism and Protestantism is in some specifications (1500, and the panel data) positively related to gender friendly family systems.Our explanation is as follows. 1. The family systems that emerged during the millennia following the NR are in general older than (most) religions (Hinduism may be the exception here); 2. That religions therefore perhaps did not create new gender relations and family related institutions, but

adapted to them, perhaps consolidated existing practices by legitimizing them religiously 3. Our data reveal that Buddhism and Christianity are clearly positively correlated with the FFindex, and Islam (and Confucianism and Hinduism) negatively 4. The original message of Buddha and Jezus may have been relatively 'female friendly', but this did not fundamentally change family institutions in the regions where they emerged (Northern India, Middle East), but they eventually migrated – were more generally accepted – in other regions where family systems were already more female friendly (such as Sri Lanka, South East Asia, Mongolia, and Western Europe) 5. But religions also adapted to the family systems in which they further developed – the Medieval doctrine of consensus marriage was an important 'invention' for the Latin West, and Protestantism eventually took root in those parts of Western Europe (Scandinavia, Northern Germany, North Sea area) where female agency was greatest. This all suggests, perhaps, that the basic spatial structure of family systems was determined by the evolution of the NR and of the urban revolution that followed, but that different parts of EurAsia adopted religions – female friendly or more patriarchal – which fitted the pre-existing family systems, thereby reinforcing and consolidating the spatial differences found. In other words, religion is an 'intermediate' factor, which may have played a role in stabilizing and legitimizing the value systems on which different family systems were based. This explains why it is sometimes so highly correlated with the FFindex and, less often, with GDP growth.

Overall the results presented here are indicative of a strong relationship between balanced power relations at the micro level and economic development between 1500 and 2000. We have shown that this result is robust to controlling for several cofounding factors, such as, amongst others, geography and trade potential.

Conclusion

This paper sheds new light, we think, on the character of long-term economic development in EurAsia. It is possible to distinguish two different phases of development, a first process of 'ancient' economic and political development, and a second stage of 'modern' economic and institutional growth. During the first stage, which was concentrated in and near the centers of the Neolithic Revolution, development resulted in – co-evolved with – the creation of hierarchical structures, both at the level of the state and at the micro level. Development and inequality went hand in hand. The EurAsian economy as a result was characterized by a large band of (strong)states, high levels of urbanization and relatively intense international trade stretching from the Mediterranean to the Yangze Delta. This created the spatial structure of family systems and gender relations we mapped in this paper (see Figure 1).

Growth after 1500 was fundamentally different to growth before 1500: it started and was most intense in the margins of the EurAsian continent, in regions with relatively low levels of patriarchy, in Western Europe and Japan. Growth was not based on the creation of large hierarchical structures subjugating the working population, on 'extractive institutions, but on 'bottom up' processes of market participation and investment in human capital (by households), which required radically different, inclusive institutions. The margins of EurAsia, where the hierarchization of the previous millennia had not occurred, were much better placed for this second stage of growth. Here we find most intense forms of pre-industrial growth (in the North Sea area), followed by the industrial revolution and the 'Great

Divergence'. Our explanation for this 'reversal of fortune' is a combination of the gendered North hypothesis and the gendered Becker hypothesis, but at this point we can only demonstrate that female friendly institutions appear to have mattered for long-term economic success in EurAsia after 1500. Which mechanisms translated female agency into growth cannot easily be established at the level of EurAsia as a whole, but we have suggested elsewhere – in case studies of the economic and demographic effects of the European Marriage Pattern for example – which mechanisms may have played a role.

Our analysis also helps to explain the persistent regional differences in family systems and gender relations, and argues that their roots are to be sought in the differential impact of the first stage of economic development. Moreover, the persistence of these institutions in the heartland of EurAsia hindered their economic modernization. The reversal of fortune within EurAsia is in the end explained by this interplay of geographic and institutional factors – such as distance to the centers of the NR, the institutions that emerged in the core and in the margins of the Continent.
We have also speculated about the 'intermediate' role of religion in this analysis.
Finally, we were able to test a specification of the more general hypothesis about the effect of female agency (at the micro level of the family and the household) on economic development, and found strong evidence that women do matter. In conclusion differences in the position of women within family systems help to explain the Little Divergence and the Great Divergence.

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APPENDIX

As a robustness check, we have tested the validity of our instrument – i.e. distance to the nearest centre of the Neolithic Revolution. Olson and Paik (2015) have found a strong relationship between years since transition to agriculture and levels of per capita GDP so it might well be that there is a positive direct relationship between distance to the nearest centre of the Neolithic Revolution and per capita GDP. To test for this possibility, we relate our instrument to levels of economic development. Table *** reports on the results.

Columns (1) and (3) illustrate a strong positive association between distance to the nearest centre of the Neolithic Revolution and levels of per capita GDP. However, when we include our female friendliness index in Columns (2) and (4) the positive effect disappears, indicating that the effect runs via female agency.

*** TABLE *** WITH IV REGRESSIONS INCLUDING FFINDEX AND LOG OF DISTANCE TO NR ***

TABLE 2: OLS REGRESSIONS

	(1) 1500	(2) 1800	(3) 1870	(4) 1910	(5) 1950	(6) 2000	(7) PanelU	(8) PanelB
ffindex	0.0986***	0.139***	0.179***	0.203***	0.192***	0.320***	0.196***	0.292***
	(4.66)	(3.88)	(3.92)	(3.86)	(2.74)	(3.71)	(7.78)	(12.41)
year== 1500							0	-1.123***
							(.)	(-7.58)
year== 1800							-0.120	-1.061***
							(-1.43)	(-7.69)
year== 1870							0.134	-0.739***
							(1.45)	(-5.32)
year== 1910							0.548***	-0.315**
							(5.40)	(-2.13)
year== 1950							0.738***	0
							(5.94)	(.)
year== 2000							1.950***	1.333***
							(13.32)	(7.18)
Constant	6.468***	6.258***	6.420***	6.778***	6.992***	7.918***	6.245***	7.150***
	(137.46)	(93.94)	(80.10)	(68.32)	(47.58)	(39.14)	(74.99)	(52.10)
r2	0.322	0.283	0.257	0.245	0.122	0.209	0.584	0.806
r2a								
N	25	42	47	47	54	54	269	150

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

TABLE 3: IV REGRESSIONS AND FIRST STAGES (GDP dependent vaiable)

	(1) 1500	(2) 1800	(3) 1870	(4) 1910	(5) 1950	(6) 2000	(7) PanelU	(8) PanelB
ffindex	0.0759***	0.133***	0.243***	0.288***	0.377***	0.553***	0.285***	0.317***
	(3.03)	(3.91)	(4.66)	(4.76)	(4.13)	(5.17)	(8.83)	(10.55)
year== 1500							0	-1.123***
							(.)	(-7.44)
year== 1800							-0.123	-1.061***
							(-1.16)	(-7.63)
year== 1870							0.130	-0.739***
							(1.17)	(-5.36)
year== 1910							0.544***	-0.315**
							(4.64)	(-2.15)
year== 1950							0.741***	0
							(5.40)	(.)
year== 2000							1.954***	1.333***
							(12.65)	(7.35)
Constant	6.519***	6.273***	6.270***	6.580***	6.579***	7.398***	6.043***	7.094***
	(143.29)	(87.90)	(53.34)	(47.20)	(30.06)	(27.45)	(53.44)	(50.29)
r2	0.305	0.282	0.224	0.202	0.00940	0.0985	0.565	0.805
r2a								
N	25	42	47	47	54	54	269	150

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

BASELINE REGRESSION: IV, CORRESPONDING FIRST STAGES (On FFindex)

	(1) 1500	(2) 1800	(3) 1870	(4) 1910	(5) 1950	(6) 2000	(7) PanelU	(8) PanelB
lndistancenr	1.583***	1.379***	1.359***	1.359***	1.370***	1.370***	1.397***	1.583***
	(6.30)	(6.19)	(6.21)	(6.21)	(6.53)	(6.53)	(15.75)	(15.71)
year== 1500							0	-4.17e-16
							(.)	(-0.00)
year== 1800							-0.113	-3.86e-16
							(-0.41)	(-0.00)
year== 1870							-0.0963	-3.91e-16
							(-0.36)	(-0.00)
year== 1910							-0.0963	-3.82e-16
							(-0.36)	(-0.00)
year== 1950							-0.154	0
							(-0.60)	(.)
year== 2000							-0.154	-4.27e-16
							(-0.60)	(-0.00)
Constant	-9.636***	-8.205***	-8.043***	-8.043***	-8.178***	-8.178***	-8.234***	-9.636***
	(-4.99)	(-4.98)	(-4.96)	(-4.96)	(-5.28)	(-5.28)	(-11.82)	(-12.12)
r2	0.682	0.417	0.398	0.398	0.400	0.400	0.433	0.682
r2a								
N	25	42	47	47	54	54	269	150

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

TABLE 4: IV REGRESSIONS AND FIRST STAGES: CONTROLLING FOR TRADE, MALTHUSIAN FORCES, GEOGRAPHY AND ETHNIC FRACTIONALISATION (ELF 15)

	(1) 1500	(2) 1800	(3) 1870	(4) 1910	(5) 1950	(6) 2000	(7) PanelU	(8) PanelB
ffindex	0.128**	0.0929**	0.218***	0.260***	0.301***	0.365***	0.202***	0.218***
	(2.16)	(2.32)	(3.08)	(3.07)	(2.70)	(2.88)	(4.95)	(4.88)
lnlandlabour	-0.0535	0.0976	-0.141	-0.0632	0.150	-1.651*	-0.304*	-0.178
	(-0.25)	(0.52)	(-0.48)	(-0.17)	(0.30)	(-1.73)	(-1.89)	(-1.16)
lncoast	-0.0000483	0.0544	-0.0302	-0.0649	0.0205	0.130	0.0278	-0.00442
	(-0.00)	(1.29)	(-0.55)	(-0.97)	(0.27)	(1.46)	(0.89)	(-0.12)
latitude	-0.259	1.669***	2.054***	2.314***	3.327***	3.459***	2.569***	2.262***
	(-0.40)	(4.52)	(3.96)	(4.06)	(4.79)	(3.75)	(8.96)	(3.96)
elf15	0.284	0.557**	0.404	0.305	0.492	-0.0668	0.375**	0.381*
	(0.97)	(2.66)	(1.61)	(1.12)	(1.56)	(-0.14)	(2.55)	(1.83)
year== 1500							0	-1.085***
							(.)	(-7.39)
year== 1800							0.00412	-1.041***
							(0.03)	(-8.40)
year== 1870							0.233*	-0.725***
							(1.94)	(-6.41)
year== 1910							0.644***	-0.305**
							(5.26)	(-2.52)
year== 1950							0.871***	0
							(6.41)	(.)
year== 2000							2.044***	1.307***
							(12.68)	(8.04)
Constant	6.444***	5.309***	5.427***	5.708***	5.118***	6.583***	4.979***	6.169***
	(22.05)	(22.09)	(17.98)	(16.48)	(13.11)	(15.06)	(24.28)	(20.87)
r2	0.393	0.592	0.542	0.561	0.441	0.521	0.718	0.843
r2a								
N	25	42	47	47	53	53	267	150

IV REGRESSION: ADDING GEOGRAPHICAL CONTROLS AND ELF15, CORRESPONDING FIRST STAGES

	(1) 1500	(2) 1800	(3) 1870	(4) 1910	(5) 1950	(6) 2000	(7) PanelU	(8) PanelB
lndistancenr	1.549***	1.245***	1.220***	1.215***	1.251***	1.293***	1.292***	1.614***
	(4.66)	(4.67)	(4.53)	(4.50)	(4.99)	(5.06)	(12.19)	(12.51)
lnlandlabour	0.993	-0.362	-0.457	-0.577	-1.412*	-0.697	-0.405	0.493
	(1.41)	(-0.38)	(-0.49)	(-0.57)	(-2.00)	(-0.55)	(-1.13)	(1.64)
lncoast	0.244	0.384***	0.315**	0.312**	0.233*	0.260**	0.294***	0.218***
	(1.43)	(2.88)	(2.46)	(2.45)	(1.99)	(2.15)	(5.81)	(3.49)
latitude	2.124	2.732*	2.547*	2.499*	2.027*	1.971*	2.366***	2.587**
	(0.79)	(1.86)	(1.81)	(1.86)	(1.92)	(1.74)	(4.39)	(2.47)
elf15	2.606**	2.069***	1.661**	1.668**	1.251*	1.293*	1.681***	2.689***
	(2.43)	(2.74)	(2.20)	(2.24)	(1.76)	(1.72)	(5.50)	(6.66)
year== 1500							0	-0.114
							(.)	(-0.45)
year== 1800							-0.0249	-0.0642
							(-0.10)	(-0.26)
year== 1870							0.0129	-0.0460
							(0.05)	(-0.19)
year== 1910							0.00866	-0.0361
							(0.03)	(-0.15)
year== 1950							0.0370	0
							(0.15)	(.)
year== 2000							-0.0230	0.0729
							(-0.09)	(0.29)
Constant	-12.42***	-9.766***	-9.119***	-9.019***	-8.459***	-9.187***	-9.593***	-12.72***
	(-6.24)	(-5.07)	(-4.57)	(-4.39)	(-4.12)	(-4.61)	(-11.63)	(-16.19)
r2	0.785	0.560	0.509	0.511	0.523	0.496	0.538	0.771
r2a								
N	25	42	47	47	53	53	267	150

Table 5 IV Regressions and first stages: controlling for religion

Second Stage

	(1) 1500	(2) 1800	(3) 1870	(4) 1910	(5) 1950	(6) 2000	(7) PanelU	(8) PanelB
ffindex	0.197	-0.107	0.0433	0.0647	0.203	0.420*	0.0708	-0.120
	(0.73)	(-1.50)	(0.73)	(0.80)	(1.55)	(1.91)	(1.05)	(-0.24)
religioncath	-0.00527	0.00820***	0.00883***	0.00937***	0.0107***	0.00972**	0.00943***	0.0177
	(-0.52)	(3.02)	(4.40)	(4.06)	(3.56)	(2.24)	(6.92)	(1.02)
religionmuslim	-0.00207	-0.00200	0.00253	0.00247	0.00797**	0.00830	0.00265	0.00398
	(-0.85)	(-0.82)	(1.29)	(0.88)	(2.49)	(1.43)	(1.38)	(1.29)
religionprot	-0.00622	0.00924***	0.0115***	0.0131***	0.0182***	0.0159***	0.0128***	0.0201
	(-0.65)	(3.13)	(5.05)	(5.26)	(6.88)	(3.99)	(9.07)	(1.26)
religionbuddh	-0.00750	0.00181	-0.000654	-0.00137	-0.00541	-0.00575	-0.00224	0.0119
	(-1.06)	(0.67)	(-0.30)	(-0.46)	(-1.17)	(-0.72)	(-1.11)	(0.99)
year== 1500							0	-1.123***
							(.)	(-7.73)
year== 1800							0.0532	-1.061***
							(0.44)	(-8.42)
year== 1870							0.338***	-0.739***
							(2.91)	(-6.32)
year== 1910							0.752***	-0.315**
							(6.33)	(-2.61)
year== 1850							0.982***	0
							(7.78)	(.)
year== 2000							2.194***	1.333***
							(14.72)	(8.32)
Constant	6.655***	6.478***	6.274***	6.607***	6.329***	7.104***	5.849***	6.856***
	(33.13)	(33.20)	(37.21)	(27.65)	(20.21)	(12.34)	(28.52)	(25.83)
r2	0.455	0.456	0.701	0.695	0.702	0.492	0.764	0.821
r2a								
N	25	42	47	47	54	54	269	150

First Stages

	(1) 1500	(2) 1800	(3) 1870	(4) 1910	(5) 1950	(6) 2000	(7) PanelU	(8) PanelB
lndistancenr	0.246	0.664***	0.678***	0.678***	0.682***	0.682***	0.677***	0.246***
	(1.38)	(3.88)	(4.07)	(4.07)	(4.43)	(4.43)	(10.24)	(3.74)
religioncath	0.0279***	0.00577	0.00412	0.00412	0.00461	0.00461	0.00530**	0.0279***
	(4.86)	(0.94)	(0.86)	(0.86)	(1.00)	(1.00)	(2.57)	(13.15)
religionmuslim	-0.00649**	-0.0246***	-0.0255***	-0.0255***	-0.0232***	-0.0232***	-0.0237***	-0.00649***
	(-2.49)	(-4.67)	(-6.24)	(-6.24)	(-6.02)	(-6.02)	(-13.61)	(-6.73)
religionprot	0.0253***	0.00345	0.00210	0.00210	0.00262	0.00262	0.00321	0.0253***
	(4.35)	(0.55)	(0.42)	(0.42)	(0.53)	(0.53)	(1.49)	(11.78)
religionbuddh	0.0172***	0.00557	0.00454	0.00454	0.00418	0.00418	0.00454	0.0172***
	(3.59)	(0.66)	(0.64)	(0.64)	(0.69)	(0.69)	(1.58)	(9.70)
year== 1500							0	-5.41e-17
							(.)	(-0.00)
year== 1800							0.0216	-6.64e-17
							(0.11)	(-0.00)
year== 1870							0.00909	-4.71e-17
							(0.05)	(-0.00)
year== 1910							0.00909	-4.52e-17
							(0.05)	(-0.00)
year== 1950							0.0343	0
							(0.19)	(.)
year== 2000							0.0343	-7.33e-17
							(0.19)	(-0.00)
Constant	-1.065	-2.419*	-2.439*	-2.439*	-2.521**	-2.521**	-2.537***	-1.065***
	(-1.04)	(-1.99)	(-1.96)	(-1.96)	(-2.18)	(-2.18)	(-5.24)	(-2.70)
r2	0.876	0.761	0.737	0.737	0.747	0.747	0.754	0.876
r2a								
N	25	42	47	47	54	54	269	150